US Army Corps
of Engineers®

Fort Worth District

July 2015

Draft

Regional Environmental Impact Statement for Surface Coal and Lignite Mining in Texas

Cooperating Agencies:

Office of Surface Mining, Reclamation, and Enforcement
Railroad Commission of Texas
U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service

DEPARTMENT OF THE ARMY
FORT WORTH DISTRICT, CORPS OF ENGINEERS
P. O. BOX 17300
FORT WORTH, TEXAS 76102-0300

July 10, 2015

Regulatory Division

Dear Reader:

The Draft Regional Environmental Impact Statement (REIS) for Surface Coal and Lignite Mining in Texas is submitted for your review and comment. The REIS considers the potential environmental impacts of future mine expansions or satellite mines in six study areas along the coal-bearing geological formations that run from southwest to northeast Texas (detailed maps within). The study areas encompass locations within the coal/lignite belt in Texas that were determined to be within reasonable proximity to existing surface coal and lignite mines with potential for future expansion.

The U.S. Army Corps of Engineers (USACE), Fort Worth District, is proposing changes to their regulatory framework for surface coal and lignite mines in Texas. The proposed regulatory framework includes the establishment of a Regional General Permit (RGP) and a revised Letter of Permission (LOP) procedure with modifications to aquatic resource impact thresholds and a change from agency concurrence to agency coordination as compared to the current process. No changes to the criteria for Nationwide Permit (NWP) 21 or NWP 49 are proposed. The REIS is intended to provide an environmental evaluation focusing on the potential direct, indirect, and cumulative aquatic resource impacts, in addition to other relevant environmental and human resources, that could be affected by future surface coal and lignite mining within defined geographic regions in Texas. The REIS would facilitate future tiering or supplementation of the NEPA analysis in the REIS in the evaluation of future project-specific Section 404/10 permit applications. It also is intended to provide a cohesive framework for stream mitigation, establishment of sound performance metrics, and enhance project monitoring efforts associated with these types of activities. The REIS is intended to avoid duplication and provide efficiency and effectiveness with future decisions. ***The REIS does NOT render a project-specific permit decision.*** Its purpose is to inform the public and decision maker of the impacts associated with implementing the proposal, to evaluate alternatives to the proposal, and to solicit other agencies and the public for comments.

The REIS is being prepared in compliance with the National Environmental Policy Act of 1969 (NEPA), the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] 1500-1508), and the USACE Procedures for Implementing NEPA (33 CFR 230). An electronic copy of the document is available for review and/or download at: http://www.swf.usace.army.mil/Missions/Regulatory/Permitting/REISforLigniteMininginTexas.aspx

For further information, please contact Mr. Darvin Messer at 817-886-1744.

Sincerely,

Stephen L. Brooks
Chief, Regulatory Division

DRAFT REGIONAL ENVIRONMENTAL IMPACT STATEMENT
SURFACE COAL AND LIGNITE MINING IN TEXAS

Lead Agency:	Department of the Army U.S. Army Corps of Engineers Fort Worth District
Project Location:	Six defined study areas located along the southwest- to northeast-trending coal belt in Texas
Comments on this EIS Should be Directed to:	Mr. Darvin Messer, EIS Project Manager U.S. Army Corps of Engineers Fort Worth District 819 Taylor Street, Room 3A37 P.O. Box 17300 Fort Worth, Texas 76102-0300 (817-886-1744)
Date Draft EIS Filed with USEPA:	July 1, 2015
Date by Which Comments Must be Received by the USACE:	September 8, 2015

ABSTRACT

The U.S. Army Corps of Engineers (USACE), Fort Worth District, as lead federal agency, is preparing this Regional Environmental Impact Statement (REIS) to analyze potential impacts within defined geographic regions in Texas that may be affected by future USACE, Fort Worth District, permit decisions for future surface coal and lignite mine expansions within the District's area of responsibility. The REIS is being prepared in compliance with the National Environmental Policy Act of 1969 (NEPA), the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] 1500-1508), and the USACE Procedures for Implementing NEPA (33 CFR 230).

The USACE, Fort Worth District, is proposing changes to the USACE regulatory framework for surface coal and lignite mines in Texas. The proposed regulatory framework includes the establishment of a Regional General Permit (RGP) and a revised Letter of Permission (LOP) procedure with modifications to aquatic resource impact thresholds and a change from agency concurrence to agency coordination as compared to the current process. No changes to the criteria for Nationwide Permit (NWP) 21 or NWP 49 are proposed.

The REIS considers the potential environmental impacts of future mine expansions or satellite mines in six study areas along the coal-bearing formations in Texas that run from southwest Texas to northeast Texas. The study areas encompass locations within the coal/lignite belt in Texas that were determined to be within reasonable proximity to existing surface coal and lignite mines with potential for future expansion.

Responsible Official for the EIS:

for Clay A. Morgan, P.E.
Lieutenant Colonel, U.S. Army
District Engineer

Executive Summary

ES1.1 Introduction and Background

The U.S. Army Corps of Engineers (USACE) Fort Worth District, as lead federal agency, is preparing this Regional Environmental Impact Statement (REIS) to analyze potential impacts within defined geographic regions in Texas that may be affected by future USACE Fort Worth District permit decisions for future surface coal and lignite mine expansions or satellite mines within the District's area of responsibility. The REIS is being prepared in compliance with the National Environmental Policy Act of 1969 (NEPA), the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] 1500-1508), and the USACE Procedures for Implementing NEPA (33 CFR 230). The Office of Surface Mining, Reclamation, and Enforcement (OSMRE); Railroad Commission of Texas (RCT); U.S. Environmental Protection Agency (USEPA); and U.S. Fish and Wildlife Service (USFWS) are serving as cooperating agencies.

