Appendix C

Proposed Conceptual Mitigation Plan
South Hallsville No. 1 Mine
Rusk Permit Area

U.S. ARMY CORPS OF ENGINEERS

PROPOSED CONCEPTUAL MITIGATION PLAN

APPLICATION FOR DEPARTMENT OF THE ARMY INDIVIDUAL PERMIT

South Hallsville No. 1 Mine – Rusk Permit Area

USACE Project No. SWF-2007-00560

January 28, 2010

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SOUTH HALLSVILLE NO. 1 MINE – RUSK PERMIT AREA

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SOUTH HALLSVILLE NO. 1 MINE – RUSK PERMIT AREA

PROPOSED CONCEPTUAL MITIGATION PLAN

1.0 BACKGROUND

The Sabine Mining Company (Applicant), a subsidiary of North American Coal, operates the South Hallsville No. 1 Mine and the South Marshall Mine in northeast Texas. Mined lignite (coal) fuels the Southwestern Electric Power Company (SWEPCO) Henry W. Pirkey power plant in Harrison County, Texas. The Applicant proposes to expand the South Hallsville No. 1 Mine south across the Sabine River to include the proposed Rusk Permit Area. This proposed conceptual mitigation plan is submitted as **Attachment J** and is part of an Application for Department of the Army Individual Permit provided to the Fort Worth District of the Army, Corps of Engineers (USACE) to initiate the process for approval to impact waters of the United States (U.S.), including wetlands, under Section 404 of the Clean Water Act.

Additional detailed background information is contained in a separate permit application for a Surface Mining and Reclamation Permit for the Rusk Permit Area that was submitted to the Railroad Commission of Texas (RCT) Surface Mining and Reclamation Division in May 2009. The RCT permit application details mining for a five-year permit term. The RCT has not approved the permit application; however, it is anticipated that the application will be approved in late 2010 or early 2011. All subsequent references to the RCT permit application refer to the aforementioned document.

Note that cross-references to the 2008 mitigation regulations (FR Vol. 73, No. 70, Thursday, April 10, 2008) are noted throughout the document in section titles or with brackets at specific paragraphs. These cross-references direct the reader to document information corresponding to specific regulatory requirements.

2.0 GOALS AND OBJECTIVES [332.4(c)(2)]

The goal of the Applicant's Proposed Conceptual Mitigation Plan (PLAN) is to provide a comprehensive overview of planned efforts to provide mitigation (including compensatory mitigation) for adverse impacts to waters of the U.S., including wetlands, at the Rusk Permit Area. This goal is supported by the following objectives:

Objective 1: Vegetation will be established within and around reclaimed areas that will be designated as waters of the U.S., including wetland areas, to minimize erosion and provide sediment retention equal to or better than surrounding non-impacted areas.

Objective 2: Establishment of (and with increased acreage when possible) vegetative corridors (associated habitat buffers), adjacent to replaced streams, with plant communities comparable to those which existed prior to mining.

Objective 3: Restoration of or improvement to, as appropriate, aquatic functions of stream channels. Functions to be restored include floodwater transport and habitat elements (e.g., pools similar to premine conditions in intermittent streams), while sediment transport mechanisms will be improved through reduction of erosion in the reclaimed watershed.

Objective 4: In the future, if necessary to meet mitigation requirements, applicant will work toward providing off-site mitigation by enhancement, restoration, or preservation of previously-impacted bottomland hardwoods, wetlands, and associated aquatic resources and buffer areas, by modifying land use of an off-site property.

In addition, the following project objectives are noted to support the overall goal of the PLAN.

- In accordance with the 2008 mitigation regulations (dated April 10, 2008), the PLAN will provide for a sequential mitigation process of avoidance, minimization, and compensation.
- The PLAN will provide appropriate offset for adverse mining impacts that result in unavoidable permanent and temporary losses of aquatic functions and values and will ensure those losses result in minimal adverse effects on the aquatic environment [332.3(a)(1) and 332.3(m)].
- The PLAN will provide adequate mitigation to meet the requirements addressed in sections 332.3(f) and 332.4(c)(6).
- PLAN development will follow the USACE Regulatory Guidance Letter 02-2 dated December 24, 2002; Mitigation Guidelines developed by the Fort Worth District Regulatory Program, Draft - December 24, 2003; and new mitigation regulations published in the Federal Register dated April 10, 2008.
- The PLAN follows applicable sections of the RCT permit application to support the Memorandum of Understanding Among The U.S. Army Corps of Engineers, The U.S. Office of Surface Mining, The U.S. Environmental Protection Agency, and the U.S. Fish and Wildlife Service For The Purpose of Providing Concurrent and Coordinated Review and Processing of Surface Coal Mining Applications Proposing Placement of Dredged and/or Fill Material in Waters of the United States.

- The PLAN provides specific information in regard to mining at the Rusk Permit Area in relation to: (1) avoidance and minimization of impacts, (2) reclamation actions that create mitigation, (3) temporal loss, (4) mitigation for adverse impacts to streams and wetlands, (5) detailed methodologies for creation, restoration, enhancement, and preservation, (6) revegetation strategies, and (7) protection of aquatic environments [332.3(a)(3)].

2.1 Mitigation

Applicant proposes to provide mitigation (including compensatory mitigation) for adverse impacts to waters of the U.S. by creating, enhancing, restoring, or preserving waters of the U.S. at the ratios shown in **Table 1**. The total acreage of mitigation required to satisfy authorization requirements, with USACE approval, may be in-kind or out-of-kind in reclaimed areas of the mine to meet specific requirements; and may in the future include additional compensatory mitigation at an off-site location. On-site mitigation areas will be within the mine boundary approved by the RCT. No mitigation will be outside the RCT permit boundary without RCT and USACE approval. Mitigation may result from either: (1) creation, (2) restoration, (3) enhancement, or (4) preservation (with USACE approval).

TABLE 1

Proposed Mitigation Ratios for the Proposed Rusk Permit Area

Waters of the U.S.	Mitigation Ratios*	Compensatory Mitigation Ratios*	Composite** Mitigation Ratios*
Forested wetlands	1.0 to 1.0	1.0 to 1.0	2.0 to 1.0
Non-forested wetlands	1.0 to 1.0	0.5 to 1.0	1.5 to 1.0
Ponds	1.0 to 1.0	---	1.0 to 1.0
Streams	1.0 to 1.0	---	1.0 to 1.0

Notes:

* Ratios in the table above represent acres of mitigation to acres of impact. For example, a 1.5 to 1.0 ratio is expressed as 1.5 acres of mitigation required for 1.0 acre of impact.

** Composite ratios include both mitigation and compensatory mitigation.

Basis for Mitigation Ratios

Criteria used to determine the proposed mitigation and compensatory mitigation ratios include: (1) assessment of the quantity and quality of jurisdictional waters impacted by temporary and permanent adverse impacts to waters of the U.S., including wetlands, for the entire life of the mine, (2) temporary versus permanent impacts, (3) the types of mitigation practices used to provide environmental "lift", and (4) local threats to adjacent properties and the aquatic environment.

Mitigation ratio requirements for adverse mining impacts will ultimately follow ratios approved by the USACE Fort Worth District upon issuance of the Individual Permit for the Rusk Permit Area. The ratios proposed in Table 1 are appropriate for these sites and are based on the following:

- Temporal loss of function is minimized by contemporaneous reclamation in a manner compliant with RCT and Surface Mining Control and Reclamation Act (SMCRA) regulatory requirements.
- The proposed establishment (creation and restoration) of adequate acres of higher-quality forested and non-forested (emergent) wetlands that provide “environmental lift” when compared with premine conditions.
- An assessment of premine hydrologic resources with the understanding that with limited premine hydrology, there will be, in most situations, limited postmine hydrology to support higher ratios (e.g., substantially increased wetlands or drainage features).

Mitigation Planning and Projected Results

The Proposed Conceptual Mitigation Plan, **Attachment J** of this document, provides detailed methodologies related to mine, reclamation, and mitigation planning used by The Sabine Mining Company to create, enhance, restore, or preserve aquatic resources (including wetlands and stream channels). Additional site-specific information is provided in this section to show projected mitigation results.

Reclamation and resulting mitigation will provide an abundance of mitigation acreage and linear feet of stream channels to satisfy mitigation requirements when compared to the quantity and function of premine waters of the U.S. that can potentially be adversely impacted by mine operations. Mitigation areas will be functional, provide offsets above and beyond impacts, and provide ecological lift to local and regional watersheds and aquatic environments.

Table 2 provides projected outcomes of reclamation and mitigation efforts on the mine. These results are one outcome of mine planning and modeling efforts that predict the final contour of the land and resulting drainage patterns and associated water features. Other reclamation activities, based on this same data, include

planning for postmine forestry and pastureland land use areas and other RCT approved land uses. Mitigation areas fit within these land uses and are advantaged by increased water features as compared to premine conditions.

TABLE 2

Projected Outcomes of Mitigation Efforts

Projected Outcome by Category of Waters of the U.S.	Pre-Impact Quantities of Waters of the U.S. (ac)	Projected Adverse Impacts within the Initial Five-Year Area (ac)	Projected Mitigation[1] (ac)
Forested wetlands	389.7	53.3	106.6
Non-forested wetlands[2]	128.3	28.4	42.6
Ponds	223.8	11.4	11.4
Streams[3]	185.5	9.6*	9.6

* Approximately 69,392 linear feet.

Table 2 Notes:

1. Projected mitigation outcomes are estimated on a 2:1 ratio for forested wetlands, a 1.5:1 ratio for non-forested wetlands, a 1:1 ratio for stream channels, and a 1:1 ratio for ponds.
2. Category includes emergent wetlands and other non-forested wetlands. Examples might include constructed shallow water areas adjacent to stream channels, constructed shallow water areas incorporated in pond designs to create waters < 6.6 feet in depth, or water-holding depressions formed in other land uses.
3. Based on past practice and regulatory requirements, reclaimed stream channels will be sized to meet RCT regulatory requirements. This necessitates a wide channel. Other small stream channels feeding into the above-mentioned stream channels will be created by reclamation; however, at this point in the process, projecting this quantity of linear feet is not practical.

Note 3 above, related to **Table 2**, acknowledges that additional, smaller stream channels will be created by reclamation activities, and history shows that many small stream channels exist and function in a similar fashion to premine ephemeral stream channels. These stream channels are sized as reclamation develops and are designed to move water within small, local watersheds. Watershed size and other RCT regulatory requirements will dictate if the stream channel requires detailed design versus “in the field” construction through the typical leveling and reclamation process. **Figures 1, 2, and 3** in this Proposed Conceptual Mitigation Plan provide cross-section views of typical configurations for bankfull channels designed for low and medium flows inside wide channels. Wide channels with internal bankfull channels combined with wetlands provide stable systems that mimic or enhance premine conditions (fluvial geomorphology). Many smaller stream channels will be included in habitat areas and as a result will be revegetated to include riparian habitat. Review of postmine contours show many areas where smaller stream

channels will collect overland flow and channel this water to impoundments and larger reclaimed stream channels.

Section 4.4 of this Proposed Conceptual Mitigation Plan provides details regarding revegetation of reclaimed areas, including wetlands, riparian areas, and adjacent uplands. Included are projected revegetation species. Additional species may be proposed in the future as revegetation lists are amended and approved by the RCT, TPWD, and USACE.

2.2 Other Considerations

In accordance with the 2008 mitigation regulations, the Applicant's activities and ancillary non-mining, non-RCT regulated activities (such as oil and gas activities, and pipeline and utility relocations) are planned to avoid and minimize, to the extent practicable, adverse impacts to waters of the U.S., including wetlands. Some adverse impacts (both direct and indirect) are expected and understandable based on mining methods, the location of the mine, and types of ancillary impacts. Mining operations and ancillary activities within waters of the U.S., including wetlands, that cannot be avoided, are addressed with mitigation activities through the overall reclamation planning effort. Reclamation efforts consider the entire area in a holistic manner and focus on reestablishing pre-mining hydrogeomorphic conditions when possible. Uplands, wetlands, streams, and open water are considered together to protect local and regional watersheds and aquatic environments [332.3(b)(1) and 332.3(c)(1), (2) and (3)].

Temporal loss of wetland and other aquatic ecosystem functions are considered in the reclamation planning process to allow (1) adequate replacement of functions and (2) creation or enhancement of the required quantity of acreage with and including other physical characteristics in accordance with USACE requirements. At some locations, mitigation may exhibit higher functional value than impacted premine conditions. More or less acreage or stream length may then be required for mitigation depending on whether the mitigation efforts result in higher or lower quality ecosystem function(s). An important factor is the general focus toward restoring or enhancing the function of the local aquatic ecosystem.

Mitigation activities will be concurrent with authorized impacts when feasible; however, due to the large scale, complexity, and sequential manner in which mines operate, some mitigation activities will occur after impacts have taken place. The PLAN considers the above factors in conjunction with the associated temporal loss of functions [332.3(b)(5) and 332.3(m)].

Based on SMCRA and RCT requirements that mined lands must be reclaimed, and for impacts to waters of the U.S. to be mitigated on-site (to the extent that is practicable), Applicant plans to provide compensatory mitigation on-site by reclamation activities (permittee-responsible mitigation); and with the future option of providing some part of the compensatory mitigation via an off-site, Applicant-owned

mitigation area. On-site compensatory mitigation will incorporate elements that take into account local and regional watersheds and aquatic environments. This approach, absent a local watershed plan, ensures the ultimate goal of maintaining, and likely improving, the quality and quantity of aquatic resources within the local watershed will be accomplished [332.3(b)(4) and 332.3(c)(1)].

The use of a significant volume of "entrepreneurial" mitigation bank credits is not proposed in this PLAN. Although mitigation bank credits may be available in the region, the use of credits is not feasible due to the potential volume of credits that would be necessary and the cost per credit based on current mitigation bank pricing [332.3(b)(2)].

3.0 BASELINE INFORMATION [332.4(c)(5)]

Mine Specific

Extensive site specific baseline information is not detailed in the PLAN. Details related to specific baseline information and adverse impacts are located in applicable Individual Permit sections and the RCT [Surface Mining Control and Reclamation Act (SMCRA)] permit application. These documents provide extensive environmental data regarding cultural resources, soils, vegetation, aquatic environments, wetlands, fish and wildlife resources, land uses, and threatened and endangered species. This documentation forms the basis of site specific mitigation planning, but is not duplicated due to the volume of information, the large areas impacted by mining and associated mine activities, the dynamic nature of mine planning and operations, and the potential lengthy time frames of adverse mine impacts.

The PLAN and projected outcome (mitigation) will be compatible with historic and current agricultural land uses. Historic land uses included use of the area for silviculture and agriculture—mainly related to timber and crop production, and later for livestock operations. Mitigation created by reclamation of mined lands will be compatible with historic land uses by correcting past impacts to riparian habitats. Similarly, this mitigation will be compatible with the current, landowner-preferred, land uses in the area. The majority of the current land uses are pastureland (approximately 28%) and forestry (approximately 65.8%), with the balance being industrial/commercial (5.1%), developed water resources (0.4%), and residential (0.7%). The proposed postmine land uses within the five-year permit term and at the end of mining include forestry, pastureland, and developed water resources. At the end of mining and reclamation the projected outcome will generally be: forestry (approximately 38.45%), pastureland (approximately 61.23%), and developed water resources (approximately 0.32%).

Incorporated within the postmine forestry and pastureland land uses will be reclaimed habitats for fish and wildlife that will be compatible with these postmine land uses. These areas will include drainage features with riparian habitats and

other aquatic sites that provide mitigation for impacts to waters of the U.S., including wetlands. Associated with the drainages will be increased developed water resources. These areas will provide additional areas for mitigation due to increased hydrology and aquatic resources. Another positive aspect of these land uses is the introduction of enhanced species diversity and travel corridors. Both will be beneficial to wildlife and the overall aquatic environment.

Off-Site Mitigation

At the time of application submittal, no off-site mitigation property is available for use to offset future mitigation requirements. Applicant may in the future propose the use of an off-site mitigation area to offset mitigation requirements. Prior to the use of an off-site mitigation area (property), Applicant will provide detailed information to the USACE Fort Worth District for assessment and approval.

4.0 MITIGATION PLAN IMPLEMENTATION [332.4(c)(7)

Minimization efforts related to mining the five-year mining area, including construction of mining and ancillary non-mining infrastructure projects, are contained in the RCT permit application in Sections .144 (Fish and Wildlife Plan), .145 (Reclamation Plan), and .147 (Postmine Land Uses). These plans contain details related to avoiding waters of the U.S., including wetlands; reclaiming the mined landscape in a contemporaneous manner to reduce temporal loss of function; and planning postmine land uses that support uses equal to premine uses, or higher and better uses, as approved by the regulatory authority. In accordance with 2008 mitigation regulations, created mitigation is planned to be self-sustainable with minimal use of features or structures that require maintenance or long-term management [332.7(b)].

Void areas, where no lignite exists or where no mine-related impacts are projected, are protected from disturbance. These areas are specifically identified by early mine planning efforts and avoided when possible. Some of these areas contain aquatic ecosystems and waters of the U.S., including wetlands. To ensure these areas are not adversely impacted, best management practices (BMPs) are used to control erosion, deposition of water transported sediment, and contact with untreated runoff. BMPs include creation of sediment control ponds, water treatment basins, streams with grade control designs to reduce channel velocities, silt fencing, shallow berms, diversion ditches, grassed waterways, terraces, placement of riprap and natural boulder clusters, placement of geotextile and natural fiber mats, and temporary sediment basins.

4.1 Mitigation for Adverse Impacts to Streams

Streams identified in the Individual Permit may be adversely impacted by mining activities and other ancillary non-mining activities. Adverse impacts may be direct or indirect. Direct adverse impacts come from mining or construction actions in

streams or wetlands, and indirect impacts may occur when hydrology is reduced and results in impacts to downstream or down-slope waters of the U.S., including wetlands. Mitigation, including compensatory mitigation, if necessary, to account for these adverse impacts will be accomplished by reestablishment of streams or other waterways, drainages, and diversions through the mine reclamation process. Evaluation of premine streams (evaluation of fluvial geomorphology) is conducted, for incorporation into PCNs and RCT permit applications, to understand whether reestablishment of adversely impacted streams is practicable and ecologically desirable.

Permanent stream diversions will be constructed to mimic premine conditions, if practicable; however, the locations and size of postmining drainage watershed basins may differ from premine watershed basins. For drainage channels that have a drainage basin less than one square mile, the combination of channel, bank, and floodplain will be adequate to safely pass the 10-year, 6-hour precipitation event. For drainage channels that have a drainage basin greater than one square mile, the combination of channel, bank, and floodplain will be adequate to safely pass the 100-year, six-hour precipitation event to meet RCT regulatory requirements. **Appendix 1**, **Figures 1, 2, and 3** provide cross-section views of typical configurations for bankfull channels designed for low and medium flows inside wide channels. Wide channels with internal bankfull channels combined with wetlands provide stable systems that mimic or enhance premine conditions (fluvial geomorphology). Stream channel designs specific to the PLAN are provided in the RCT permit application and are not duplicated in this PLAN.

The size and configuration of reestablished streams will be a function of the type of system being restored and the size of the reestablished watershed basin. Once established, these areas provide connection between open water areas and wetlands, and are complementary of adjacent vegetated upland areas. All areas together provide important enhancements, in terms of both acreage and function, to local aquatic environments and larger regional watersheds.

Reestablished streams will be revegetated with permanent vegetative cover to create riparian areas (buffer zones). The focus is to manage these areas to enhance aquatic functions and increase overall ecological functioning of mitigation and aquatic resources in the area. This improves the overall mitigation plan and enhances streams by providing functional wildlife habitat, runoff filtration (reduced silt loading to streams), moderation of water temperature changes, and detritus for aquatic food webs. Details regarding revegetation are discussed in Section 4.4.

Stream restoration practices will be used, where practicable, during the reclamation process to reestablish streams into functional aquatic environments. The restoration practices detailed in this PLAN are considered applicable to the Applicant's mining operations based on the nature of mining operations, mining methods, local geology, regulatory requirements, and other location specific factors. See sub-section 4.2 for details related to stream restoration practices incorporated into the PLAN.

4.2 Stream Restoration Practices

Examples of stream restoration practices, civil engineering techniques, and structures used during reclamation actions are provided below from a USACE guidance document and focus on principles of fluvial geomorphology. Implementation of all the listed examples is likely not feasible for each case of stream reestablishment. Each location is assessed and the appropriate practices, techniques, or structures applied as necessary.

- Riparian areas are established as soon as practicable by planting trees, shrubs, and herbaceous vegetation [332.3(i)].
- Re-established streams are constructed with slopes appropriate to soil conditions, engineering design, grade, and as necessary to reduce erosion.
- Re-established stream slopes are mulched, to the extent possible, after planting vegetative species.
- The timing of revegetation is monitored to ensure some form of vegetation is in place in a timely manner. If the season for permanent vegetation has passed, temporary vegetation is planted until the next appropriate planting season for permanent vegetation.
- Geotextile and natural fiber mats, in conjunction with vegetation, are used, when necessary, to protect slopes from overland flow and surface erosion.
- Diversions are terraced where appropriate in order to create broad floodplains for development of streamside vegetation and riparian systems.
- Silt fencing is used to capture silt load before it enters a drainage or stream.
- Grade control structures (concrete drop structures) are used, when necessary, to reduce velocity and dissipate energy in locally steep sloped areas with erosive soils. This technique is a last resort in reestablishment of stream channels and in most cases is used at non-jurisdictional locations (ephemeral or less areas and where sheet flow collects in hillside swales) higher in a watershed.
- Weirs and sills (berms), constructed of natural or inert beneficially reused materials (e.g., concrete riprap), are located to dissipate energy and create microhabitats.
- Boulder clusters using native rock are located to provide reduced flow and microhabitats.
- Anchored vegetative cuttings are used for slope stability, when necessary.
- Wing deflectors are added to help divert flow away from easily eroded areas or other structures.
- Streams are designed to meander, when possible.

- Riprap is used to protect slopes, structures, and the inside curve of stream meanders.
- Sediment basins are constructed on- and off-channel to capture sediment.
- Livestock is excluded or managed to reduce impact to slopes or other sensitive locations to reduce adverse impacts that may occur close to or adjacent to streams.

4.3 Mitigation for Adverse Impacts to Wetlands [332.3(d)]

In accordance with Regulatory Guidance Letter No. 02-2 (RGL 02-2) and 2008 mitigation regulations, mitigation meeting the definition of a wetland will fall into one or more of the following categories: (1) establishment [creation], (2) restoration, (3) enhancement, or (4) protection/maintenance [preservation]. Definitions and plan specific details are provided below [332.3(a)(2)].

. . . excerpts from 332.2 - Definitions

Establishment (Creation): *The manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site. Establishment results in a gain in aquatic resource area and functions [332.2].*

Restoration: *The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource [332.2].*

Enhancement: *The manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s) [332.2].*

Protection/Maintenance (Preservation): *The removal of a threat to, or preventing the decline of, aquatic resources by an action in or near those aquatic resources. This term includes activities commonly associated with the protection and maintenance of aquatic resources through the implementation of appropriate legal and physical mechanisms [332.2].*

Following unavoidable adverse impacts to wetlands, the mitigation plan and reclamation planning process establishes mitigation wetlands in mined and reclaimed, or non-mined areas. These wetlands will be characteristic of premine systems, when possible, or otherwise appropriate for the hydrogeomorphic features of the watershed. In the event that wetlands cannot be generated to match premine conditions, mitigation will be generated to exceed or be equal to premine wetlands that were lost or damaged. The majority of mitigation wetlands will be established by creation within reclaimed areas of the mine. In some cases, mitigation wetlands

may be generated by restoration, enhancement, or preservation of non-mined, "historically" disturbed wetlands. These areas are typically adversely impacted by previous landowners for agricultural or industrial reasons. These areas may or may not be within the boundary of properties covered by USACE authorizations and may be outside the boundary permitted by the RCT. See sub-sections 4.3.1, 4.3.2, 4.3.3, and 4.3.4 for additional details related to creation, restoration, enhancement, and preservation [332.3(e)].

4.3.1 Creation

Mitigation areas may be created along the banks of waterways, drainages, and permanent stream channel diversions, in small depressional areas, and in specially designed areas. Additionally, there will be wetlands created around the perimeter of impoundments that are added to the landscape to support postmine land uses and fulfill regulatory requirements related to the approved postmine land uses.

Wetlands around the perimeter of impoundments are created by providing shallow areas along the margins of these structures. This creates a diverse wetland habitat ranging from emergent vegetation in areas that are continually inundated to shrub and forested wetlands in areas periodically submerged by fluctuating water levels.

The creation of wetlands along the banks of streams and in specially designed areas will focus on replacement of aquatic features that are environmentally preferable to the adversely impacted wetlands. This will be accomplished by using appropriate civil engineering techniques or constructing structures that promote proper hydrology.

Examples of civil engineering techniques and structures are provided below.

- construct wide, flat, or undulating floodplains.
- vary the stream gradient to create stream reaches with low gradients.
- construct constrictions in stream channels (these may be constructed with a low berm across the floodplain upstream of the constriction).
- design and construct mitigation areas to mimic gently sloped or undulating forested wetlands.

The reclaimed surface will be contoured to promote the creation of wetlands, where appropriate, and may include reestablishment of topographic highs and lows that act as micro-ecosystems. These small areas of internal drainage (depressions) will be created to promote collection of surface water runoff. These areas will enhance recharge of near surface aquifers.

Examples of conceptual plans for wetland reclamation are shown in **Appendix 1.**

4.3.2 Restoration

Restoration of wetlands, for the purpose of mitigation, is an activity undertaken to return a wetland from a disturbed or altered condition with lesser acreage or fewer functions to a previous condition with greater wetlands acreage or functions. Wetlands that may be restored will be identified based on historical information in combination with existing soils, vegetation, and hydrology information. In these areas, several methods may be used to obtain the desired results.

Methods may involve any or all of the following:

- civil engineering techniques to restore topography and hydrology.
- placement of fill material to restore hydrology.
- removal of man-made structures to restore topography and hydrology.
- selective removal of unwanted or invasive vegetative species.
- design and construction of mitigation areas to mimic gently sloped or undulating forested wetlands.
- addition of specific native vegetative species (e.g., oak and other appropriate location-specific species) to achieve appropriate diversity.

The acreage of a restored site that can be used as mitigation will be based on the total restored acreage, the types of restored functions, and the types of wetlands that are involved.

4.3.3 Enhancement

Enhancement of wetlands, for the purpose of mitigation, is any activity that increases the value of one or more functions in existing wetlands. Wetlands that can be enhanced will be identified based on historical information in combination with existing soils, vegetation, and hydrology information. In these areas, several methods may be used to obtain the desired results.

Methods may involve any or all of the following:

- civil engineering techniques to enhance topography and hydrology.
- placement of fill material to enhance hydrology.
- removal of man-made structures to enhance topography and hydrology.
- selective removal of unwanted or invasive vegetative species.
- addition of specific native vegetative species (e.g., oak and other appropriate location-specific species) to achieve appropriate diversity.
- design and construction of mitigation areas to mimic gently sloped or undulating forested wetlands.

The acreage of an enhanced site that can be used as mitigation will be based on the total enhanced acreage, the functions that are being enhanced, and the types of wetlands that are involved.

4.3.4 Preservation

Mitigation may be established, on-site, in areas where non-mined properties are designated as preservation areas. This type of mitigation would be supplemental to other processes. Nevertheless, they provide overall benefit to local and regional watersheds and aquatic environments due to their proximity to other mitigation areas. Use of this type of mitigation will only be granted by the USACE following discussions with the Fort Worth District.

4.4 Revegetation of Uplands, Streams, and Created, Restored, and Enhanced Wetland Areas [332.4(c)(7)]

Revegetation of mined lands and areas created, restored, and enhanced for mitigation will be conducted during the first normal period of favorable conditions using approved plant species that are appropriate for the season. Equipment commonly used for seedbed preparation, planting, and maintenance of agricultural lands will be used. Additional details regarding reclamation processes are located in the Reclamation Plan and Fish & Wildlife Plan contained in the RCT permit.

Herbaceous species will include a variety of native species. A variety of selected hardwood and shrub species are proposed in order to provide features that will enhance wildlife habitat, increase diversity, and provide cover and forage. See **Appendix 2, Table 144-1**. The selection of revegetation species will be based on water regime, topography, soils, the intended final species mix, and species availability. Seeds and other propagules and tree/shrub stock will be from local sources when possible. See Section 4.4.1 for detailed discussion regarding species selection for mitigation and reclamation areas.

In some mitigation areas, seed banking will be used as a method to introduce desirable vegetative species to a wetland or stream system. This method will only be used where feasible and when appropriate seed bank materials exist in close proximity to the work area.

4.4.1 Species Selection for Mitigation and Revegetation

4.4.1.1 Selection of Preferred Species is Based on the Following Criteria

- Reclamation should emphasize native plant species that occur locally; i.e., in the area to be revegetated. Mast producers, especially a diversity of oaks, walnuts, hickories, persimmon, and plums, are examples. They are important food and cover plants.
- Weedy, native invader species should be limited in the plan (e.g., ash, cottonwood, pine, sycamore, and willow). In general, such species have great capacity for natural dispersal and are adapted to disturbed soil sites. Under special conditions, specific species might be used for erosion control (e.g., creation of a “willow wattle”).
- Oaks, walnuts, and hickories should be planted because they have limited capacity for dispersal. In contrast, trees, shrubs, and woody vines with winged or fleshly fruits are dispersed by wind or animals. Thus, these plants can be provided more sparingly in the plan.
- Native plants are adapted to the local environment and will persist through periods of environmental stress. Most exotic plants cannot similarly persist and are also overrated as wildlife food and cover. However, a few exotic species can establish themselves by out-competing native plants. They then become serious persistent pests, difficult if not impossible to control or eradicate. Exotic species should, therefore, be omitted from permanent revegetation plans.

4.4.1.2 Desirable Characteristics of Native Plants for Erosion Control and Wildlife Use

Native plants considered for erosion control and wildlife use should possess as many of the following characteristics as possible.

- Thrive under specific climatic and soil conditions.
- Compete with other plant species occurring in these conditions.
- Cover as much area as possible. Desirable characteristics include spreading by stolons, runners, or rhizomes; forming thickets, mats, or coppices; rooting from decumbent or declining branches, or forming root shoots (suckers).
- Produce fertility-enriching litter with high water holding capacity.

- Inexpensive, readily available from local sites or nurseries, and easy to propagate and maintain. Use local seed or propagules.
- Rapid growing and long-lived.
- Possess hardy characteristics such as resistance or adaptability to grazing or browsing, drought, fire, shade, insect damage, and diseases; and grow rapidly on soils with a wide range of fertility and chemical characteristics.
- Produce dense foliage (deciduous and evergreen) stems, or thorns, preferably close to the ground.
- Produce seasonally abundant shoots, leaves, buds, and fruits that have high nutritive value for many species of animal life.
- Produce annual, persistent fruits that have high seed germination ratios.
- For tall-growing plants, they should not produce inhibitors that prevent other plant species from growing beneath them.
- Preferably, non-poisonous to man and livestock.

4.4.1.3 Desirable Characteristics of Native Plant Associations for Erosion Control and Wildlife Use

- Selected plants should be of the same local climatic and ecological region, topography, and soil conditions.
- Selected plants should be noncompetitive, i.e., compatible.
- The association should cover as much area as possible (overlapping canopies).
- The association should form at least two canopy layers above the soil surface.
- Selected plants should include a mixture of physical and habit forms (e.g., deciduous, evergreen, tree, shrub, vine, forb, grass).
- The association should provide annual, all-season fruits.
- The association should provide areas of adequate cover.
- Some components of the association should establish quickly and provide rapid growth.
- Selected plants should include at least one nitrogen-fixing species, if feasible.
- Planting should be arranged in irregular groups rather than uniform rows so that the association will produce a more natural form.

4.4.1.4 Notes Related to Section 4.4.1 and Appendix 2 of the PLAN

1. The information provided has been developed by the Texas Parks and Wildlife Department—Wildlife Division in conjunction with various mine operators within Texas. Special thanks to Kathy Boydston for her help and guidance in development of this information.

2. Species selection should emphasize plants native to the local area. Other factors important to the selection of plant species and their establishment and success include:

   a) Physiographic features,
   b) Land management considerations,
   c) The amount of area to be developed,
   d) Planting methods,
   e) Plant material availability, and
   f) Intended management during the period of extended responsibility.