The REIS considers six study areas along the coal-bearing formations in Texas that run from southwest Texas to northeast Texas (see **Figure ES-1**). The study areas encompass locations within the coal/lignite belt in Texas that were determined to be within reasonable proximity to existing surface coal and lignite mines with potential for future expansion.

ES1.2 USACE Purpose and Need for the Action

Currently operating surface coal and lignite mines in Texas provide a long-term, reliable, continuous, and economically stable fuel source to existing nearby power plants, with one mine providing raw lignite material to an existing carbon activation plant. As the existing permitted surface coal and lignite mines approach the extent of the reserves that can be safely and economically recovered within the limits of their current mine permit areas, expansion of mine areas would be required in order to continue to meet their supply obligations.

Surface coal and lignite mining projects typically conduct work that results in impacts to waters of the U.S. Such work requires authorization under Section 404 of the Clean Water Act, and for projects affecting navigable waters, authorization under Section 10 of the Rivers and Harbors Act of 1899. These programs are administered by the USACE. As part of the permit evaluation process associated with Section 404 and Section 10 permit authorizations, the USACE is also required to comply with the regulatory requirements of NEPA in evaluating the potential impacts of a proposed action.

A majority of the future surface coal and lignite mining proposals will require Section 404 (and in some cases Section 10) permits and associated NEPA compliance documents. The anticipated number of future permit applications requiring USACE Fort Worth District compliance with NEPA, along with agency resource constraints, could result in lengthy review times. Historic permit evaluations associated with mine expansions have required substantial time periods. These timeframes have been influenced in part by the need to develop resource information, undertake data gathering efforts, as well as coordination with various agencies and their permit review processes. The USACE Fort Worth District also needs to ensure it can adapt and efficiently respond to multiple concurrent requests for permits that may occur in the future. In addition, mine operators also have to coordinate with and obtain authorizations from other agencies which can contribute to additional time for other evaluation and regulatory decisions they are pursuing.

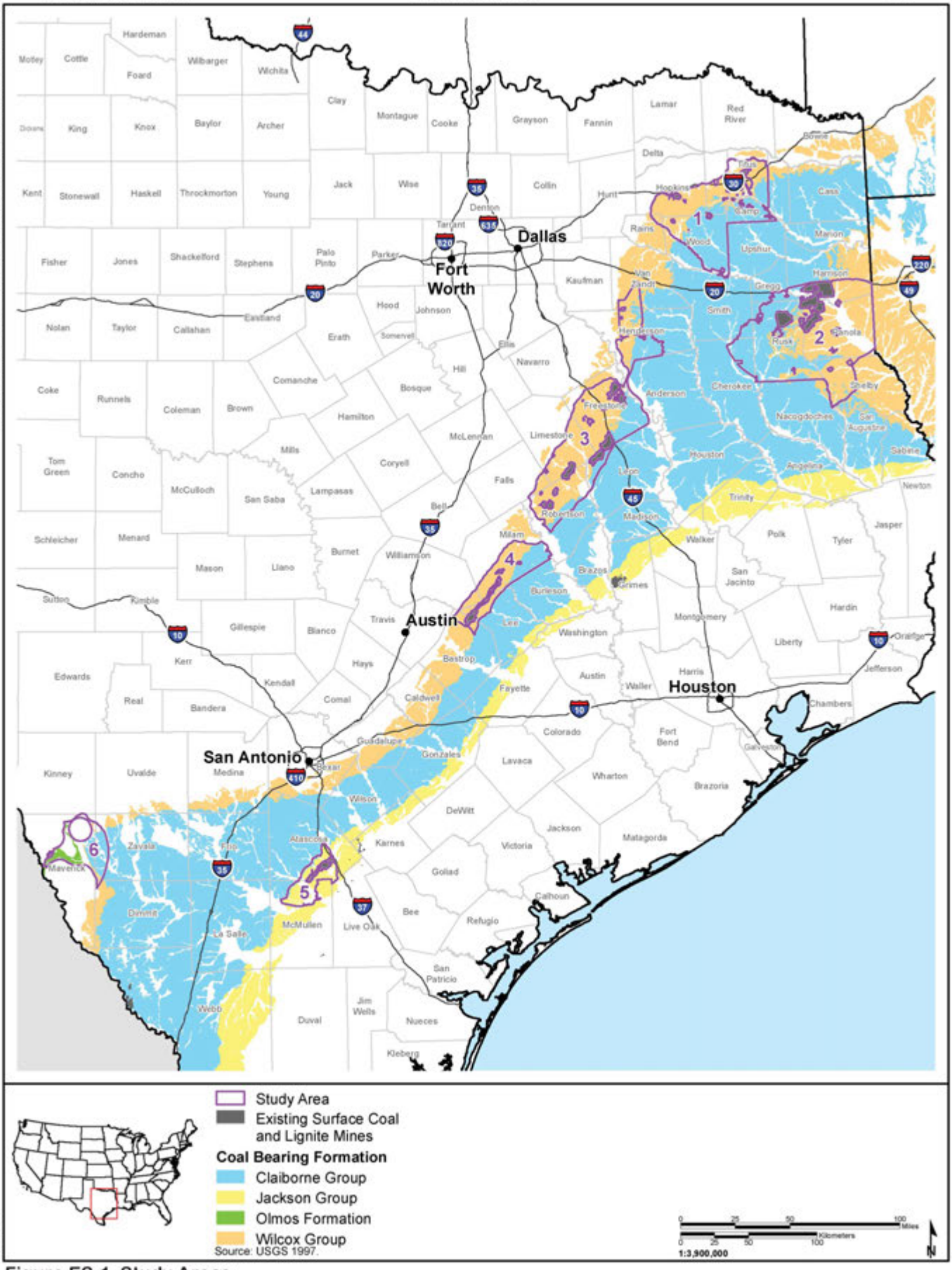

Figure ES-1 Study Areas

Many of the federal and state agency regulatory requirements and environmental issues associated with surface coal and lignite mining projects are similar, such as large landscape alterations, economic effects, impact avoidance, mitigation measures, performance metrics/monitoring, and the contribution to cumulative impacts. Therefore, the USACE Fort Worth District is undertaking the REIS to streamline the NEPA aspect of the District's Section 404/10 permitting process, as well as to develop information, data, and analysis to be used in Section 404(b)(1) guidelines and public interest review analyses for future coal and lignite mine expansions and satellite mines in Texas. The USACE Fort Worth District's purpose for the REIS is to provide a NEPA-compliant environmental evaluation focusing on potential direct, indirect, and cumulative aquatic resource impacts, in addition to all other relevant environmental and human resources within the defined geographic regions in Texas that would be associated with and affected by future USACE Fort Worth District permit decisions. Additionally, this REIS will serve to establish a cohesive framework for stream mitigation, establish sound performance metrics, and enhance project monitoring efforts. This assessment would facilitate future tiering or supplementation in the evaluation of future project-specific Section 404/10 permit applications for surface coal and lignite mines. A single regional NEPA document is intended to avoid duplication and be more efficient and effective for the lead and cooperating agencies involved in the regional NEPA process in making future decisions under their respective authorities.

ES1.3 Alternatives Analyzed in Detail

ES1.3.1 Proposed Action

The USACE Fort Worth District is proposing changes to the District's regulatory framework for surface coal and lignite mines in Texas. The proposed regulatory framework, as presented in **Table ES-1**, includes the establishment of a Regional General Permit (RGP) and a revised Letter of Permission (LOP) procedure with modifications to aquatic resource impact thresholds and a change from agency concurrence (agreement) to agency coordination as compared to the process for the existing LOP-3. Resulting thresholds that would trigger evaluation of a potential future surface coal or lignite mine expansions and satellite mines under the existing Individual Permit (IP) process also are shown in the table. No changes to the criteria for Nationwide Permit (NWP) 21 or NWP 49 are proposed.

Table ES-1 Proposed USACE Fort Worth District Regulatory Framework

Permit Type	Acreage Limit	Linear Footage Limit	Agency Coordination Requirement	Resource Limitations (type)
NWP 21[1]	0.5	300 linear feet of stream (perennial, ephemeral, or intermittent), unless waived for ephemeral and intermittent streams	Coordination for waiver	No regional conditions limiting use
NWP 49 – Coal Remining Activities[1,2]	None	None	No	Mine, reclamation and mitigation plan must result in a net increase in aquatic resource functions
RGP	0.5 – 10 acres	Study Areas 1-4: 20,000 linear feet all stream types, with no more than 1,000 total linear feet for perennial streams	No	Forested wetlands cannot make up more than 50 percent of the water of the U.S. impact area; no

Table ES-1 Proposed USACE Fort Worth District Regulatory Framework

Permit Type	Acreage Limit	Linear Footage Limit	Agency Coordination Requirement	Resource Limitations (type)
		Study Areas 5-6: 30,000 linear feet all stream types, with no more than 1,000 total linear feet for perennial streams		impacts to bogs; no impacts to bald cypress-tupelo swamps
LOP	10 – 25 acres	No limit[3]	Yes	Forested wetlands cannot make up more than 50 percent of the waters of the U.S. impact area
IP	>25 acres	No limit	Yes	None

[1] Reflects existing thresholds and resource limitations for the NWP 21 and NWP 49; no changes are proposed.

[2] May be authorized for mining and reclamation of lands previously mined for coal/lignite if the proposed activities are currently authorized, or are in the process of being authorized, under the Surface Mining Control and Reclamation Act SMCRA of 1977. New coal/lignite mining activities may be authorized in conjunction with the remining activities if: 1) the proposed new mining disturbance is 40 percent or less of the proposed total disturbance and 2) the overall mining plan would result in a net increase in aquatic resource functions.

[3] USACE Fort Worth District will review each proposed action on a case-by-case basis.

Note: WOUS = waters of the U.S.

No changes to the USACE Fort Worth District's current Section 404 mitigation guidelines for surface coal and lignite mines in Texas are proposed. As such, the current Section 404 mitigation guidelines would continue to be implemented under the Proposed Action. Under this REIS the USACE Fort Worth District will not render a decision on any specific mine project. Rather, submittal of project-specific permit applications, development and evaluation of separate project-specific NEPA analyses, and subsequent issuance of all required local, state, and federal permits would be required prior to development of any future surface coal or lignite mine expansion area or satellite mine in any of the study areas. The study areas for this REIS are summarized in **Table ES-2**.