3. Information provided in the species lists is not intended as a restrictive listing of species to be planted in reclamation. Other species may be planted as allowed by the regulatory authorities. Some of the listed species may not be planted due to plant material availability and propagation limitations.

4. Section 4.4.1 provides general guidance related to criteria and characteristics related to species selection for mitigation and revegetation. In keeping with the fact that this is general guidance, strict adherence with parts of this information may be difficult in some situations. This is due to factors such as: (1) the actual species planted; (2) species availability; (3) the type of mitigation proposed; or (4) the feasibility of implementing specific guidance. In some cases, the Applicant's past experience with large reclamation and mitigation projects provides methodologies that are proven to provide (1) better species survival, (2) the ability to meet the intent of regulations and permits, and (3) cost effectiveness.

4.5 Erosion Repair [332.4(c)(7 and 8)]

Erosion of landscapes is a naturally occurring process. The rate and extent of its occurrence are dependent on factors such as amount/intensity of rainfall, roughness of the land surface, slope length/steepness, soil type, vegetative cover, and erosion control practices. These factors are taken into consideration during regrading of disturbed areas to minimize erosion problems. Rills and gullies that may form in reclaimed areas and which either disrupt the reestablishment of the permanent vegetative cover, disrupt the land use, or cause/contribute to a violation of water

quality standards for receiving streams will be filled, regraded, or stabilized. The affected area will then be reseeded or replanted. Erosion control practices as described in Section 145 (included in the RCT permit) will be applied as needed.

4.6 Implementation Schedule [332.3(m)]

Implementation of actions covered by this Conceptual Mitigation Plan will be initiated, when possible, concurrently with the mine operation activities that impact waters of the U.S., including wetlands. In some instances immediate action is not possible due to SMCRA regulatory requirements; although these actions are typically implemented in a timely manner to maintain compliance with contemporaneous reclamation requirements [332.3(m)].

5.0 SUCCESS CRITERIA AND PERFORMANCE STANDARDS FOR ANTICIPATED FUNCTIONS [332.4(c)(9) AND 332.5(a) AND (b)]

The following information provides discussion of success criteria and performance standards for anticipated functions that result on reclaimed areas used for mitigation. These criteria and standards are provided by specific categories of waters of the U.S. or generally when applied to all categories. Details of anticipated functions are provided in Section 5.1 below, and a summary of functional assessment work is provided in Section 5.2.

<u>Stream Channels</u>

Success Criteria -

1. Stream channels will not exhibit adverse impacts from erosion, head cutting, and excessive silt accumulation.
2. Planted riparian zones will be measured to ensure that at least 25 to 50 [ref. NWP 21 GC 20(f)] feet are in place on each planted side of the stream channel.
3. Stream restoration practices discussed in Section 3.2 will be utilized when necessary.

Variations to the above criteria may be necessary, if justified by local conditions during the five-year monitoring period. Plantings will be monitored and deficiencies rectified by replanting, controlling competing vegetation, guarding against herbivory, or installing temporary water control structures.

Forested Wetlands

Planting Success Criteria -

Tree and shrub plantings:

1. Five years after planting, a minimum density of 100 trees per acre will be established.
2. Eligible trees will be species detailed in Section 3.4 and **Appendix 2** of the PLAN.
3. Trees will be 1 inch DBH or 6 feet tall.
4. If the density is less than the minimum five years after planting, the area will be replanted as necessary to achieve the minimum density five years after the most recent remedial planting.
5. Volunteer growth that meets the species and size criteria is eligible for counting.
6. Of the most dominant tree species in the planted area, three must be native species typically dominant in the local landscape.
7. No one species may constitute more than 30% of the surviving planted trees.

Variations to the above criteria may be necessary, if justified by local conditions during the five year monitoring period. Plantings will be monitored and deficiencies rectified by replanting, controlling competing vegetation, guarding against herbivory, or installing temporary water control structures. No water control structures are planned at this time beyond those typically used in the reclamation process.

Non-forested Wetlands

Planting Success Criteria -

Herbaceous plantings:

1. Planted areas will exhibit an 80% ground cover three years after planting.
2. If the ground cover is less than the minimum three years after planting, the area will be replanted as necessary to achieve the minimum density three years after the most recent remedial planting.
3. None of the three most dominant species may be non-native, noxious, or invasive species.

Ponds

Success Criteria -

1. Ponds proposed as permanent structures will not exhibit excessive bank erosion or silt accumulation.
2. Ponds proposed as permanent structures will be designed to meet RCT regulatory requirements.

Shared Functions

Success Criteria Related to -

Aesthetics
Sediment retention
Water storage
Groundwater recharge
Nutrient cycling
Vegetation
Wildlife habitat
Water quality

1. Reclaimed areas will be aesthetically pleasing with no excessive erosion or bare soils.
2. Sediment retention in stream channels, ponds, and associated non-forested wetlands will not accumulate beyond levels that would impair water quality or aquatic life movements.
3. Water storage and groundwater storage will not be impaired by unnecessary water control structures.
4. Vegetation will be healthy and contribute to nutrient cycling, water quality, and wildlife habitat.
5. Water quality will meet regulatory standards of the RCT and the Texas Commission on Environmental Quality, if required for specific impoundments under regulatory control.

Performance Standards

The permittee shall be responsible for maintaining the mitigation areas to comply with conditions above until such time as the permittee provides documentation to, and receives verification from the USACE, that areas within the property (designated as compensatory mitigation) meet the following requirements:

1. Waters of the U.S. meet the definition of a waters of the U.S. under the Regulatory Program regulations applicable at the time the project is authorized.
2. Wetlands that are waters of the U.S. will meet the definition of a wetland under the Regulatory Program regulations applicable at the time the project is authorized.
3. Waters of the U.S. are functioning as the intended type of waters of the U.S., and at the level of ecological performance prescribed in the mitigation plan.
4. Buffer and riparian zones and other areas integral to the enhancement of the aquatic ecosystem are functioning as the intended type of ecosystem.

5.1 Anticipated Functions of On-Site Minimization Activities

Detailed discussion of functions related to mitigation areas, resulting from reclamation, is provided for specific categories of waters of the U.S.

5.1.1 Stream Channels

Mitigation areas designated as stream channels function to divert overland flow of rainfall, or in some cases, groundwater. Once reestablished or created, stream channels provide connections between open water areas and wetlands, and are complementary of adjacent vegetated upland areas. All areas together provide important enhancements, in terms of both acreage and function, to local aquatic environments and larger regional watersheds. Ultimately, the size and configuration of streams will be a function of the type of system and the size of the reestablished watershed basin.

The majority of areas bordering streams will be revegetated with permanent vegetative cover to create riparian areas. The goal of this revegetation effort is to enhance aquatic functions and increase overall ecological functioning of mitigation and aquatic resources in the area. This improves the overall mitigation plan and enhances streams by providing functional wildlife habitat, wildlife forage resources, runoff filtration (reduced silt loading to streams), moderation of water temperature changes, and detritus for aquatic food webs. Trees planted in riparian areas will be predominately hard mast bearing species that are limited or absent from the premine landscape.

5.1.2 Forested Wetlands

Mitigation acreage categorized as forested wetlands includes designed wetlands. The function of these areas is related to tree species and can be short- and long-term. Short-term function relates to trees such as black willow and eastern cottonwood that fringe ponds or cover areas where appropriate hydrology exists. In these cases, the important function is to serve as short-term nurse trees for slower-

growing tree species. In appropriate areas, trees such as water oak, willow oak, and pecan (examples) will be planted with longer-term function as the goal.

5.1.3 Non-forested Wetlands

Functions related to this wetland type are dependent on water depth, vegetation, and position in the landscape. Some of this created mitigation acreage is associated with ponds where water depth ranges from zero to 6.6 feet in depth. These areas are typical of shallow emergent wetland systems and function as wildlife habitats for terrestrial and aquatic species. Some non-forested wetlands consist of isolated depressional features in postmine reclamation. Many of these areas are small and only contain water during the spring and winter. Their main function is to provide habitat diversity in reclaimed areas. Other locations where these wetlands occur are adjacent to stream channels where a designed diversion of water occurs in areas that can contain overflows from rainfall events. These areas function as wildlife habitats by adding diversity to adjacent stream channels and land uses.

5.1.4 Ponds

Ponds with water deeper than 6.6 feet function in a similar manner as existing premine ponds. Waterfowl use these areas for loafing and feeding. Aquatic vertebrates use them for feeding and reproduction. The larger ponds provide permanent water coverage and may function as livestock watering features in the future.

<u>Shared Functions</u>

Functions shared by each category of water of the U.S. discussed above include (1) aesthetics, (2) sediment retention, (3) short- and long-term water storage, (4) groundwater recharge, (5) nutrient cycling, (6) accelerated succession of vegetation, and (7) wildlife habitats. In regard to water quality, each type of water of the U.S. functions to improve water quality.

5.2 Functional Assessment

The Fort Worth District is working toward completing “Functional Assessment” evaluation tools (methodologies) for streams and wetlands using quantitative methodologies. The Fort Worth District has approved the use of “interim” methodologies for The Sabine Mining Company until the process to finalize their “functional assessment” methodologies is complete in the future. The interim methodologies are based on the WRAP—Wetland Rapid Assessment Procedure and Mobile SOP—Mobile District Compensatory Stream Mitigation Standard Operation Procedures and Guidelines that are existing (and in use) methodologies. Some modifications to the two procedures were implemented to adapt the methodologies to local conditions. Further, the methodologies will be used to quantify function of reference mitigation areas (created from reclamation) at the

South Hallsville No. 1 Mine. The data from the functional assessment of impacted waters of the U.S. and the reference mitigation areas will be used to evaluate the future projected potential of proposed compensatory mitigation for the project. The results of this effort, related to impacts within the Rusk Permit Area, will be final and will not be redone when the Fort Worth District's methodologies are finalized. However, given the interim nature of the "functional assessment" methodologies, through consultation with Fort Worth District, Sabine Mining Company requests the ability to implement any permanent "functional assessment" methodologies that may be adopted post approval of this application.

Note: Due to delays in finalizing the interim methodologies, the data summary and report is not complete at the time of submittal of this IP application. With Fort Worth District approval, this information will be allowed to be submitted at a later date and will be included in Appendix 3 of this Conceptual Mitigation Plan.

6.0 SITE PROTECTION [332.4(c)(4) AND 332.7(a)]

Applicant provides site protection on RCT permitted properties by maintaining right-of-entry and control as necessary for mining, reclamation, and environmental control through fee ownership or coal mining leases. Additionally, the RCT requires that a reclamation performance bond be posted for all disturbed lands within the RCT permit boundary prior to disturbance. This bond ensures the availability of funds adequate to meet approved reclamation obligations, including compensatory mitigation for Section 404 waters, in the event of default by the operator. The RCT also has established a comprehensive system for obtaining bond release that ensures that all reclamation obligations, including compensatory mitigation for Section 404 permit authorizations, are met.

Following release from the Rusk Permit Area RCT reclamation performance bond, future impacts by current or future landowners to any waters of the U.S., including areas that are considered mitigation for Section 404 permit authorizations, are protected by Section 404 of the Clean Water Act, and impacts will require USACE permit authorization. Compensatory mitigation areas located on leased properties cannot legally be encumbered by the surface mining operator, so site protection is not warranted or practicable. Additionally, cost prohibitive lease amendments or adding new lease agreements are not practicable and are wholly within the discretion of the landowner.

<u>Liens and Encumbrances</u>

There are no liens, restrictions, or other encumbrances that would preclude the Applicant from completing the proposed work.

7.0 ADAPTIVE MANAGEMENT [332.4(c)(12) AND 332.7(c)]

Mitigation and compensatory mitigation areas that result from this PLAN are vulnerable (but no more so than any other reclaimed areas) to acts of nature such as wildfires, climatic instability, wildlife activities, and disease as well as unauthorized human activities that may cause the site to become non-compliant with the PLAN. Occurrence of such acts of nature following attainment of performance standards may require changes to the PLAN to allow for maintenance activities to offset and counteract negative impacts. Depending upon the circumstances, however, it may be appropriate to let nature take its course, particularly when wetland vegetation is expected to reestablish due to continued existence of seed sources, wetland hydrology, hydric soils, and restrictions on incompatible land uses. As appropriate, the Applicant will discuss options and management decisions on such issues with the USACE.

8.0 MONITORING AND LONG-TERM MANAGEMENT [332.4(c)(10-11); 332.6; AND 332.7(d)]

The Applicant will ensure that sufficient financial resources are allocated to perform monitoring activities. Additionally, the Applicant will provide site protection, initially by deed restriction, for SWEPCO-owned property tracts associated with compensatory mitigation. Future long-term site protection is addressed in Section 6.0 of the PLAN. Long-term management practices conducted by The Sabine Mining Company following attainment of the performance standards may include such activities as:

1. Mechanical vegetation control,
2. Selective herbicide treatments,
3. Use of selected prescribed fire to mimic pre-settlement summer burns,
4. Planting nurse crops to suppress or compete with weed species,
5. Planting native herbaceous vegetation,
6. Selective tree removal to control insect-damaged, diseased, or storm-felled trees, (Although generally discouraged, these activities may be conducted in coordination with the USACE. In some instances, felling trees in place and leaving them on the ground will be acceptable to the USACE.),
7. Water regime management, and
8. Visual monitoring of activities (i.e., hunting, hiking, etc.) on the mitigation site.

8.1 10-Year Incremental Reporting (Self-Monitoring)

Applicant plans to establish and implement a self-monitoring program that includes the following actions:

1. Designation, in writing, of a responsible party or position, who shall coordinate with the USACE related to on-site inspections and compliance with permit conditions; and

2. Implementation of a reporting program on a 10-year incremental basis. Reporting will include submittal of a written compliance report to the USACE, due within one year following RCT approval of the appropriate permit term. Typical RCT permit terms are in five-year increments.

   The first report would be due in year 11 following RCT approval of the initial permit application. Subsequent reports would be required every other RCT permit renewal cycle. Reports will outline compliance with any applicable USACE conditions issued upon approval of the permit, summarize all activities that occurred during the reporting period, and provide notification of completion of all authorized work. These reports shall document activities that have occurred over the ten years preceding the year of the report. Reports are due October 1 of the reporting year.

   Compliance reports shall include at a minimum:

   a. The approximate acreage, location, type, and description of waters of the U.S. impacted during the reporting period;
   b. The approximate acreage, location, type, status, and completion date (actual or projected) of the ongoing mitigation that occurred during the reporting period;
   c. A description of the configuration of completed mitigation areas, including a topographic map showing the location and acreage of vegetation planted or waters of the U.S. created and supporting documentation including vegetative species and planting rates or stems per acre;
   d. Representative photographs of the progress and success of mitigation work accomplished under this permit; and
   e. A cumulative summary of impacted and created waters of the U.S., categorized into the following classes:
      1) Forested Wetlands
      2) Non-Forested Wetlands
      3) Streams within Ordinary High Water Marks (OHWM)
      4) Ponds within OHWM

9.0 FINANCIAL ASSURANCES [332.3(n) AND 332.4(c)(13)]

Initial financial assurance for the mining and reclamation process is in-place in accordance with RCT (SMCRA) requirements for a performance bond. Financial resources for long-term management will be provided by the Applicant. The Applicant will ensure that these financial resources are available to protect mitigation areas. The financial resources will also be able to provide for maintenance and remedial actions that may be necessary in the future.

Financial assurances in the form of performance bonds, irrevocable trusts, escrow accounts, casualty insurance or letters of credit will not be provided due to the size of the mine and current ownership by the Applicant. The Applicant is a self-insured entity and can provide proof of financial assurance upon request.

10.0 COMPENSATORY MITIGATION ALTERNATIVES

In accordance with the 2008 mitigation regulations, the use of various forms of compensatory mitigation may be used to satisfy mitigation requirements. In special situations the need may arise to use mitigation bank credits, in-lieu fee arrangements, or separate activity-specific projects to fulfill all compensatory mitigation requirements. Use of these alternatives will only be considered following discussion with the USACE, Fort Worth District, and following a thorough investigation of potential on-site (defined as mitigation created by reclamation actions) and off-site compensatory mitigation opportunities. The proposed use of off-site locations for compensatory mitigation will not exempt the Applicant from reclamation requirements detailed in the RCT application or permit sections .144 and .145. Further, it is understood that reclamation activities will result in the creation of all or part of the mitigation, including compensatory mitigation, requirements of USACE permit authorizations for adverse impacts to waters of the U.S., including wetlands.

11.0 REFERENCES AND SUPPORTING DOCUMENTATION

Coastal Zone Resources Division. 1978. Handbook for terrestrial wildlife habitat development on dredged material. Tech Rep. D-78-37. Ocean Data Systems, Inc., Wilmington, N.C. 369 pp.

Correll, D. S. and M. C. Johnston. 1970. Manual of the vascular plants of Texas. Texas Research Foundation, Renner, Texas. 1881 pp.

Damude, N., and K. C. Bender. 1999. Texas wildscapes: gardening for wildlife. Texas Parks and Wildlife Press, Austin. 387 pp.

Dickson, K. L. and D. Vance. 1981. Revegetating surface mined lands for wildlife in Texas and Oklahoma. Super. Doc., U.S. Govern. Print. Off., Wash. D.C. FWS/OBS/81/25. 121 pp.

Dietz, D. R., C. H. Wasser, P. L. Dittberner, and C. O. Martin. 1992. "Maximilian Sunflower (*Helianthus maximilian*): Section 7.4.3., U. S. Army Corps of Engineers Wildl. Res. Manage. Man.," Tech. Rep. EL-92-16, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Miss. 25 pp.

Elias, T. S. 1980. The complete trees of North America: field guide and natural history. Outdoor Life/Nature Books: Van Nostrand Reinhold Co. 948 pp.

Engle, D. M., J. F. Stritzke, and F. T. McCollum. 1991. Vegetation management in the Cross Timbers: response of understory vegetation to herbicides and burning. Weed Tech. 5: 406-410.

Evers, G. W. and D. J. Dorsett. 1986. Forage legumes for Texas. Texas Agric. Exp. Stn. MP-1610, College Station. 13 pp.

Foote, L. E. and J. A. Jacobs. 1996. Partridge pea management and yield comparison with other annual forage legumes. Agron. J. 58: 573-575.

Fowells, H. A. 1965. Silvics of forest trees of the United States. Agriculture Handbook No. 271. Forest Service, U.S. Dept. Agric. Wash. D.C. 726 pp.

Gould, F. W. 1978. Common Texas grasses: an illustrated guide. Texas A&M Univ. Press, College Station, TX. 267 pp.

Grelen, H. E. and R. H. Hughes. 1984. Common herbaceous plants of southern forest range. Res. Pap. 50-210 New Orleans, LA: U.S. Dept. Agric., Forest Serv., South. Forest Exp. Sta. 147 pp.

Halls, L. K. 1977. Southern fruit-producing woody plants used by wildlife. Southern Forest Exper. Sta., U.S. Dept. Agric., Forest Serv. Gen. Tech. Rpt. 50-16. 235 pp.

Hartnett, D. C. 1991. Effects of fire in tall grass prairie on growth and reproduction of prairie conflower (*Ratibida columnifera*: Asteraceae). Am. J. Bot. 78: 429-435.

Hatch, S. L., K. N. Gandhi, and L. E. Brown. 1990. Checklist of the vascular plants of Texas. Tex. Agri. Exp. Stn., Texas A&M Univ., College Station, TX, MP-1655. 158 pp.

Haynes, R. J., J. A. Allen, and E. C. Pendleton. 1988. Reestablishment of bottomland hardwood forests on disturbed sites: an annotated bibliography. U.S. Fish Wildl. Serv. Biol. Rep. 88(42). 104 pp.

Herbarium, S.M. Tracey. (2002) Department of Rangeland Ecology and Management at Texas A&M University. Available from: http://www.csdl.tamu.edu./FLORA/taes/taes/tracy/regeco.html. [Accessed May/June of 2003].

Hughes, H. G., L. W. Varner, and L. H. Blankinship. 1987. Estimating shrub production from plant dimensions. J. Range Manage. 40: 367-369.

Kadlec, J. A. and W. A. Wentz. 1974. State-of-the art survey and evaluation of marsh plant establishment techniques: induced and natural. Vol. I: Report of research. Contract Rept. D-74-9. Dredged Material Research Program. U.S. Army Engineer Waterways Experiment Station, Vicksburg, Miss. 231 pp.

Larson, J. L. 1999. Woolgrass: a plant profile. Ecol. Restor. 17: 210-215

Leithead, H. L., L. L. Yarlett, and T. N. Shiflet. 1971. 100 native forage grasses in 11 southern states. Soil Conserv. Serv. Agric. Handbook No. 389, U.S. Dept. Agric. 216 pp.

Leopold, A. 1933. Game management. Charles Scribner's Sons, New York. 481 pp.

Marcy, L. E. and C. O. Martin. 1986. "Partridge Pea (*Cassia fasciculata*): Sect. 7.3.3., U.S. Army Corps of Engineers Wildl. Res. Manage. Man.," Tech. Rep. EP-86-29, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Miss. 15 pp.

Marcy, L. E. and C. O. Martin. 1986. "Doveweeds (*Croton spp.*): Sect. 7.4.2., U. S. Army Corps of Engineers Wildl. Res. Manage. Man.," Tech. Rep. EL-86-24, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Miss. 14 pp.

Martin, A. C., H. S. Zim, and A. L. Nelson. 1951. American wildlife and plants: a guide to wildlife food habits. Dover Publ., Inc. 500 pp.

Martin, C. O. and S. P. Mott. 1997. "American Elder (*Sambucus canadensis*): Sect. 7.5.7., U.S. Army Corps of Engineers Wildl. Res. Manage. Man.," Tech. Rep. EL-97-14, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Miss. 18 pp.

Martin, C. O., and S. P. Mott. 1997. "American Beautyberry (*Callicarpa americana*): Section 7.5.8., U.S. Army Corps of Engineers Wildl. Res. Manage. Man.," Tech. Rep. EL-97-15, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Miss. 17 pp.

Martin, C. O. and S. P. Mott. 1997. "Yaupon (*Ilex vomitoria*): Section 7.5.10., U.S. Army Corps of Engineers Wildl. Res. Manage. Man.," Tech. Rep. EL-97-16, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Miss. 18 pp.

Martin, H. and G. Sick. 1995. American Beautyberry for borrow pit reclamation in South Carolina. Restor. and Manage. Notes 13: 90-97.

McMahan, C. A., R. G. Frye, and K. L. Brown. 1984. The vegetation types of Texas, including cropland. Texas Parks and Wildlife Dept., Austin, TPWD Bull. 7000-120, ii + 40 pp. map.

Miller, H. A. 1978. How to know the trees. 3rd ed. The Pictured Key Nature Series: Wm. C. Brown Co. 263 pp.

Mitchell W. A., P. A. Gibbs, and C. O. Martin. 1988. "Flowering Dogwood (*Cornus florida*): Sect. 7.5.9, U.S. Army Corps of Engineers Wildl. Resour. Manage. Man.," Tech. Rep. EL-88-9, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Miss. 25 pp.

Nokes, J. 1986. How to grow native plants of Texas and the southwest. Texas Monthly Press. 404 pp.

Packard, S. and C. F. Mutel (eds). 1997. The tallgrass restoration handbook: for prairies, savannas and woodlands. Island Press, Wash., D.C. 463 pp.

Pellett, F. C. 1978. American honey plants, together with those which are of special value to the beekeeper as sources of pollen. 5th ed. Dadant and Sons. Hamilton, Illinois.

Platt, S. G. and C. G. Brantley. 1993. Switchcane: propagation and establishment in the American southeast. Restor. and Mange. Notes 11:134-137.

Phillips Petroleum Company. 1955. Pasture and range plants. Sects. 1-6. Phillips Petrol. Co., Bartlesville, Okla. 176 pp.

Sauter, E. H. 1962. Germination of switchgrass. J. Range Mange. 15: 108-109.

Schweitzer, S. H., F. C. Bryant, and D. B. Wester. 1993. Potential forage species for deer in the southern mixed prairie. J. Range Manage. 45: 70-75.

Scifres, C. J. and K. W. Duncan 1982. Brownseed paspalum response to season of burning. J. Range Manage. 35: 251-253.

Simpson, B. J. 1988. A field guide to Texas trees. Texas Monthly Press, Austin. 372 pp.

Soil Conservation Society of America. 1982. Sources of native seeds and plants. Soil Conserv. Soc. Amer., Ankeny, Iowa. 32 pp.

Sorneson, J. J. and D. J. Holder. 1974. Germination of native prairie forbes. J. Range Manage. 27: 123-126.

Stubbendieck, J., S. L. Hatch, and C. H. Butterfield. 1992. North American range plants. 4th ed. Univ. of Nebraska Press, Lincoln. 493 pp.

Texas Department of Agriculture. 1988. Texas native tree and plant directory 1988. Marketing Division, Tex. Dept. Agric. Austin, TX. 162 pp.

Turner, B. L. 1959. The legumes of Texas. Univ. of Texas Press, Austin. 284 pp.

U.S. Army Corps of Engineers. 1998. Stream Corridor Restoration: Principles, Practices, and Processes. Final Manuscript June 1998.

U.S. Army Corps of Engineers. 2002. Regulatory Guidance Letter No. 02-2. 16 pp.

U.S. Army Corps of Engineers. 2005. Memorandum of understanding among the U.S. Army Corps of Engineers, The U.S. Office of Surface Mining, The U.S. Environmental Protection Agency, and the U.S. Fish and Wildlife Service for the purpose of providing concurrent and coordinated review and processing of surface coal mining applications proposing placement of dredged and/or fill material in waters of the United States. Effective February 8, 2005.

U.S. Army Corps of Engineers Wildlife Resources Management Manual. 1986 - et seq. U.S. Army Engineer Waterways Experiment Station, Vicksburg, Miss.

U.S. Department of Agriculture. 1965. Silvics of forest trees of the United States. USDA For. Serv. Agric. Handbook. 271. 762 pp.

U.S. Fish and Wildlife Service. 1988. National list of plant species that occur in wetlands: South Plains (Region 6), Biological Report 88 (26.6). Washington, DC. 94 pp.

Van Dersal, W. R. 1938. Native woody plants of the United States: their erosion-control and wildlife values. USDA Misc. Publ. No. 303. U.S. Govt. Printing Office, Washington, D.C. 362 pp.

Vines, R. A. 1960. Trees, shrubs, and woody vines of the Southwest. Univ. Texas Press. 1104 pp.

Wasowski. S. 1988. Native Texas plants: Landscaping by region. Texas Monthly Press, Austin, Texas. 406 pp.

Wasowski, S. and J. Ryan. 1985. Landscaping with native Texas plants. Texas Monthly Press, Austin, Texas. 233 pp.

Wasowski, S. and A. Wasowski. 1997. Native Texas plants. 2nd. Ed. Gulf Publ. Co. Houston, Texas. 407 pp.

Wasser, C. H., P. L. Dittberner and W. A. Mitchell. 1986. "Switchgrass (*Panicum virgatum*): Sect. 7.1.2, U.S. Army Corps of Engineers Wildl. Res. Manage Man.," Tech. Rep. EL-86-27, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Miss. 19pp.

Wentz, W. A., R. L. Smith, and J. A. Kadlec. 1974. State-of-the-art survey and evaluation of marsh plant establishment techniques: induced and natural. Vol. II: A selected annotated bibliography on aquatic and marsh plants and their management. Dredge Material Research Program. Contract Report D-74-9. US Army Coastal Engineering Research Center, Ft. Belvoir, Virginia. 190 pp. + 1 appendix (16 pp.).

11.1 Supporting Documentation

The following documents were used in preparation of the Individual Permit and Conceptual Mitigation Plan.

1. National Historic Preservation Act of 1966 (amended through 2000), Section 106.
2. Surface Mining Control and Reclamation Act of 1977 (Revisions through 1993).
3. USACE *1987 Wetlands Delineation Manual.*
4. Nationwide Permit 21 Guidance, October 6, 1999 [Fort Worth District].
5. Army Corps of Engineers Standard Operating Procedures for the Regulatory Program, dated October 15, 1999 [HQ].
6. Government Accounting Office (GAO) report entitled "Wetlands Protection—Assessments Needed to Determine Effectiveness of In-Lieu-Fee Mitigation", published May 2001.
7. National Research Council (NRC) report entitled "Compensating for Wetland Losses Under the Clean Water Act", published August 2001.
8. Regulatory Guidance Letter 02-02, December 24, 2002 [HQ].
9. Nationwide Permit 21 (Surface Coal Mining Activities), effective date March 18, 2002.
10. Nationwide Regional Conditions for the State of Texas, March 2002 and December 2007 [Fort Worth District].
11. National Wetlands Mitigation Action Plan, December 24, 2002.
12. Mitigation Guidelines, Regulatory Program, draft dated December 24, 2003 [Fort Worth District].
13. Standard Operating Procedures for NWP 21 Processing, March 19, 2004.
14. Guidance on compensatory mitigation, May 7, 2004 [Fort Worth District].
15. Joint Procedures Framework Memorandum of Understanding, effective date February 8, 2005 [Signatory agencies USACE, FWS, OSM, and EPA].
16. Regulatory Guidance Letter 05-03, August 4, 2005 [HQ].
17. The White House Council on Environmental Quality's April 2006 document entitled "Conserving America's Wetlands 2006: Two Years of Progress Implementing the President's Goal".
18. Proposed rule by the EPA and Corps of Engineers, "Compensatory Mitigation for Losses of Aquatic Resources", March 28, 2006.
19. Regulatory Guidance Letter 06-03, Minimum Monitoring Requirements for Compensatory Mitigation Projects Involving the Creation, Restoration, and/or Enhancement of Aquatic Resources, August 3, 2006.
20. Nationwide Permit 21 (Surface Coal Mining Operations), effective date March 19, 2007.
21. Federal Register (FR Vol. 72, No. 47, Monday, March 12, 2007, Notices) Notice of Reissuance of Nationwide Permits. The effective date for all NWPs, General Conditions, and Definitions is March 19, 2007.

22. Railroad Commission of Texas permit application submitted May 2009, for the Rusk Permit Area and subsequent “supplemental” documents submitted by Applicant.
23. Railroad Commission of Texas—Coal Mining Regulations (16 Texas Admin. Code §12.1 et seq.).
24. Federal Register (Vol. 73, No. 70, Thursday, April 10, 2008, Rules and Regulations) Compensatory Mitigation for Losses of Aquatic Resources.