Table ES-2 Summary of Study Areas

Study Areas	Approximate Total Acreage in Study Area	Estimated Maximum Disturbance Acreages Associated with Potential Requests for Future Authorizations	Estimated Percent of Study Area Potentially Disturbed under Anticipated Requests for Future Authorizations
Study Area 1	912,500	13,500	1.5
Study Area 2	1,449,300	50,200	3.5
Study Area 3	1,219,200	50,600	4.2
Study Area 4	365,300	9,800	2.7
Study Area 5	180,800	9,500	5.3
Study Area 6	252,300	25,000	9.9
Total	4,379,400	158,600	3.6

ES1.3.2 No Action Alternative

Under the No Action Alternative, the existing USACE Fort Worth District regulatory framework for surface coal and lignite mines in Texas, and the District's current Section 404 mitigation guidelines, would continue to be used. The existing regulatory framework is presented in **Table ES-3**.

Table ES-3 Existing USACE Fort Worth District Regulatory Framework

Permit Type	Acreage Limit	Linear Footage Limit	Agency Coordination Requirement	Resource Limitations
NWP 21	0.5	300 linear feet of stream (perennial, ephemeral, or intermittent), unless waived for ephemeral and intermittent streams	Coordination for waiver	No regional conditions limiting use
NWP 49 – Coal Remining Activities[1]	None	None	No	Mine, reclamation and mitigation plan must result in a net increase in aquatic resource functions
LOP-3	20 acres	20,000 linear feet of stream, with no more than 1,000 linear feet for perennial streams	Yes[2]	Forested wetlands cannot make up more 50 percent of the waters of the U.S. impact area
IP	>20 acres	No limit	Yes	None

[1] May be authorized for mining and reclamation of lands previously mined for coal/lignite if the proposed activities are currently authorized, or are in the process of being authorized, under SMCRA. New coal/lignite mining activities may be authorized in conjunction with the remining activities if: 1) the proposed new mining disturbance is 40 percent or less of the proposed total disturbance and 2) the overall mining plan would result in a net increase in aquatic resource functions.

[2] LOP-3 requires agency concurrence.

ES1.4 Summary of Impacts

Table ES-4 summarizes the potential impacts for each resource that would be affected by the implementation of the Proposed Action or No Action Alternative. The construction, operation, and closure/final reclamation activities and mine components of a typical surface coal or lignite mine expansion area or satellite mine were used to facilitate the impact analysis for this REIS. The need for additional mitigation may be identified during the project-specific NEPA and 404(b)(1) analyses that would be conducted at the time future mine expansion areas or satellite mines are proposed.

ES1.5 Coordination and Consultation

ES1.5.1 Public Participation and Scoping

Public participation for the REIS began with the scoping process. The USACE Fort Worth District initiated the scoping process by publishing the Notice of Intent to prepare the REIS in the Federal Register on October 24, 2013. Additionally, a Public Notice was mailed to over 485 federal, state, and local government agencies; private businesses and organizations; private landowners; and tribes. Public notices were also placed in 18 local newspapers announcing the public scoping meetings. The USACE Fort Worth District conducted public scoping meetings on December 3, 2014, in Uvalde, Texas; December 4, 2014, in Temple/Belton, Texas; and December 5, 2014, in Tyler, Texas. A total of 110 meeting participants signed their attendance at the meetings.

The USACE Fort Worth District coordinated a meeting with interested agencies on July 16, 2013, to provide detailed technical information about the REIS and to solicit agency input regarding the scope, issues, and potential alternatives to be considered. Attendees included representatives from OSMRE, RCT, USFWS, Texas Parks and Wildlife Department, and Texas Commission on Environmental Quality.

At the end of the comment period, the scoping comments were compiled and analyzed to identify key issues and concerns. Some of the scoping comments were eliminated from consideration in the REIS because they addressed issues outside of the scope of the NEPA analyses, or the comment stated an opinion rather than a substantive comment that could be addressed in the REIS. A Scoping Summary Report was prepared and posted to the USACE Fort Worth District's public website for the REIS. The scope of the REIS reflects input received from the public and from government agencies.

ES1.5.2 Consultation and Coordination with Federal, State, and Local Government Agencies

Specific regulations require the USACE to coordinate and consult with federal, state, and local agencies about the potential for a proposed action and alternatives to affect sensitive environmental and human resources. For the REIS, the USACE Fort Worth District initiated these coordination and consultation activities through the scoping process. In addition, the USACE Fort Worth District invited interested agencies to serve as cooperating agencies for preparation of the REIS; OSMRE, USEPA, USFWS, and RCT are serving as cooperating agencies.

ES1.5.3 Tribal Government-to-Government Consultation

In compliance with the National Historic Preservation Act and USACE Policy Guidance Letter No. 57 (Indian Sovereignty and Government-to-Government Relations with Indian Tribes) the USACE is required to establish regular and meaningful consultation and collaboration with Native American tribal governments on development of regulatory policies that could significantly or uniquely affect their communities. As such, the USACE Fort Worth District has initiated consultation with Native American tribes.

Table ES-4 Summary of Direct and Indirect Impacts by Resource or Impact Issue and Recommended Monitoring and Mitigation

Resource/Impact Issue	Proposed Action Alternative	No Action Alternative	Recommended Monitoring and Mitigation Measures
Geology/Minerals/Paleontology			
Modification of topography	Topography would be altered by the removal of overburden and coal or lignite on approximately 158,600 acres. Effects minimized through regrading to approximate original contour.	Same as the Proposed Action.	• No monitoring or mitigation is recommended for geology, paleontological, or mineral resources.
Removal of coal and lignite resources making it unavailable in the future	Permanent removal of an estimated 35 million tons of coal or lignite annually	Same as the Proposed Action.	
Access to oil and gas resources	Access to oil and gas resources would be precluded or limited during active mining unless horizontal drilling were implemented.	Same as the Proposed Action.	
Damage to fossils	Mining may directly damage or destroy common fossils; however, the potential for impact to significant fossils is low.	Same as the Proposed Action.	
Water Resources			
Groundwater			
Drawdown of aquifers	Maximum extent of projected mine-related 5-foot groundwater contour as a result of dewatering and depressurization would vary across the study areas, ranging from a high of 15 miles in Study Area 4 to zero in Study Area 6. Mine-related groundwater pumping impacts for future mines would be confined to the portion of the affected aquifers within a mine-related groundwater drawdown area, until mining ends and groundwater levels recover.	Same as the Proposed Action.	• No monitoring or mitigation measures are recommended.