APPENDIX 1: FIGURES

Figure 1

Conceptual Plans for Wetland Reclamation [332.4(c)(7)]

Figure 2

Typical Cross-Sections for Reclaimed Stream Channel With and Without Wetland Area [332.4(c)(7)]

Figure 3

Typical Section Restored Stream [332.4(c)(7)]

from 404 IP Attachment J

Figure 1

Conceptual Plans for Wetland Reclamation

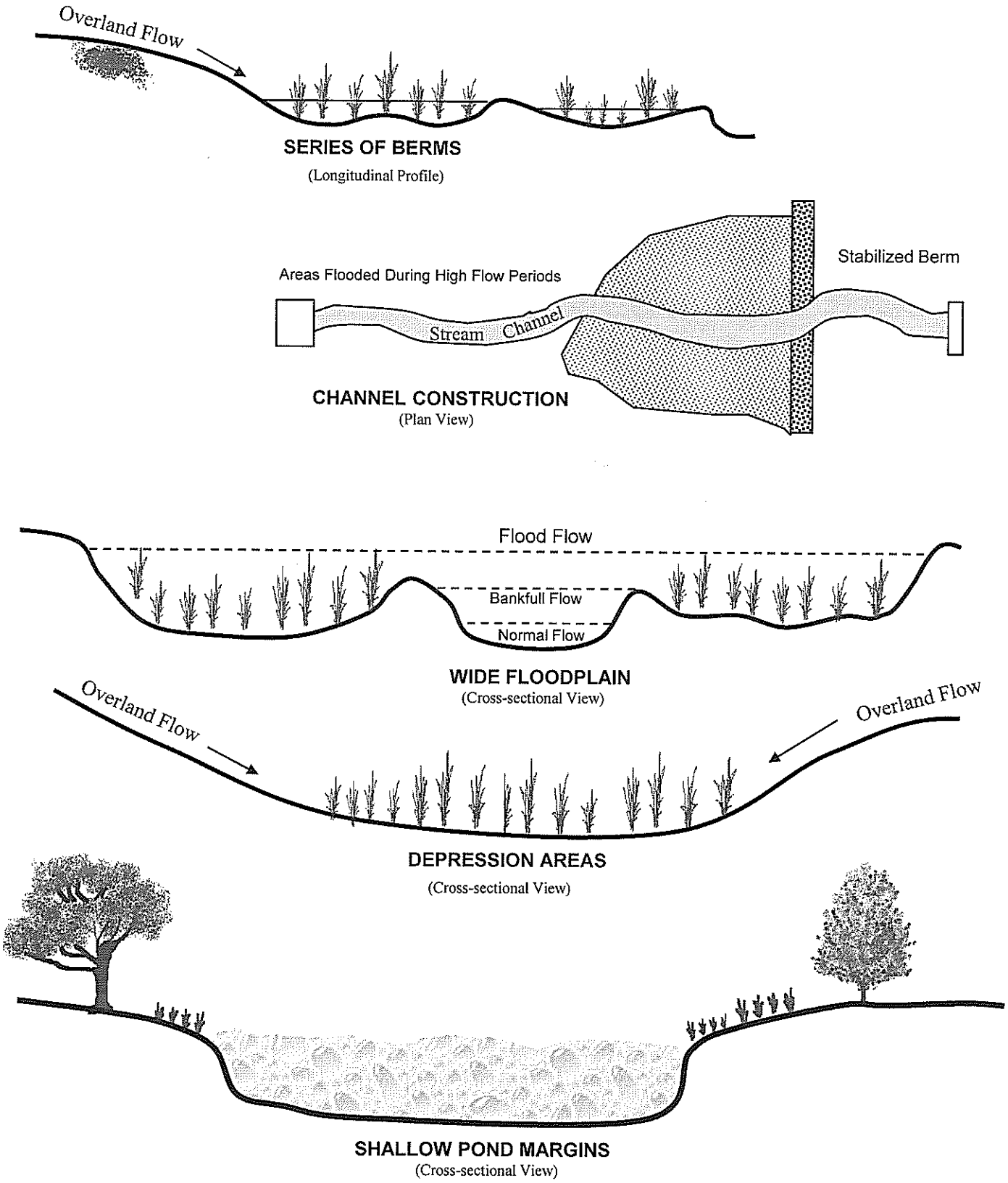
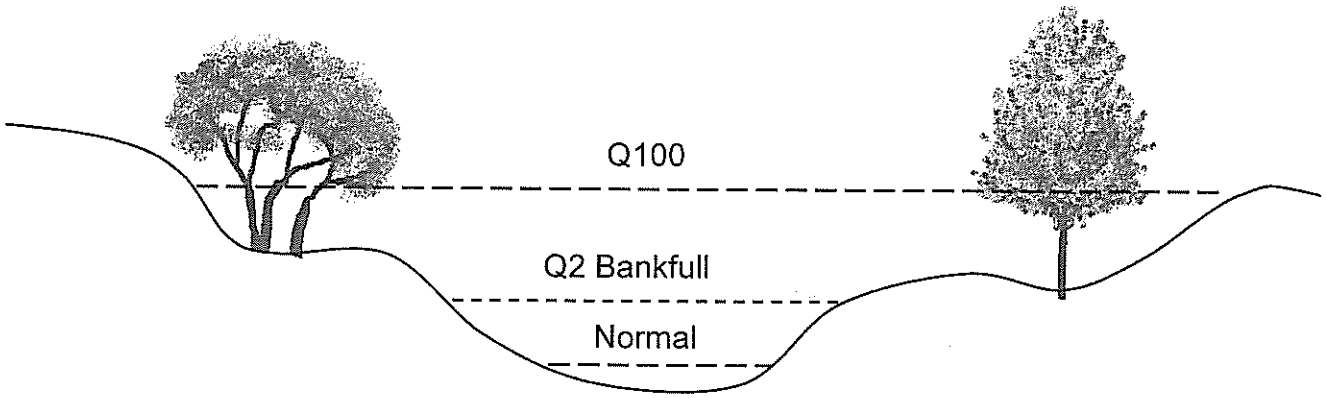


Figure 2

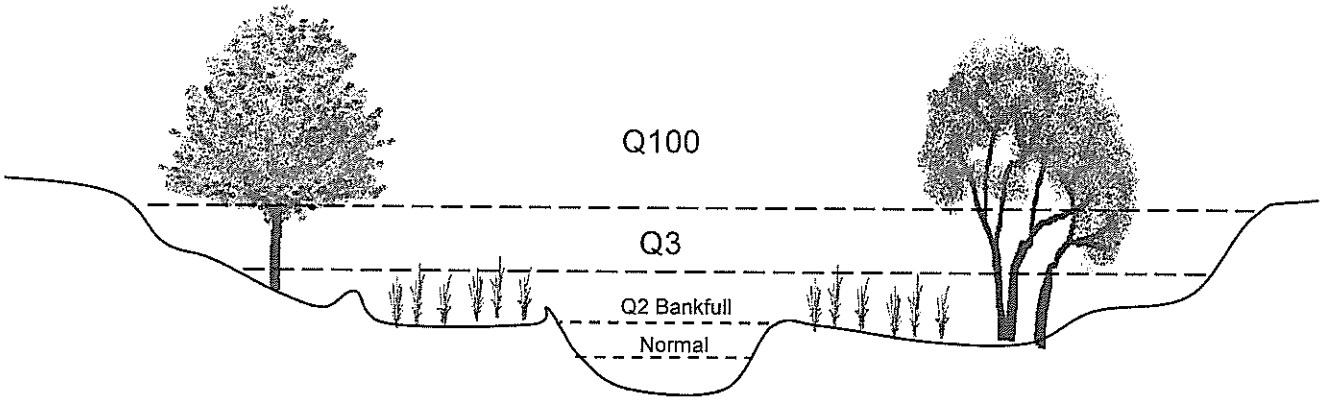
Typical Cross-sections for Reclaimed Stream Channel

With and Without Wetland Area



Reclaimed Stream Channel

Without Wetland Area



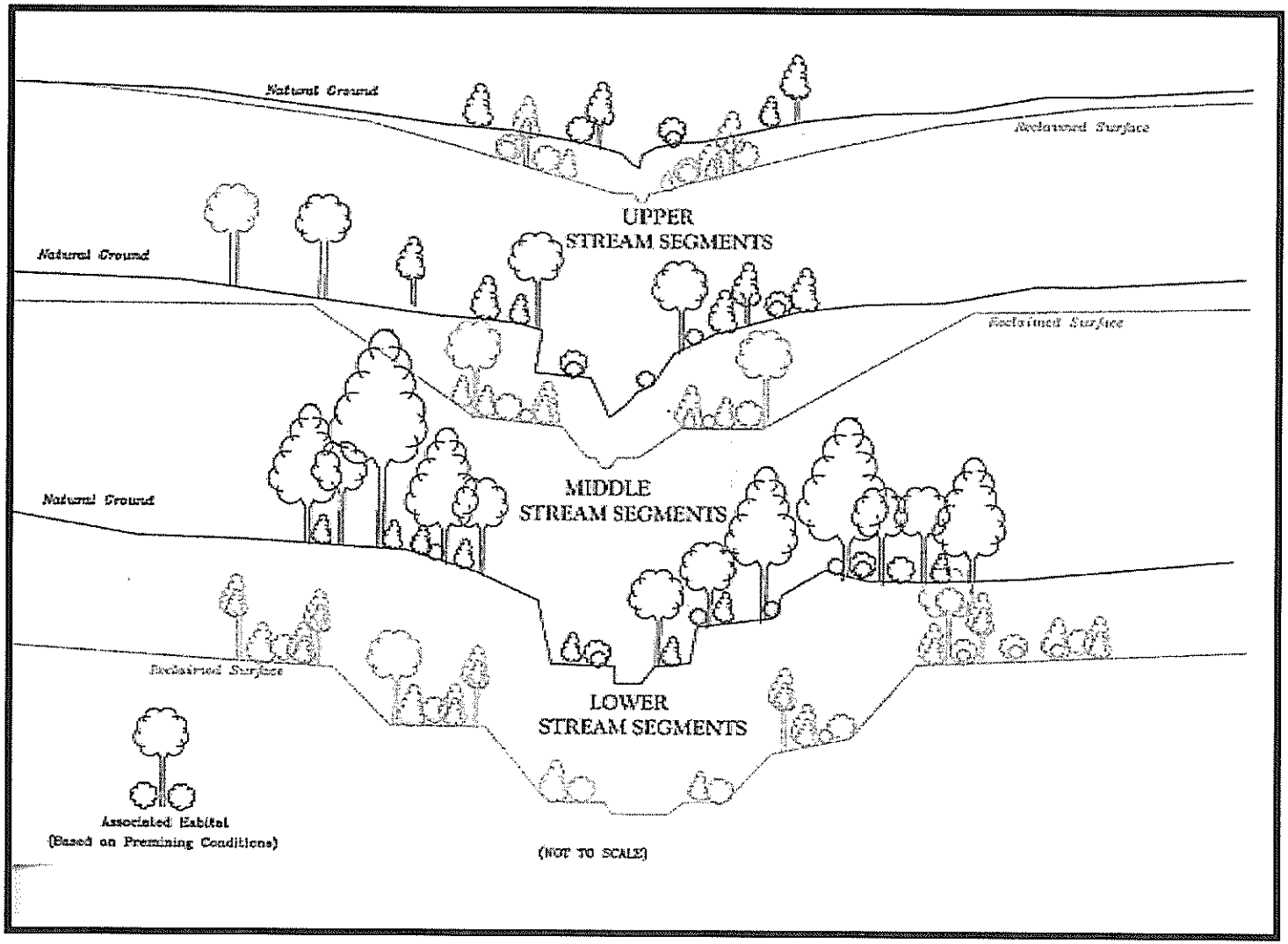
Reclaimed Stream Channel

With Wetland Area

Adapted from Classification of Wetlands And Deepwater Habitats of the United States, US Dept Interior, December 1979

Figure 3

Typical Section Restored Stream



APPENDIX 2: REVEGETATION LISTS

Lists are from the South Hallsville No. 1 Mine—Rusk Permit Area Railroad Commission of Texas permit application (submitted May 2009), Sections .144 and .145.

Table 144-1 **Wildlife Value of Selected Plant Species [332.4(c)(7)]**

Appendix 145-2 **Planting and Invader Species List by Land Use [332.4(c)(7)]**

Appendix 145-3 **Native Plants Recommended for Possible Reclamation and Mitigation Value in Texas [332.4(c)(7)]**

Table 144-1
South Hallsville No. 1 Mine – Rusk Permit
Wildlife Value of Selected Plant Species

Common Name	Food Value Rating[a]	Cover Value Rating[a]
Woody Species		
Black Walnut	1	2
Persimmon	1	2
Texas Sugarberry	1	2
Hawthorn	1	1
Post Oak	1	1
Water Oak	1	1
Willow Oak	1	1
Southern Red Oak	1	1
Blackjack Oak	1	1
Bur Oak	1	1
Overcup Oak	1	1
Shumard Oak	1	1
Pecan	1	2
Red Mulberry	1	2
Sumac	1	1
Sweetgum	2	2
Wild Plum	1	1
Yaupon	1	1
River Birch	3	2
Hickory	1	2
Red Bud	2	2
Wild Cherry	1	1
Sassafras	1	1
American Elm	2	2
Cedar Elm	2	1
Dogwood	1	1
American Holly	1	1
Osage Orange	3	1
Arrow-Wood	1	2
American Beautyberry	1	2
Buttonbush	1	1
Possumhaw	1	1
Elderberry	1	1

Table 144-1
(Continued)

Vines		
Pepper Vine	1	3
Virginia Creeper	1	1
Dewberry	1	1
Grape	1	1
Trumpet Creeper	2	1
Coralberry	1	1
Grasses		
Indiangrass	2	3
Switchgrass	1	2
Sideoats Grama	2	3
Green Sprangletop	3	3
Big Bluestem	3	2
Little Bluestem	3	2
Buffalo Grass	3	4
Eastern Gama Grass	3	3
Dropseed	2	3
Forbs		
Oats *	1	2
Winter Wheat *	1	3
Maximilian Sunflower	1	1
Illinois Bundleflower	2	2
Western Indigo	2	2
Common Sunflower	1	1
Aquatic Species		
Cattail	4	1
Rush	3	1
Millet *	1	2
Japanese Millet *	1	2
Smartweed	1	1
Pondweed	1	4
Sesbania	2	3
Cordgrass	4	1
Common Reed	4	1

[a] 1 = Excellent; 2 = Good; 3 = Fair; 4 = Limited
Source: Dickson and Vance (1981) Revegetating Surface Mined Lands for Wildlife in Texas and Oklahoma. USFWS. FBS/OBS-81/25.
* Denotes species used only for temporary reclamation.

APPENDIX 145-2
PLANTING AND INVADER SPECIES LIST
BY LAND USE

GRAZING:

Planting List

- Green sprangletop - *Loptochioa dubia*
- Side oats grama - *Bouteloua curtipendula*
- Big blue stem - *Andropogon gerardii*
- Indiangrass – Cheyenne - *Sorghastrum nutans*
- Illinois bundleflower - *Desmanthus illinoensis*
- Partridge pea - *Cassic fasciculata*
- Switchgrass - *Panicum virgatum*
- Sunflower – black peredovik - *Helianthus Annuus*
- Iron clay cowpea - *Vigna unguiculata*
- Bluestem, Little - Schizachyrium scoparium
- Bluestem, Silver - *Bothriochloa laguroides*
- Fall panicum - *Panicum dichotomiflorum*
- Herbaceous mimosa - *Mimosa strigillosa*
- Buffalo grass - *Buchloe dactyloides*
- Indian paintbrush - *Castilleja sp.*
- Purple prairie clover - *Dalea purpurea*

Approved Invaders and Volunteers

- Crimson clover - *Trifolium incarnatum*
- Eastern baccharis - *Baccharis halimifolia*
- Hairy Vetch - *Vicia villosa*
- Sericea lespedeza - *Lespedeza cuneata*
- ***Can include approved pasture grasses from planting list***

PASTURE:

Planting list

- Bermudagrass, coastal - *Cynodon dactylon*
- Bermudagrass, common - *Cynodon dactylon*
- Bahiagrass – *Paspalum notatum*
- Crimson clover - *Trifolium incarnatum*
- ***Can include approved grasses from grazing planting list***

Approved invaders and volunteers

- Arrowleaf clover - *Trifolium vesiculosum*
- Hairy vetch - *Vicia villosa*
- ***Can include any grass from grazing approved invader list***

FORESTRY:

Planting List

Grasses

- Big blue stem - *Andropogon gerardii*
- Bluestem, Little - Schizachyrium scoparium
- Bluestem, Silver - *Bothriochloa laguroides*
- Buffalo grass - *Buchloe dactyloides*
- Fall panicum - *Panicum dichotomiflorum*
- Green sprangletop - *Loptochioa dubia*
- Green sprangletop (*Loptochioa dubia)*
- Herbaceous mimosa - *Mimosa strigillosa*
- Illinois bundleflower - *Desmanthus illinoensis*
- Indian paintbrush - *Castilleja sp.*
- Indiangrass – Cheyenne - *Sorghastrum nutans*
- Iron clay cowpea - *Vigna unguiculata*
- Partridge pea - *Cassic fasciculata*
- Purple prairie clover - *Dalea purpurea*
- Side oats grama - *Bouteloua curtipendula*
- Sunflower – black peredovik - *Helianthus Annuus*
- Sunflower – maximillian prairie gold - *Helianthus maximilianii*
- Switchgrass - *Panicum virgatum*

Trees

- Hickory, bitternut - C*arya cordiformis*
- Hickory, black - *Carya texana*
- Hickory, mockernut- *Carya tomentosa)*
- Hickory, shagbark - *Carya ovata*
- Hickory, water (Pecan, bitter) - *Carya aquatica*
- Maple, red - *Acer rubrum*
- Oak, black - *Quercus velutina*
- Oak, blackjack - *Quercus marilandica*
- Oak, bur - *Quercus macrocarpa*
- Oak, laurel - *Quercus laurifolia*
- Oak, overcup - *Quercus lyrata*
- Oak, post- *Quercus stellata*
- Oak, Shumard - *Quercus shumardii*
- Oak, southern red- *Quercus falcata*
- Oak, swamp chestnut - *Quercus michauxii*
- Oak, water- *Quercus nigra*
- Oak, white - *Quercus alba*
- Oak, willow - *Quercus phellos*
- Pecan - *Carya illnoensis*
- Pine, loblolly - *Pinus taeda*
- Pine, longleaf - *Pinus palustris*

- Pine, shortleaf - *Pinus echinata*
- Walnut, black - *Juglans nigra*

Approved Invaders and Volunteers

Grasses

- ***Can include approved invader grazing and pasture grasses***

Trees

- Basswood, Carolina (Linden)- *Tillia caroliniana*
- Beech, American - *Fagus grandifolia*
- Birch, river - *Betula nigra*
- Black-gum (Tupelo, black) - *Nyssa slyvatica*
- Boxelder - *Acer negundo*
- Cherry, black - *Prunus serotina*
- Coma (Bumelia, Chittamwood) - *Bumelias lanuginosa*
- Cypress, Bald - *Taxodium distichum*
- Dogwood, flowering - *Cornus florida*
- Dogwood, roughleaf - *Cornus drummondii*
- Elm, American - *Ulmus americana*
- Elm, cedar - *Ulmus crassifolia*
- Elm, slippery - *Ulmus rubra*
- Elm, winged - *Ulmus alata*
- Hackberries - *Celtis spp.*
- Holly, American - *Ilex opaca*
- Hornbeam, American (Beech, blue) - *Carpinus caroliniana*
- Hornbean, eastern hop- *Ostrya virginiana*
- Magnolia, southern - *Magnolia grandiflora*
- Mulberry, red - *Morus rubra*
- Osage Orange (horse-apple, bois d'arc) - *Maclura pomifera*
- Persimmon, common - *Diospyrus virginana*
- Red Cedar, eastern - *Juniperus virginiana*
- Redbud, eastern - *Cercis canadensis*
- Sassafras - *Sassafras albidum*
- Sweetgum - *Liquidambar styraciflua*
- Tupelo, water - *Nyssa aquatica*
- Water Elm (Planetree) - *Planera aquatica*

FISH AND WILDLIFE:

- See Table 144-1 for a list of planting species approved by Texas Parks and Wildlife. SMC may plant any of these species for the purpose of developing fish and wildlife habitat.