Table ES-4 Summary of Direct and Indirect Impacts by Resource or Impact Issue and Recommended Monitoring and Mitigation

Resource/Impact Issue	Proposed Action Alternative	No Action Alternative	Recommended Monitoring and Mitigation Measures
Groundwater quantity	The effects on other groundwater uses would vary depending on the extent of required mine depressurizion and dewatering. Impacts would be confined to the portion of the affected aquifers within a mine-related groundwater drawdown area until mining ends and groundwater levels recover. In accordance with RCT requirements, water supply would be replaced if water supply wells are impacted by mining operations.	Same as the Proposed Action.	
Groundwater quality	Groundwater quality in mine pit backfill areas may have elevated levels of salinity; however, impacts to groundwater due to increased salinity would be minimal in all study areas.	Same as the Proposed Action.	
Surface Water			
Removal of surface water features[1]	Direct effects to surface water features from mining would vary by study area. It is estimated that the occurrence of streams within future mining areas would range from a high of approximately 56 miles of perennial streams and 187 miles of intermittent streams potentially affected in Study Area 2 to a low of approximately 0.3 miles of perennial streams and 82 miles of intermittent streams in Study Area 6. A currently unquantifiable portion of these streams may be impacted by future mining activities if during future mine-specific permitting: 1) a waiver is granted by RCT (per Section 12.355 under the Texas Coal Mining Regulations) and 2) the proposed disturbance represents the least environmentally damaging practicable alternative in accordance with the USACE's Section 404(b)(1) guidelines.	Same as the Proposed Action.	• No monitoring beyond that required by jurisdictional agencies is recommended for surface water; no mitigation is recommended.

Table ES-4 Summary of Direct and Indirect Impacts by Resource or Impact Issue and Recommended Monitoring and Mitigation

Resource/Impact Issue	Proposed Action Alternative	No Action Alternative	Recommended Monitoring and Mitigation Measures
Flow effects from watershed modifications	Changes to flow patterns and increased storm water runoff from bare ground may alter stream flows. Compliance with federal and state regulations would minimize flow increases from disturbed areas.	Same as the Proposed Action.	
Surface water quality	Surface water runoff from disturbed areas would contain increased turbidity and possibly higher concentrations of salinity and other contaminants. These adverse impacts to would be largely confined to the future mine permit areas. Impacts would be minimized through compliance with RCT and USACE Fort Worth District permit requirements. The potential for acid-forming constituents or other geochemical weathering products to affect surface water quality would be avoided by compliance with RCT regulations. The regulations require analysis of overburden and underburden through appropriate acid-base accounting or other assessments. Selective handling plans and follow-up testing would be developed and implemented to ensure that acid- or toxic-forming material are not placed in the upper 4 feet of the backfill profile.	Generally similar to the Proposed Action. Restrictions on impacts would not be applied for smaller mine expansion areas (0.5 to 10 acres), which could allow greater surface water-related impacts in some areas. The resource benefits from concentrating regulatory efforts and specific mitigation on future mine expansion areas or satellite mines with greater potential for surface water impacts would not occur.	
Waters of the U.S., including wetlands			
Impacts to waters of the U.S., including wetlands	Assuming that the acreage of waters of the U.S., including wetlands, projected to be impacted by future mining would be proportional to the size of the study area and the projected acreage that would be mined in each study area, most of the wetlands projected to be impacted by future mining would be palustrine because this type covers the largest acreage within the study areas. It is estimated that the acreage of wetlands projected to be impacted would range from approximately 3,655 acres in Study Area 2 to 110 acres in Study Area 5.	Same as the Proposed Action.	• No additional monitoring or mitigation beyond that currently required by the USACE Fort Worth District is recommended.

Table ES-4 Summary of Direct and Indirect Impacts by Resource or Impact Issue and Recommended Monitoring and Mitigation

Resource/Impact Issue	Proposed Action Alternative	No Action Alternative	Recommended Monitoring and Mitigation Measures
Soils and Reclamation			
Impacts to soil resources	Direct incremental disturbance of soil resources may cause associated increased erosion, alteration of soil structure, and reduction in soil productivity. Implementation of erosion control measures, soil and suitable growth media salvage, and a mine-specific reclamation plan would minimize the impacts. The projected acreage of soils anticipated to be affected equates to the amount of surface disturbance projected in each study area.	Same as the Proposed Action.	• Rough and final grading should occur when the soils are dry to minimize soil compaction during reclamation. • Compacted surface or subsurface soils should be treated for compaction by deep ripping or subsoiling, prior to revegetation efforts.
Vegetation (including special status species)			
Impacts to vegetation	Up to 158,600 acres of vegetation or approximately 3.6 percent of the 4,379,400 acres within all study areas is projected to be disturbed by mine development, ranging from 1.5 percent of the acreage in Study Area 1 to 9.9 percent in Study Area 6. There would be a long-term loss of woody species and short-term loss of herbaceous species following reclamation. Implementation of compensatory mitigation plans would minimize impacts to vegetation in each study area.	Same as the Proposed Action.	• Conduct of special status plant species surveys in areas of potentially suitable habitat prior to ground-disturbing activities is recommended. • Development of appropriate mitigation and monitoring in coordination with USFWS and TPWD, as applicable, to minimize impacts to identified special status plant species is recommended. • Where possible, surface disturbance should be at least 100 feet from any non-jurisdictional wetland or riparian area, with a vegetation buffer maintained. • Prior to ground disturbance, select plant species (e.g., pitcher-plant) may be relocated to suitable habitat in coordination with the appropriate jurisdictional agency.
Establishment of noxious weeds or invasive plants	Surface disturbance from future mining would increases the potential for the spread and establishment of noxious weeds or invasive plant species,	Same as the Proposed Action.	
Impacts to special status plant species (i.e., species afforded protection under federal and state laws)	Surface disturbance in Study Areas 2, 3, 4, and 6 may affect populations or habitat for the six federal or state listed plant species, but adverse impacts would be minimized through consultation with USFWS under the ESA and compliance with state laws and regulations.	Same as the Proposed Action.	