INDUSTRIAL/COMMERCIAL:

- Plants may be selected from any of the above planting list for the purpose of controlling erosion.

APPENDIX 145-3

NATIVE PLANTS RECOMMENDED FOR POSSIBLE RECLAMATION AND MITIGATION VALUE IN TEXAS

APPENDIX 145-1TPW

Native Plants Recommended for Possible Reclamation and Mitigation Value in Texas (Erosion Control and Wildlife Use)

Trees

Acer negundo	Boxelder
A. rubrum	Maple, red
Betula nigra	Birch, river
Bumelias lanuginosa	Coma (Bumelia, Chittamwood)
Carpinus caroliniana	Hornbeam, American (Beech, blue)
Carya tomentosa)	Hickory, mockernut
C. aquatica	_____, water (Pecan, bitter)
C. cordiformis	_____, bitternut
C. illnoensis	Pecan
C. ovata	Hickory, shagbark
C. texana	_____, black
Celtis spp.	Hackberries
Cercis canadensis	Redbud, eastern
Cornus drummondii	Dogwood, roughleaf
C. florida	_____, flowering
Diospyrus virginana	Persimmon, common
Fagus grandifolia	Beech, American
Ilex, opaca	Holly, American
Juglans nigra	Walnut, black
J. virginiana	Red Cedar, eastern
Liquidambar styraciflua	Sweetgum
Maclura pomifera	Osage Orange (horse-apple, bois d'arc)
Magnolia grandiflora	Magnolia, southern
Morus rubra	Mulberry, red
Nyssa aquatica	Tupelo, water
N. slyvatica	Black-gum (Tupelo, black)
Ostrya virginiana	Hornbean, eastern hop
Pinus echinata	Pine, shortleaf
P. palustris	_____, longleaf
P. taeda	Pine, loblolly
Planera aquatica	Water Elm (Planetree)
Prunus serotina	Cherry, black
Quercus alba	Oak, white
Q. falcata	_____, southern red
Q. laurifolia	_____, laurel
Q. lyrata	_____, overcup
Q. macrocarpa	_____, bur
Q. marilandica	_____, blackjack
Q. michauxii	_____, swamp chestnut

Q. nigra	_____, water
Q. phellos	_____, willow
Q. shumardii	_____, Shumard
Q. stellata	_____, post
Q. velutina	_____, black
Sassafras albidum	Sassafras
Tillia caroliniana	Basswood, Carolina (Linden)
Toxodium distichum	Baldcypress
Ulmus alata	Elm, winged
U. americana	_____, American
U. crassifolia	_____, cedar
U. rubra	_____, slippery

Shrubs

Alnus serrulata	Alder, hazel
Asimina parviflora	Pawpaw, dwarf
A. triloba	_____, common
Ascyrum hypericoides	St. Andrew's cross
Callicarpa americana	Beautyberry, American
Cephalanthus occidentalis	Buttonbush, common
Crataegus spp.	Hawthorns
Euonymus americanus	Strawberrybush
Foresteria acuminata	Privet, swamp
Ilex decidua	Possum-haw (Holly, deciduous)
I. vomitoria	Yaupon
Lindera benzoin	Spicebush, common
Myrica cerifera	Wax-myrtle, southern
Prunus angustifolia	Plum, chicksaw
P. umbellata	Plum, flatwood
Rhamnus caroliniana	Buckthorn, Carolina
Rhododendron spp.	Azaleas
Rhus spp.	Sumacs
Sambucus canadensis	Elderberry, American
Symphoricarpos orbiculatus	Coralberry
Vaccinium spp.	Huckleberries, blueberries
V. arboretum	Farkleberry (Huckleberry, tree)
Viburnum acerifolium	Viburnum, mapleleaf
V. dentatum	Arrowwood, southern
V. nudum	Viburnum, possumhaw
V. prunifolium	Blackhaw
V. rufidulum	Viburnum, downy (Blackhaw, rusty)
Zanthoxylum clava-herculis	Hercules Club (Pricklyash)

Vines

Ampelopsis arborea	Peppervine
Berchemia scandens	Supplejack, Alabama (Rattanvine)
Bignonia carpreolata	Crossvine
Campsis radicans	Trumpet-Creeper, common

Cocculus carolinus	Snailseed, Carolina
Gelsemium sempervirens	Jessamine, Carolina (Jessamine, yellow)
Lonicera sempervirens	Honeysuckle, trumpet
Parthenocissus quinquefolia	Creeper, Virginia
Rubus spp.	Blackberries, Dewberries
Smilax spp.	Greenbriars
Vitis spp.	Grapes

Forbs

Chamaecrista fasciculata	Partridge Pea, (Senna, prairie)
Commelina spp.	Dayflowers
Coreopsis spp.	Coreopsis (Tickseeds)
Croton spp.	Crotons
Desmanthus illinoensis	Bundleflower, Illinois (Mimosa, prairie)
Desmodium sessilifolium	Tickclover, sessileleaf
Gaillardia spp.	Indian blanet (Firewheels)
Helianthus spp.	Sunflowers
Laitris spp.	Gayfeathers
Lupinus spp.	Bluebonnets (Lupines)
Mimosa strigillosa	Herbaceaous mimosa
Oenthera speciosa	Evening Primrose, Mexican
Rudbeckia spp.	Coneflowers (Brown-eyed Susans)
Ruellia spp.	Ruellias (Wild-petunias)
Schrankia nuttalli	Sensitivebriar, catclaw
Strophostyles spp.	Wildbeans
Tephrosia virginiana	Tephrosia (Goat's rue)

Grasses

Andropogon gerardii	Bluestem, big
A. virginicus	_____, broomsedge
Arundinaria gigantea	Cane, giant
Bothriochloa laguroides	Bluestem, silver
Bouteloa curtipendula	Grama, sideoats
B. gracilis	_____, blue
B. hirsuta	_____, *hairy*
Buchloe dactyloides	Buffalograss
Chasmanthium latifolium	Oats, wild
C. sessiliflorum	Spikegrass, longleaf
Dichanthelium obligosanthes	Panicum, Scribners
Elymus virginicus	Wildrye, Virginia
Leptochloa dubia	Sprangletop, green
Panicum anceps	Panicum, beaked
Panicum, obtrusum	Vine-Mesquite
P. virgatum	Switchgrass
Paspalum floridanum	Paspalum, Florida
P. plicatulum	_____, brownseed
Phragmites australis	Reed, common

Schizachrium scoparium	Bluestem, little
Sorghastrum nutans	Indiangrass, yellow
Tripsacum dactyloides	Gamagrass, eastern

Marsh Plants

Brasenia schreberi	Watershield, Schreber
Cyperus esculentus	Nutgrass, yellow (Chufa)
Enchinochloa spp. (natives)	Barnyardgrasses
Elocharis spp.	Spikerushes
Leersia oryzoides	Cutgrass, rice
Lemnaceae	Duckweeds
Leptochloa fasicularis	Spangletop, bearded
Ludwigia spp.	Water Primrose
Najas quadulupensis	Naiad, southern
Panicum dichtotomiflorum	Panicum, fall
Paspalum boscianum	Paspalum, bull
Polygonum ssp.	Smartweed
Potamogeton ~~foliosus~~ ssp.	Pondweed, leafy
Sagittaria spp.	Arrowheads
Scirpus ~~acutus~~ ssp.	Bulrush, hardstem
S. americanus (S.olneyi)	_____, Olney

APPENDIX 3: FUNCTIONAL ASSESSMENT

Note: Refer to **Functional Assessment** Section 5.2, pages 22-23 of this document (Attachment J, Conceptual Mitigation Plan) for the following:

> "Due to delays in finalizing the interim methodologies, the data summary and report is not complete at the time of submittal of this IP application. With Fort Worth District approval, this information will be allowed to be submitted at a later date and will be included in Appendix 3 of this Conceptual Mitigation Plan."

Functional Assessment of Waters of the U.S. Report

Sabine Mine – Rusk Permit Area

Prepared for:

The Sabine Mining Company

Prepared by:

HDR Engineering, Inc.
17111 Preston Road, Suite 200
Dallas, Texas 75248

March 2010

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Appendices

Appendix A: WRAP and Stream Data Sheets
Appendix B: Representative Site Photographs
Appendix C: Map

1.0 INTRODUCTION

The U.S. Army Corps of Engineers (USACE), Fort Worth District, Regulatory Branch has required the Sabine Mining Company (SMC) to perform a functional assessment of the waters of the U.S. in The Rusk Permit Area in conjunction with the individual permit application number SWF-2007-00560. The USACE Fort Worth District is currently developing functional assessment models for wetland and stream resources within the boundaries of the Fort Worth and Tulsa Districts in Texas. These models will allow the USACE to quantify the functional condition of waters of the U.S. and aid calculation of adverse impacts and mitigation compensation under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act of 1899. The Fort Worth District has approved the use of "interim" methodologies for The Sabine Mining Company until the "functional assessment" methodologies for use in the Fort Worth District are complete.

The interim methodologies are based on the Wetland Rapid Assessment Procedure (WRAP) and Mobile District Compensatory Stream Mitigation Standard Operation Procedures and Guidelines (Mobile SOP) that are existing methodologies being utilized in other USACE districts. Some modifications to the two procedures were implemented to adapt the methodologies to local conditions. Further, the methodologies will be used to quantify function of reference mitigation areas (created from reclamation) at the South Hallsville No. 1 Mine. The data from the functional assessment of impacted waters of the U.S. and the reference mitigation areas will be used to evaluate the projected compensatory mitigation for the project.

The purpose of this report is to describe the interim methodologies used for the functional assessment at the Rusk Permit Area and present the results from this functional assessment.

2.0 METHODS

2.1 Wetlands

The interim methodology selected for assessing wetlands for this project is the WRAP (Miller and Gunsalus 1999). This method was selected based on a review and evaluation of existing available methods, the needs of SMC, and the prior use at a North American Coal project in Mississippi. SMC proposed and the USACE Fort Worth District approved using WRAP as the interim methodology for assessing wetlands at the Rusk Permit Area.

WRAP is a rating index for individual ecological and anthropogenic factors that provides a combined score (between zero and one) used to evaluate current wetland condition. The six variables assessed in the WRAP methodology are:

- Wildlife Utilization,
- Wetland Overstory/Shrub Canopy,
- Wetland Vegetative Ground Cover,
- Adjacent Upland Support/Wetland Buffer,
- Field Indicators of Wetland Hydrology, and
- Water Quality Input and Treatment System.

Each variable is scored between zero (0) and three (3) based on a set of calibration descriptions. Additionally, the scores for the Adjacent Upland Support/Wetland Buffer and Water Quality Input and Treatment System variables are calculated from the sum of subtotals for the

percent of the area with each particular score (see WRAP data sheet in Appendix A). The overall score is calculated by summing the scores for the six variables and dividing by the total possible score (18 unless one of the variables is not applicable, then 15). Even though the WRAP was developed in Florida, the scoring descriptions are general enough to apply to the project area.

For assessing conditions of reference wetlands (created from reclamation) at the South Hallsville No. 1 Mine, the Water Quality Input and Treatment System variable was refined to give the "reclamation" land use and pre-treatment category a score of 2.5 based on the condition of these areas. A score of 2.5 is justified for reclamation areas due to the high standards for bond release of mine reclamation areas and the healthy condition of vegetation that ensure storm-water runoff quality is moderately high and nearly that of natural undeveloped areas.

The WRAP was performed in the field for a representative sample of the pre-mine wetlands (both forested and non-forested) in the Rusk Permit Area. The WRAP was also performed on reference mitigation wetlands (post-mining wetlands created from reclamation) at the South Hallsville No. 1 Mine. The assessment of reclamation wetlands consisted of non-forested, forested, and potential forested (likely to become forested based on presence of healthy seedlings/saplings) wetlands of various ages (time since completion of reclamation). Within this report the reference wetlands are labeled with a prefix of WR- for the wetland ID.

For the representative and reference wetlands, each WRAP variable was evaluated and scored in the field with observations documented on the WRAP data sheet (see Appendix A). In the office, the percent of the buffer type, land use category, and pre-treatment category surrounding each wetland was confirmed using GIS and recent aerial photography. The overall WRAP score was then calculated for each representative and reference wetland.

In the Rusk Permit Area, each wetland that was impacted (based on Table E-1 in the individual permit application) was assigned a WRAP score from a representative wetland based on the similarity to that representative wetland from on-site observations and aerial photography. The functional impact to each wetland was calculated by multiplying the acres of impact (based on Table E-1 in the individual permit application) by the sum of one plus the WRAP score.

Functional Impact = Acres of Impact x (1 + WRAP Score)

This formula is used to standardize the functional impacts based on the WRAP score and is not a mitigation multiplier. This formula would not over-compensate for low quality wetlands that should be compensated at a one-to-one ratio since a similar formula (shown below) is used to calculate the projected acres of wetland reclamation needed to compensate for the functional impacts. This formula also follows the example of other assessment methodologies (e.g., the Hydrogeomorphic [HGM] approach and Habitat Evaluation Procedures [HEP]) that use an overall assessment score or index multiplied by a spatial measure to generate units (e.g., functional capacity in HGM or habitat in HEP).

The total functional impacts for forested and non-forested wetlands in the Rusk Permit Area were calculated from the sum of the functional impacts to the individual wetlands.

The average WRAP score was calculated for the non-forested and forested reference wetlands. The average WRAP score for the reference forested wetlands included the scores for the

potential forested wetlands since these wetlands are likely to become forested wetlands based on the density and vigor of tree seedlings and saplings present in the wetland.

The average WRAP score for reference forested and non-forested wetlands was used to calculate the projected acres of wetland reclamation needed to compensate for the total functional impacts by wetland type.

Projected Acres of Wetland Reclamation
= Total Functional Impacts by Wetland Type / (1 + Average Reference WRAP Score)

This formula has an inverse relationship to the formula used to calculate the functional impacts (shown above) and provides an acreage that allows comparison with the acres of impact. This comparison can be used to evaluate the projected functional replacement for the impacted wetlands. However, this analysis does not consider temporal or other mitigation factors that may be considered by the USACE in determining mitigation requirements.

2.2 Streams

The interim methodology selected for assessing streams for this project is the Mobile SOP (USACE 2009). This method was selected based on a review and evaluation of existing available methods, the needs of SMC, and the prior use at a North American Coal project in Mississippi. SMC proposed and the USACE Fort Worth District approved using the Mobile SOP as the interim methodology for assessing streams at the Rusk Permit Area.