Table ES-4 Summary of Direct and Indirect Impacts by Resource or Impact Issue and Recommended Monitoring and Mitigation

Resource/Impact Issue	Proposed Action Alternative	No Action Alternative	Recommended Monitoring and Mitigation Measures
Fish and Wildlife Resources (including special status species)			
Terrestrial Wildlife			
Loss or alteration of terrestrial habitats	Direct impacts would include habitat loss and alteration, habitat fragmentation, wildlife displacement, and wildlife mortality. Indirect impacts would include effects related to increased noise, light, and human presence. Long-term impacts would include permanent changes to, or loss of, habitats and the wildlife populations that depend on those habitats, irrespective of reclamation success. Even with successful reclamation, the habitats would be altered for a long time period, particularly woody-species dominated habitats. Larger species displaced during mining would return following reclamation as long as suitable habitat is re-established. The regional carrying capacity for birds may be reduced by the incremental loss of available nest and roost sites depending on the species affected and the site-specific conditions.	Same as the Proposed Action.	• If vegetation clearing activities should be required during the migratory bird breeding season (March through July), pre-construction breeding bird surveys would be conducted prior to these activities. • If active nests are located or other evidence of nesting is observed, appropriate protection measures should be implemented, including the establishment of buffer areas and constraint periods, until the young have fledged and dispersed from the nest area. • If interior least tern nesting activity is observed in mine-related disturbance areas, appropriate buffer areas and constraint periods would be implemented in coordination with the jurisdictional agencies. • For the protection of wildlife and special status species, dark-sky lighting should be installed that is fully shielded.
Changes in wetland and riparian habitat	Resident and migratory bird species and reptiles would be affected by an incremental reduction in available habitat where directly removed or where impacted by mine-related groundwater drawdown. Mine discharges to surface water channels may increase flows downstream and could support additional riparian areas or wetlands that could be used by terrestrial species during active mining operations.	Same as the Proposed Action.	
Effects on special status wildlife species populations and habitat (i.e., species afforded protection under federal and state laws)	Potential impacts to special status species including14 bird species, 4 mammal species, and 7 reptile species are anticipated to be minor as long as field surveys and mitigation or avoidance measures are completed in advance of ground-disturbing activities. Potential types of impacts would parallel those described above for general wildlife species.	Same as the Proposed Action.	

Table ES-4 Summary of Direct and Indirect Impacts by Resource or Impact Issue and Recommended Monitoring and Mitigation

Resource/Impact Issue	Proposed Action Alternative	No Action Alternative	Recommended Monitoring and Mitigation Measures
Fisheries and Other Aquatic Biological Resources			
Loss or alteration of aquatic habitat	Surface disturbance of streams that are ecologically important to fisheries and aquatic habitat is expected to occur during mine-related activities. Compliance with state and federal permit requirements would minimize long-term impacts, but disturbance of habitat would occur where streams cannot be avoided by surface mining operations. The impacts would vary by study area, based on the projected maximum acreage of surface disturbance and the amount of perennial streams. Flow reductions resulting from mine-related groundwater drawdown and stream flow increases due to mine water discharge may alter aquatic habitat near active mines.	Same as the Proposed Action.	• If direct disturbance occurs in a waterbody with invasive aquatic species, all vehicles and equipment would be cleaned and dried prior to working in adjacent drainages. • Avoid important spawning or nursery areas for special status fish species. • Where there is potential habitat, conduct special status mussel species surveys within the proposed disturbance areas. Relocate to similar habitat if disturbance cannot be avoided. • Avoid mining-related construction and operations in designated critical habitat for Houston toad in Study Area 4.
Effects of water quality changes	Surface water quality may be affected due to surface disturbance within or near waterbodies that may increase sedimentation and turbidity. Off site impacts on aquatic habitat from mining operations would be minimized through compliance with federal and state permit requirements, such as erosion controls and storm water management.	Same as the Proposed Action.	
Effects on special status aquatic species and habitat (i.e., species afforded protection under federal and state laws)	Changes in water flow and quality and the disturbance of perennial streams, contributing drainages, and upstream watersheds may result in adverse impacts to habitat important to listed species. Impacts would vary depending on the location of future mine expansion areas or satellite mines in relation to the rivers and perennial streams containing habitat for federal and state listed species.	Same as the Proposed Action.	

Table ES-4 Summary of Direct and Indirect Impacts by Resource or Impact Issue and Recommended Monitoring and Mitigation

Resource/Impact Issue	Proposed Action Alternative	No Action Alternative	Recommended Monitoring and Mitigation Measures
Cultural Resources			
Direct impacts to cultural resources	Historic properties representing numerous cultures, both historic and prehistoric, occur in each study area. Mining-related disturbance would alter archaeological stratigraphy that provides context for buried historic properties, if present. Surface disturbance may modify cultural landscapes, and historic structures and buried archaeological sites may be adversely affected by earth-moving and vibrations from mining activities. Adverse impacts to NRHP-eligible sites would be minimized through survey and documentation in advance of surface disturbance and avoidance or mitigation as determined by the USACE Fort Worth District and THC.	Same as the Proposed Action.	• Monitoring of mine-related construction activities (i.e., new surface disturbance) conducted by knowledgeable professionals to avoid recorded NRHP-eligible or state protected cultural resources and minimize damage to previously unknown sites. • Each mining company would educate on site mine personnel as to the sensitive and confidential nature of cultural resources and implement a strict policy against illegal collection.
Potential impacts to previously undiscovered significant sites	Previously unidentified sites could be discovered during construction and operations. Implementation of committed measures to protect a site until it can be evaluated by the THC potentially would minimize impacts.	Same as the Proposed Action.	
Potential indirect impacts to cultural resources	Potential indirect impacts to NRHP-eligible sites within and outside a mine area may result from increased runoff or water discharge. Implementation of surface water controls and erosion control measures would minimize these effects. Other possible indirect adverse impacts could include illegal collection, inadvertent damage, and vandalism associated with increased access and human presence.	Same as the Proposed Action.	

Table ES-4 Summary of Direct and Indirect Impacts by Resource or Impact Issue and Recommended Monitoring and Mitigation

Resource/Impact Issue	Proposed Action Alternative	No Action Alternative	Recommended Monitoring and Mitigation Measures
Air Quality			
Potential exceedence of ambient air quality standards	There would be temporary air quality impacts due to increases in local fugitive dust levels. Concentrations of criteria pollutants generated from mining-related activities would not exceed National Ambient Air Quality Standards (NAAQS).	Same as the Proposed Action.	• No additional monitoring or mitigation measures are recommended.
Greenhouse gas emissions	Potential contribution to manmade global climate effects would be immeasurably small.	Same as the Proposed Action.	
Land Use and Recreation			
Impacts to urban growth	Development of future mine expansion areas or satellite mines could delay adjacent urban growth until areas are mined and successfully reclaimed, depending on the proposed location of a future mine area in relation to urban areas.	Same as the Proposed Action.	• Accidental damage to property or infrastructure, as a result of mining activities, would be reported to landowners or the appropriate authorities immediately, and the mine operator would be responsible for repair or replacement.
Impacts to agricultural uses	Agricultural uses would not be available in mine-related disturbance areas until reclamation is completed.	Same as the Proposed Action.	
Impacts to industrial uses	The primary industrial land use in the study areas is oil and gas development. Access to new oil and gas resources may be restricted during active mining. Gathering lines, access roads, and other facilities and associated infrastructure may need to be relocated to allow for mining operations.	Same as the Proposed Action.	

Table ES-4 Summary of Direct and Indirect Impacts by Resource or Impact Issue and Recommended Monitoring and Mitigation

Resource/Impact Issue	Proposed Action Alternative	No Action Alternative	Recommended Monitoring and Mitigation Measures
Impacts to availability of dispersed recreational uses	Potential future mining locations temporarily would be inaccessible while mining operations progress through an area and reclamation is completed. Mine construction and operation could disturb recreationists on lands outside of the mine area. Potential impacts would be related to mine-related noise and ground vibrations, fugitive dust emissions, increased human presence, and the visual intrusion of mine equipment and components where solitude and remote experiences are desired. Mining operations may cause game and aquatic species to relocate, changing the experience for hunters and fishers in some areas.	Same as the Proposed Action.	
Social and Economic Values			
Population and housing changes	No measureable effects to population are anticipated.	Same as the Proposed Action.	No monitoring or mitigation measures are recommended.
Employment and income change	No substantial changes to employment or income patterns are anticipated, with the possible exception of a beneficial impact on the high unemployment rate in Study Area 6. There may be a minor shift in income and employment from one county to another within each study area depending on future mine locations. There would be a temporary increase of contract construction workers at the start of mine development.	Same as the Proposed Action.	
Changes to local public finances	Little or no change in public finance is anticipated. Future mine expansion areas and satellite mines would extend the taxable revenue for a longer time period and may move into and out of taxing jurisdictions.	Same as the Proposed Action.	
Impacts on public education	Little or no change in tax payments to schools would result.	Same as the Proposed Action.	

Table ES-4 Summary of Direct and Indirect Impacts by Resource or Impact Issue and Recommended Monitoring and Mitigation

Resource/Impact Issue	Proposed Action Alternative	No Action Alternative	Recommended Monitoring and Mitigation Measures
Impacts on residences	Potential future surface coal and lignite mine expansion areas and satellite mines may result in resident displacement, depending on the location of mining operations. Displacement would continue for the life of the disturbance and reclamation.	Same as the Proposed Action.	
Transportation			
Changes to roadways	Limited to no increase in traffic would be anticipated, with the possible exception of temporary increases during mine construction. Mine-related traffic may use different public roadways depending on the location of future mine expansion areas or satellite mines in relation to existing operations. No change in level of service (LOS) on affected roadways is anticipated.	Same as the Proposed Action.	No monitoring or mitigation measures are recommended.
Road closures	Short-term delays may occur where roads are temporarily affected by bridge or overpass construction to accommodate mining. County and local roads within future mine disturbance areas would be closed incrementally by the jurisdictional agency in advance of mine operations; alternate public and landowner access routes would be provided prior to road closures.	Same as the Proposed Action.	
Changes to railroads	Effects on rail transportation would be expected to be minimal.	Same as the Proposed Action.	