The Mobile SOP is a method for assessing stream impacts as well as the projected stream mitigation. The functional impacts (i.e., debits) are determined by multiplying linear feet by a total multiplier derived from the following factors: stream type, priority area, existing channel condition, impact duration, dominant impact type, and cumulative impact. The existing channel condition was evaluated in the field based on observations of a stream's bank erosion, degree of incision, channel widening, sediment deposition, access to the floodplain, and bank vegetation (see stream data sheets in Appendix A). Based on these characteristics a stream was assigned an existing channel condition of fully functional, somewhat impaired, or impaired. For streams that could not be evaluated in the field due to lack of property access, the existing channel condition was inferred based on aerial photography, watershed characteristics, and the condition of similar resources in the region. The stream type and priority area factors for each stream were assigned in the office based on the guidance in the Mobile SOP. The Mobile SOP specifies that "impacts to ephemeral streams will be addressed as wetland impacts." Therefore, this functional assessment using the Mobile SOP will not evaluate ephemeral streams, and the impacts to and mitigation for ephemeral streams will be based on total acreage.

The values used for the impact duration and dominant impact factors have been revised to reflect the type of impact and mitigation timing that is specific to surface coal mining operations. For example, the Mobile SOP contains categories of temporary, recurrent, or permanent for duration of the impact. The Mobile SOP defines temporary as meaning "impacts will occur within a period of less than 6 months and recovery of system integrity will follow cessation of the permitted activity" and permanent as meaning "project impacts will be permanent or will occur during spawning or growth periods for Federal and/or State protected species." During typical coal mining operations a stream with a watershed greater than 640 acres that would be impacted would be relocated/diverted around the mine block before beginning operations and would result in only a brief (temporary) interruption to stream flow. Although some stream

functions would be lost for a period of time in the newly constructed streambed, the mining and reclamation of a block may go on for as long as five to ten years, so it is likely that a stream relocated in accordance with the Mobile SOP to "reflect the dimension, pattern, and profile of natural reference stable conditions" would provide for recovery of system integrity and many stream functions. Studies at the Red Hills Mine in Mississippi have shown that the water and habitat quality in relocated/diverted streams achieve functional quality similar to natural streams in the area that have been impaired by forestry, transportation, and agricultural development. The majority of the streams in the Rusk Permit Area are somewhat impaired due to past land use, oil/gas activities, and crossings for county roads and highways, whereas streams created in reclamation at the South Hallsville No. 1 Mine are fully functional to slightly impaired (depending on the stage of reclamation) with comparable in-stream and riparian habitat to streams in the area. Impacted streams that are not diverted would be restored during the reclamation process following the impacts due to mining activities. Thus the "recovery of system integrity" and functional replacement is anticipated following reclamation. Since the duration of impact is greater than 6 months (i.e., "long-term"), but is not permanent, the factor used for duration is the average of temporary (0.05) and permanent (0.3) which is 0.175.

The dominant impact factor used under this approach is morphologic change. The Mobile SOP defines morphologic change as "to channelize, dredge, or otherwise alter established or natural dimensions, depths, or limits of a stream corridor." The Mobile SOP also notes that the "relocation of a stream is considered fill under these guidelines when the relocation is conducted to allow development of the area where the stream previously was located." The Mobile SOP defines fill as "permanent fill of a stream channel due to construction of dams or weirs, relocation of a stream channel (even if a new stream channel is constructed) or other fill activities." Use of morphologic change as the dominant impact factor as opposed to fill is appropriate in the context of this coal mining operation primarily because the streams are not permanently relocated "in order to allow development" (surface coal mining does not constitute "development" in the usual sense), and the dominant impacts to the existing streams would not constitute "permanent fill" as defined in the Mobile SOP. The Mobile SOP defines impoundment as "to convert a stream to a lentic state with a dam or other detention/control structure that is not designed to pass normal flows below bankfull stage." Some stream segments are impounded during mining activities for sediment control and water quality measures; however, these impoundments are not permanent, and most would be removed (or significantly downsized) during the reclamation process following mining activities. Thus the stream impacts associated with mining activities in the Rusk Permit Area do not constitute permanent fill, and the dominant impact is morphologic change.

The cumulative impact factor used in the Mobile SOP must also be revised to reflect surface coal mining operations. The Mobile SOP assumes that "the greater the linear distance affected by the impact the greater the impact." However, it is inappropriate to calculate a value for the cumulative impact factor based on the entire length of a stream that will be impacted over the life of the mine since mining activities will impact streams incrementally. Mining activities that begin in the lower portion of a watershed will not cause a cumulative impact to the upstream reach of a stream. A given mine block may have a duration of five years, during which streams outside the mine block and its associated infrastructure will not be impacted. Reclamation will also be occurring on streams as mining progresses, so a portion of the stream will be restored as impacts to other portions of the stream are occurring. Impacted streams that are relocated/diverted around the mine block would not cause a cumulative impact to the upstream or downstream portions of the stream since the upstream portion would not be impacted and the downstream portion would experience only a temporary interruption to stream flow. Stream impacts beyond the first five-year permit term have not been calculated by each five-year mine

block, so calculating the cumulative impact factor for these stream impacts is not warranted. Calculating the stream impacts by mine block would also overly-complicate the calculation of the cumulative impact factor and the impacts associated with each 404 permit term. Given the incremental nature of surface coal mining operations through the use of mine blocks and the reclamation process, the cumulative impact factor will not be used outside of the first five-year disturbance boundary.

Reference streams restored in the reclamation area at the South Hallsville No. 1 Mine were evaluated using the Mobile SOP for net benefit of mitigation related to channel condition, bank stability, in-stream habitat, and riparian habitat to demonstrate the projected stream mitigation credit that would be generated by reference reclamation streams. Within this report the reference streams are labeled with a prefix of SR- for the stream ID. The Mobile SOP calculates mitigation credit separately for in-stream work and riparian buffer work. The in-stream credits are determined by multiplying linear feet by a total multiplier derived from the following factors: stream type, priority area, existing condition, net benefit, bank stability, in-stream habitat, and timing of mitigation. The riparian buffer credits are determined by multiplying linear feet by a total multiplier derived from the following factors: stream type, priority area, net benefit for stream side A, net benefit for stream side B, system protection credit, timing of mitigation for stream side A, and timing of mitigation for stream side B. For this projection of mitigation credit, a 1,000 linear-foot reach of each reference stream was evaluated and utilized for the calculations. The projected mitigation functional credit and functional impacts may be compared using the ratios of functional credit to linear feet reclaimed/restored and functional impacts to linear feet of impact.

The existing condition factor used in the calculation of in-stream functional credit is not the existing condition of the reference streams at the South Hallsville No. 1 Mine since these streams have already been restored during reclamation. Rather, the existing condition factor used in the mitigation calculations is the channel condition prior to restoration. For this projection of mitigation credit, the somewhat impaired factor is used for the condition of the streams that existed prior to mining and reclamation based on the assessment of the predominant channel condition of the streams in the Rusk Permit Area as well as similar streams in the region.

The Mobile SOP includes a mitigation factor that reduces mitigation credits by 50 percent for stream mitigation that is located within one mile of the upstream end of an existing or proposed man-made lake and flows into the lake. The only justification for this reduction that is provided in the Mobile SOP is that stream mitigation should be conducted on free flowing streams. Although this mitigation factor may be appropriate in some regions, it is not justified for the aquatic systems found in East Texas and in the Rusk Permit Area. The streams in the Rusk Permit Area as well as those found in the South Hallsville No. 1 Mine reclamation area have a gradient that is high enough that the influence of impoundments on stream flow does not extend beyond the immediate vicinity of the upstream end of the impoundment. In addition, impoundments can serve as a refuge for aquatic organisms (e.g., invertebrates, fish, and frogs) during extended periods of drought and allow faster re-colonization of streams once flow returns. Therefore, downstream impoundments would not have an overall negative impact to the function of stream restoration in mine reclamation areas and may provide enhancements for aquatic species. Thus the use of the mitigation factor from the Mobile SOP is not justified and will not be applied in the projection of mitigation credits generated by reclamation using reference streams at the South Hallsville No. 1 Mine.

3.0 RESULTS

3.1 Wetlands

The results of the functional assessment for wetland waters of the U.S. at the Rusk Permit Area and for the reference reclamation wetlands at the South Hallsville No. 1 Mine are reported below. The WRAP data sheets for the representative and reference wetlands can be found in Appendix A. Representative site photographs are located in Appendix B, and a map is located in Appendix C.

The WRAP scores for the representative forested wetlands at the Rusk Permit Area ranged from 0.61 to 0.93. The WRAP scores for the representative non-forested wetlands at the Rusk Permit Area ranged from 0.37 to 0.78. Table 1 below depicts the score for each WRAP variable as well as the overall WRAP score for the representative forested and non-forested wetlands in the Rusk Permit Area.

Table 1. WRAP Scores for Representative Wetlands in the Rusk Permit Area

Wetland ID	Type	Wildlife Utilization (WU)	Wetland Canopy (O/S)	Wetland Ground Cover (GC)	Habitat Support/ Buffer	Field Hydrology (HYD)	Water Quality Input and Treatment (WQ)	WRAP Score
WF-102	Forested	2	1	2	2	2	2.9	0.66
WF-129	Forested	3	3	3	2.3	2.5	2.2	0.89
WF-134	Forested	2.5	3	3	2.9	2.5	2.8	0.93
WF-137	Forested	2.5	2.5	3	2.75	2.5	2.65	0.88
WF-143	Forested	2	1.5	2	2.9	2	2.73	0.73
WF-151	Forested	2.5	3	2	2.95	2.5	2.6	0.86
WF-169	Forested	2.5	2.5	2.5	2.8	1.5	2.6	0.80
WF-174	Forested	2.5	2.5	2.5	3	2	2.93	0.86
WF-202	Forested	2	1	2	2	2	1.98	0.61
WF-206	Forested	2.5	2	1.5	2.85	2	2.8	0.76
WN-34	Non-forested	1.5	N/A	1	0.5	2	0.6	0.37
WN-35	Non-forested	2	1	1	0.85	1.5	1	0.41
WN-37	Non-forested	2	2	2	1.7	2.5	2.3	0.69
WN-38	Non-forested	2	N/A	3	1.9	2	2.73	0.78

The functional impacts were calculated from the acres of impact to each wetland and the WRAP score for that wetland using the functional impact formula described in section 2.1 above. A table of the acres of impact, WRAP score, and functional impact for each individual wetland is included in Table 2 below. As depicted in the WRAP scores in Table 2, the majority of the non-forested wetlands in the Rusk Permit Area are heavily disturbed, cleared areas or areas that were cleared in the past and are now used for livestock grazing. The functional impacts calculated for forested wetlands is 269.58, and the functional impacts calculated for non-forested wetlands is 92.17, for total functional impacts in the Rusk Permit Area of 361.75.

Table 2. Functional Impact by Wetland in the Rusk Permit Area

Wetland ID	Type	Acres of Impact	WRAP Score	Functional Impact*
WF-8	Forested	0.02	0.61	0.03
WF-13	Forested	0.05	0.73	0.09
WF-14	Forested	0.10	0.73	0.17
WF-15	Forested	0.21	0.80	0.38
WF-17	Forested	0.02	0.89	0.04
WF-18	Forested	0.13	0.89	0.25
WF-19	Forested	0.23	0.89	0.43
WF-20	Forested	0.24	0.93	0.46
WF-21	Forested	0.06	0.93	0.12
WF-22	Forested	0.18	0.89	0.34
WF-23	Forested	0.12	0.93	0.23
WF-24	Forested	0.13	0.89	0.25
WF-25	Forested	0.03	0.89	0.06
WF-26	Forested	0.10	0.80	0.18
WF-27	Forested	0.37	0.80	0.67
WF-28	Forested	0.22	0.80	0.40
WF-29	Forested	0.09	0.88	0.17
WF-30	Forested	0.17	0.88	0.32
WF-31	Forested	0.12	0.80	0.22
WF-32	Forested	0.06	0.66	0.10
WF-33	Forested	0.75	0.73	1.30
WF-34	Forested	0.14	0.76	0.25
WF-74	Forested	0.28	0.80	0.50
WF-80	Forested	0.22	0.80	0.40
WF-81	Forested	0.10	0.76	0.18
WF-91	Forested	0.33	0.80	0.59
WF-102	Forested	1.33	0.66	2.21
WF-103	Forested	0.37	0.73	0.64
WF-104	Forested	0.09	0.61	0.14
WF-105	Forested	1.54	0.76	2.71
WF-106	Forested	0.33	0.76	0.58
WF-128	Forested	6.74	0.89	12.74
WF-129	Forested	17.79	0.89	33.62
WF-130	Forested	1.42	0.89	2.68
WF-131	Forested	2.62	0.88	4.93
WF-132	Forested	17.74	0.76	31.22
WF-133	Forested	29.92	0.76	52.66
WF-134	Forested	2.71	0.93	5.23
WF-137	Forested	1.07	0.88	2.01
WF-140	Forested	0.65	0.88	1.22
WF-142	Forested	6.25	0.61	10.06
WF-143	Forested	8.67	0.73	15.00
WF-150	Forested	0.37	0.66	0.61
WF-151	Forested	6.36	0.86	11.83
WF-154	Forested	0.31	0.86	0.58
WF-157	Forested	1.21	0.86	2.25
WF-158	Forested	0.20	0.86	0.37
WF-169	Forested	8.54	0.80	15.37
WF-189	Forested	2.05	0.86	3.81

Wetland ID	Type	Acres of Impact	WRAP Score	Functional Impact*
WF-190	Forested	1.56	0.86	2.90
WF-191	Forested	0.46	0.76	0.81
WF-192	Forested	0.04	0.88	0.08
WF-193	Forested	0.08	0.86	0.15
WF-194	Forested	0.08	0.88	0.15
WF-195	Forested	0.15	0.76	0.26
WF-196	Forested	0.09	0.88	0.17
WF-197	Forested	0.05	0.88	0.09
WF-200	Forested	11.44	0.76	20.13
WF-202	Forested	6.71	0.61	10.80
WF-203	Forested	0.41	0.61	0.66
WF-204	Forested	0.77	0.61	1.24
WF-205	Forested	0.39	0.61	0.63
WF-206	Forested	6.20	0.76	10.91
WN-3	Non-forested	0.19	0.41	0.27
WN-5	Non-forested	0.20	0.41	0.28
WN-7	Non-forested	0.07	0.41	0.10
WN-8	Non-forested	0.04	0.41	0.06
WN-9	Non-forested	0.001	0.41	0.001
WN-10	Non-forested	0.10	0.41	0.14
WN-11	Non-forested	0.08	0.41	0.11
WN-12	Non-forested	0.05	0.41	0.07
WN-13	Non-forested	0.02	0.41	0.03
WN-14	Non-forested	0.03	0.41	0.04
WN-15	Non-forested	0.32	0.41	0.45
WN-16	Non-forested	0.16	0.41	0.23
WN-17	Non-forested	0.20	0.41	0.28
WN-18	Non-forested	0.18	0.41	0.25
WN-19	Non-forested	0.10	0.41	0.14
WN-21	Non-forested	2.58	0.41	3.64
WN-22	Non-forested	0.12	0.41	0.17
WN-23	Non-forested	0.07	0.41	0.10
WN-24	Non-forested	0.67	0.41	0.94
WN-25	Non-forested	7.17	0.41	10.11
WN-26	Non-forested	1.13	0.41	1.59
WN-27	Non-forested	3.88	0.41	5.47
WN-28	Non-forested	4.91	0.69	8.30
WN-29	Non-forested	0.19	0.41	0.27
WN-30	Non-forested	1.59	0.41	2.24
WN-31	Non-forested	4.22	0.41	5.95
WN-34	Non-forested	2.57	0.37	3.52
WN-35	Non-forested	20.58	0.41	29.02
WN-36	Non-forested	0.004	0.41	0.01
WN-37	Non-forested	6.48	0.69	10.95
WN-38	Non-forested	2.45	0.78	4.36
WN-40	Non-forested	1.85	0.41	2.61
WN-41	Non-forested	0.33	0.41	0.47
Forested subtotal		*151.18*	-	***269.58***
Non-forested subtotal		*62.54*	-	***92.17***
TOTAL		**213.72**	-	**361.75**

* Calculated using the functional impact formula on page 2.

The WRAP scores for the reference reclamation forested wetlands at the South Hallsville No. 1 Mine ranged from 0.64 to 0.77. The WRAP scores for the reference reclamation potential forested wetlands at the South Hallsville No. 1 Mine ranged from 0.67 to 0.82. The average WRAP score for reference forested and potential forested wetlands at the South Hallsville No. 1 Mine is 0.72. The WRAP scores for the reference reclamation non-forested wetlands at the South Hallsville No. 1 Mine ranged from 0.57 to 0.66. The average WRAP score for reference non-forested wetlands at the South Hallsville No. 1 Mine is 0.61. Table 3 below depicts the score for each WRAP variable as well as the overall WRAP score for the reference reclamation forested, potential forested, and non-forested wetlands at the South Hallsville No. 1 Mine.

Table 3. WRAP Scores for Reference Wetlands at the South Hallsville No. 1 Mine

Wetland ID	Type	Wildlife Utilization (WU)	Wetland Canopy (O/S)	Wetland Ground Cover (GC)	Habitat Support/ Buffer	Field Hydrology (HYD)	Water Quality Input and Treatment (WQ)	WRAP Score
WR-1	Non-forested	1	N/A	2	1	2	2.5	0.57
WR-2	Potential Forested	2	1.5	2	2	2	2.5	0.67
WR-3	Forested	2	2	2	2.5	2	2.44	0.72
WR-4	Forested	2	1	2	2	2	2.5	0.64
WR-5	Non-forested	2	N/A	1.5	2.2	2	2.2	0.66
WR-6	Forested	2.5	2.5	2	2.3	2	2.5	0.77
WR-7	Potential Forested	2.5	2	1.5	2.9	3	2.9	0.82

Based on the total functional impacts at the Rusk Permit Area and the average WRAP score for reference forested and non-forested wetlands at the South Hallsville No. 1 Mine, the projected acres of wetland reclamation needed to compensate for the functional impacts was calculated using the projected acres of wetland reclamation formula described in section 2.1 above. The results are presented in Table 4 below.

Table 4. Functional Impacts and Projected Acres of Wetland Reclamation Needed

Type	Acres of Impact	Functional Impacts	Average Reference (Reclamation) Wetland WRAP Score	Projected Acres of Wetland Reclamation to Compensate for Functional Impacts*
Forested Wetland	151.18	269.58	0.72	156.76
Non-Forested Wetland	62.54	92.17	0.61	57.27
Total	**213.72**	**361.75**	**-**	**214.02**

* Calculated using the projected acres of wetland reclamation formula on page 3.

Based on the average WRAP score of reference wetlands in reclamation at the South Hallsville No. 1 Mine, the total acres of wetland reclamation needed to compensate for the functional impacts is nearly equal to the acres of impact at the Rusk Permit Area. Conceptually, this demonstrates that the projected reclamation could provide functional replacement for the wetland impacts.

Note that the analysis above does not consider temporal or other mitigation factors that may be considered by the USACE in determining mitigation requirements.

3.2 Streams

The results of the functional assessment for streams at the Rusk Permit Area and for the reference reclamation streams at the South Hallsville No. 1 Mine using the Mobile SOP are reported below. The stream data sheets can be found in Appendix A. Representative site photographs are located in Appendix B, and a map is located in Appendix C.

The functional impacts to streams in the Rusk Permit Area using the Mobile SOP as revised for surface coal mining operations described above are 11,364 debits of perennial stream and 230,198 debits of intermittent stream for a total of 241,562 debits (see Table 5). The perennial streams (Sabine River and Cherokee Bayou) have an existing condition of fully functional, whereas the majority of the intermittent streams have an existing condition of somewhat impaired due to past land use, oil/gas activities, and crossings for county roads and highways. The Sabine River and Cherokee Bayou were classified as secondary priority areas because of their large watersheds and moderate importance to the biodiversity of stream ecosystems. These streams did not meet any of the criteria for designated primary priority areas as defined in the Mobile SOP. The remaining intermittent streams were classified as tertiary priority areas because they did not meet the criteria for designated primary or secondary priority areas and lack importance to the biodiversity of stream ecosystems.

The well-established reference reclamation streams at the South Hallsville No. 1 Mine are fully functional with stable banks and comparable in-stream and riparian habitat to natural streams in the area. The reference streams that are recently restored have an existing condition of somewhat impaired with moderately stable banks, but are anticipated to reach fully functional and develop in-stream and riparian habitat comparable to natural streams within five to ten years as reclamation and vegetation establishment of the watershed progresses. As shown in Table 6, the total projected in-stream functional credit generated by the five reference streams assessed at the South Hallsville No. 1 Mine is 11,100 credits. As shown in Table 7, the total projected riparian buffer credit for the five reference streams assessed at the South Hallsville No. 1 Mine is 6,850 credits. The total projected mitigation credit for the five reference streams assessed at the South Hallsville No. 1 Mine is 17,950 credits (see Table 8).

Table 5. Functional Impacts to Streams in the Rusk Permit Area using Mobile SOP (Revised)

Stream ID	Stream Type Impacted	Stream Type Factor	Priority Area	Priority Area Factor	Existing Condition	Existing Condition Factor	Duration*	Duration Factor*	Dominant Impact**	Dominant Impact Factor**	Cumulative Impact Factor***	Sum of Factors	Linear Feet of Stream Impacted	Functional Impact
Impacts in First Five-Year Permit Term														
Sabine River	Greater than Second Order Perennial	0.4	Secondary	0.4	Fully Functional	1.6	Long-term	0.175	Morphologic Change	1.5	0.2	4.275	603	2,578
S3-C1	Intermittent	0.1	Tertiary	0.1	Somewhat Impaired	0.8	Long-term	0.175	Morphologic Change	1.5	2.4	5.075	12,187	61,849
S3-C2	Intermittent	0.1	Tertiary	0.1	Somewhat Impaired	0.8	Long-term	0.175	Morphologic Change	1.5	0.7	3.375	3,367	11,364
S3-G1	Intermittent	0.1	Tertiary	0.1	Fully Functional	1.6	Long-term	0.175	Morphologic Change	1.5	0.6	4.075	3,080	12,551
Impacts Projected Beyond the First Five-Year Permit Term														
Cherokee Bayou	Greater than Second Order Perennial	0.4	Secondary	0.4	Fully Functional	1.6	Long-term	0.175	Morphologic Change	1.5	-	4.075	2,156	8,786
S3-A1	Intermittent	0.1	Tertiary	0.1	Somewhat Impaired	0.8	Long-term	0.175	Morphologic Change	1.5	-	2.675	12,315	32,943
S3-A1	Intermittent	0.1	Tertiary	0.1	Impaired	0.1	Long-term	0.175	Morphologic Change	1.5	-	1.975	2,160	4,266
S3-B1	Intermittent	0.1	Tertiary	0.1	Somewhat Impaired	0.8	Long-term	0.175	Morphologic Change	1.5	-	2.675	9,353	25,019
S3-B2	Intermittent	0.1	Tertiary	0.1	Somewhat Impaired	0.8	Long-term	0.175	Morphologic Change	1.5	-	2.675	11,720	31,351
S3-C1	Intermittent	0.1	Tertiary	0.1	Somewhat Impaired	0.8	Long-term	0.175	Morphologic Change	1.5	-	2.675	9,963	26,651
S3-D1	Intermittent	0.1	Tertiary	0.1	Somewhat Impaired	0.8	Long-term	0.175	Morphologic Change	1.5	-	2.675	5,367	14,357
S3-E1	Intermittent	0.1	Tertiary	0.1	Somewhat Impaired	0.8	Long-term	0.175	Morphologic Change	1.5	-	2.675	1,938	5,184
S4-B1	Intermittent	0.1	Tertiary	0.1	Somewhat Impaired	0.8	Long-term	0.175	Morphologic Change	1.5	-	2.675	1,743	4,663
Perennial subtotal													*2,759*	***11,364***
Intermittent subtotal													*73,193*	***230,198***
TOTAL													75,952	**241,562**

* Long-term used for impact duration since the streams impacted by mining activities will be reclaimed/restored following mining. Since the impact duration is greater than 6 months but not permanent, factor used is 0.175, the average of temporary (0.05) and permanent (0.3) factors in SOP.
** Dominant Impact characterized as Morphologic Change since impacts do not constitute permanent fill as defined in the Mobile SOP.
*** Cumulative Impact Factor was only calculated for the first five year permit term due to sequencing of mining operations.

Table 6. In-Stream Functional Credit for Reference Streams at South Hallsville No. 1 Mine using Mobile SOP

Stream ID	Stream Type	Stream Type Factor	Priority Area	Priority Area Factor	Existing Condition*	Existing Condition Factor*	Net Benefit	Net Benefit Factor	Bank Stability	Bank Stability Factor	In-stream Habitat	In-stream Habitat Factor	Timing of Mitigation	Timing Factor	Sum of Factors	Linear Feet of Stream**	Functional Credit
SR-1	Intermittent	0.05	Tertiary	0.05	Somewhat Impaired	0.05	Stream Restoration (Good)	2.0	Stable Banks	0.4	Four Cover Types	0.15	After	0	2.70	1,000	2,700
SR-2	Intermittent	0.05	Tertiary	0.05	Somewhat Impaired	0.05	Stream Restoration (Good)	2.0	Stable Banks	0.4	Three Cover Types	0.1	After	0	2.65	1,000	2,650
SR-3	Intermittent	0.05	Tertiary	0.05	Somewhat Impaired	0.05	Stream Restoration (Good)	2.0	Stable Banks	0.4	Four Cover Types	0.15	After	0	2.70	1,000	2,700
SR-4	Intermittent	0.05	Tertiary	0.05	Somewhat Impaired	0.05	Stream Restoration (Moderate)	1.0	Moderately Stable Banks	0.2	One Cover Type	0	After	0	1.35	1,000	1,350
SR-5	1st Order Perennial	0.4	Tertiary	0.05	Somewhat Impaired	0.05	Stream Restoration (Moderate)	1.0	Moderately Stable Banks	0.2	One Cover Type	0	After	0	1.70	1,000	1,700
TOTAL																5,000	**11,100**

* Existing Condition is what existed prior to reclamation/restoration and is assumed to be somewhat impaired based on the condition of the majority of streams in the area.
** Linear Feet of Stream is a reference 1,000 linear foot reach.

Table 7. Riparian Buffer Restoration and Enhancement Credit for Reference Streams at South Hallsville No. 1 Mine using Mobile SOP

Stream ID	Stream Type	Stream Type Factor	Priority Area	Priority Area Factor	Net Benefit Stream Side A	Net Benefit Side A Factor	Net Benefit Stream Side B	Net Benefit Side B Factor	System Protection Credit	Timing of Mitigation Stream Side A	Timing Side A Factor	Timing of Mitigation Stream Side B	Timing Side B Factor	Sum of Factors	Linear Feet of Stream*	Functional Credit
SR-1	Intermittent	0.05	Tertiary	0.05	Riparian Restoration (100')	0.8	Riparian Restoration (100')	0.8	0.8	After	0	After	0	2.5	1,000	2,500
SR-2	Intermittent	0.05	Tertiary	0.05	Riparian Restoration (50')	0.4	Riparian Restoration (50')	0.4	0.4	After	0	After	0	1.3	1,000	1,300
SR-3	Intermittent	0.05	Tertiary	0.05	Riparian Restoration (50')	0.4	Riparian Restoration (50')	0.4	0.4	After	0	After	0	1.3	1,000	1,300
SR-4	Intermittent	0.05	Tertiary	0.05	Riparian Enhancement (50')	0.2	Riparian Enhancement (50')	0.2	0.2	After	0	After	0	0.7	1,000	700
SR-5	1st Order Perennial	0.4	Tertiary	0.05	Riparian Enhancement (50')	0.2	Riparian Enhancement (50')	0.2	0.2	After	0	After	0	1.05	1,000	1,050
TOTAL															5,000	**6,850**

* Linear Feet of Stream is a reference 1,000 linear foot reach.

Table 8. Total Projected Mitigation Credit for Reference Streams at South Hallsville No. 1 Mine

Stream ID	Stream Type	Linear Feet of Stream Reclaimed	In-stream Functional Credits	Riparian Buffer Credits	Total Credits	Ratio of Total Credits to Linear Feet Reclaimed
SR-1	Intermittent	1,000	2,700	2,500	5,200	5.2
SR-2	Intermittent	1,000	2,650	1,300	3,950	4.0
SR-3	Intermittent	1,000	2,700	1,300	4,000	4.0
SR-4	Intermittent	1,000	1,350	700	2,050	2.1
SR-5	Perennial	1,000	1,700	1,050	2,750	2.8
TOTAL	**-**	**5,000**	**11,100**	**6,850**	**17,950**	**Average* = 3.6**

* Average ratio is calculated by dividing total of total credits column by total of linear feet of stream reclaimed column.

Table 9. Summary of Functional Impacts to Streams in the Rusk Permit Area

	Linear Feet of Stream Impacted	Functional Impacts	Ratio of Functional Impacts to Linear Feet of Impact
Perennial Stream	2,759	11,364	4.1
Intermittent Stream	73,193	230,198	3.1
TOTAL	**75,952**	**241,562**	**Overall* = 3.2**

* Overall ratio is calculated by dividing total functional impacts by total linear feet of stream impacted.

Based on the projected mitigation credit for reference streams in reclamation at the South Hallsville No. 1 Mine, the average ratio of mitigation credit to linear feet of stream reclamation is 3.6 (see Table 8). This exceeds the overall ratio of functional impacts to linear feet of impact which is 3.2 (see Table 9). Conceptually, this demonstrates that the streams restored in mining reclamation areas could functionally replace the impacts to the somewhat impaired streams in the Rusk Permit Area.

4.0 CONCLUSIONS

The interim methodologies approved by the USACE Fort Worth District (WRAP for wetlands and Mobile SOP for streams) were used to assess the function of the waters of the U.S. at the Rusk Permit Area as well as reference mitigation areas (created from reclamation) at the South Hallsville No. 1 Mine.

Based on the results of this functional assessment, the total functional impacts for forested and non-forested wetlands at the Rusk Permit Area are 361.75 (Table 4). The average WRAP score for reference forested and non-forested wetlands assessed at the South Hallsville No. 1 Mine were used to project the acres of wetland reclamation needed to compensate for the functional impacts. Table 4 also indicates the acres of reclamation needed for forested wetland (156.76) are slightly higher than the acres of forested wetland impact (151.18), whereas the acres of reclamation needed for non-forested wetland (57.27) are slightly lower than the acres of non-forested wetland impact (62.54). Overall, the total acres of wetland reclamation (214.02) is nearly identical to the acres of wetland impact (213.72), which demonstrates conceptually that projected mitigation can provide the functional replacement for the wetland impacts at the Rusk Permit Area.

The total functional impacts to streams at the Rusk Permit Area based on this functional assessment are 241,562 (Table 9). The overall ratio of functional impacts to linear feet of impact is 3.2 (Table 9). Based on the projected mitigation credit for reference streams restored in

reclamation at the South Hallsville No. 1 Mine, the average ratio of functional credits to linear feet reclaimed is 3.6 (Table 8). The higher ratio for projected mitigation as compared to the ratio for impacts demonstrates conceptually that streams restored in reclamation can provide the functional replacement for streams impacted at the Rusk Permit Area.

In summary, this functional assessment evaluates the functional impacts to wetlands and streams of mining at the Rusk Permit Area as well as the projected functional replacement by mitigation wetlands and streams created and/or restored in reclamation using the South Hallsville No.1 Mine as a reference. The results of the functional assessment demonstrate that the functional impacts to wetlands and streams at the Rusk Permit Area can be compensated for by the projected function of wetlands and streams created and/or restored in reclamation based on the reference wetlands and streams at the South Hallsville No.1 Mine. The ultimate totals of functional replacement will be dependant upon the acres of wetlands and length of streams created and/or restored through the mine planning and reclamation process at the Rusk Permit Area.

5.0 REFERENCES

Miller, R.E., Jr., and B.E. Gunsalus. 1999. Wetland Rapid Assessment Procedure. Updated Second Edition. Technical Publication REG-001. Natural Resource Management Division, Regulation Department, South Florida Water Management District.

U.S. Army Corps of Engineers, Mobile District. 2009. Compensatory Stream Mitigation Standard Operation Procedures and Guidelines.