Table ES-4 Summary of Direct and Indirect Impacts by Resource or Impact Issue and Recommended Monitoring and Mitigation

Resource/Impact Issue	Proposed Action Alternative	No Action Alternative	Recommended Monitoring and Mitigation Measures
Noise			
Change in ambient noise levels	Mining-related noise levels would be temporary and transitory. Impacts at any specific location would depend on the distance between mining activities and sensitive receptors, the intervening terrain, and the in-pit operating depth of the equipment.	Same as the Proposed Action.	• Noise generation in the vicinity of sensitive receptors should be minimized by restricting the simultaneous operation of noise producing equipment. • All motorized equipment should be fitted with properly functioning mufflers. • Mine planning should include berms and other noise barriers when operating at or near the surface in the vicinity of sensitive receptors.
Visual Resources			
Effects to visual landscape	Existing landscape character would be changed from the time of initial clearing until reclamation is successfully completed. The extent of the impact would vary depending on how visible the mining operations are, as determined by the terrain, height and type of vegetation, and location of sensitive viewers. Although lights used to light the pit areas would be shielded and aimed downward, consistent with safety and MSHA regulations, there would be an overall increase in ambient light levels in the mining area.	Same as the Proposed Action.	• Visual screening should be employed near the permit boundary where there are nearby potentially sensitive public viewpoints. Existing vegetation should be preserved and augmented and groves of trees should be retained where possible to provide visual buffers.

Table ES-4 Summary of Direct and Indirect Impacts by Resource or Impact Issue and Recommended Monitoring and Mitigation

Resource/Impact Issue	Proposed Action Alternative	No Action Alternative	Recommended Monitoring and Mitigation Measures
Hazardous Materials and Solid Waste			
Hazardous materials transport and usage	No general increase in hazardous materials transport or usage; duration of hazardous materials transport would be extended up to 30 years, based on the typical life of mine.	Same as the Proposed Action.	• Develop a protocol for handling contaminated sites to ensure protection of workers and to minimize potential environmental impacts.
Spill of hazardous materials during transport	Small probability of a spill or release during the life of a mine. The greatest potential impacts would occur if a spill occurred in proximity to a major river. Implementation of SPCC Plan and Emergency Response Plan would minimize potential impacts of an on site spill or release.	Same as the Proposed Action.	
Generation of hazardous and solid wastes	Hazardous and solid wastes would be stored, used, and disposed of in accordance with current regulations.	Same as the Proposed Action.	
Public Health			
Impact to health of local populations	No adverse public health impacts are anticipated due to water quality, air quality, noise, or lighting effects.	Same as the Proposed Action.	No monitoring or mitigation measures are recommended.
Environmental Justice			
Potential disproportionate effects to low-income or minority populations	No disproportionate effects to low income or minority populations are anticipated.	Same as the Proposed Action.	No monitoring or mitigation measures are recommended.

[1] National Hydrograph Dataset (NHD) data lump ephemeral streams with intermittent streams.

Acronyms and Abbreviations

°F	degrees Fahrenheit
µg/m^3	micrograms per cubic meter
AAQS	Ambient Air Quality Standards
ACHP	Advisory Council on Historic Preservation
AIRFA	American Indian Religious Freedom Act
amsl	above mean sea level
APE	Area of Potential Effect
APLIC	Avian Power Line Interaction Committee
AQRV	air quality related values
AQS	air quality station
BCC	Birds of Conservation Concern
BGEPA	Bald and Golden Eagle Protection Act
bgs	below ground surface
BMP	best management practice
CAA	Clean Air Act
CAAA	Clean Air Act Amendment
CBNG	coal bed natural gas
CCR	coal combustion residue
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CESA	cumulative effects study area
CFR	Code of Federal Regulations
cfs	cubic feet per second
CH_4	Methane
CHIA	Cumulative Hydrologic Impact Assessment
CO	carbon monoxide
CO_2	Carbon dioxide
CO_2e	carbon dioxide equivalents
CTA	Council of Texas Archaeologists
CWA	Clean Water Act
dB	Decibels
dBA	decibels on the A-weighted scale

EA	Environmental Assessment
EIA	Energy Information Agency
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
ESCTP	Ecological Systems Classification of Texas Project
FEMA	Federal Emergency Management Agency
FM	farm-to-market
FONSI	Finding of No Significant Impact
GHG	Greenhouse gas
gpm	gallons per minute
GtC	Gigatonnes of carbon
HAP	hazardous air pollutant
HB	House Bill
HDR	HDR Engineering, Inc.
HSS	historic standing structure
HUC	Hydrologic Unit Code
HUD	U.S. Department of Housing and Urban Development
IBWC	International Boundary Waters Commission
IP	individual permit
IPaC	Information, Planning, and Conservation
IPCC	Intergovernmental Panel on Climate Change
kg/ha	kilograms per hectare
km	kilometer
kV	kilovolt
L_{dn}	day-night (average sound) level
LDWF	Louisiana Department of Wildlife and Fisheries
LOP	Letter of Permission
LOS	level of service
LRP	low revegetation potential
MACT	Maximum Achievable Control Technology
MBTA	Migratory Bird Treaty Act
mg/L	milligrams per liter
mg/m^3	milligrams per cubic meter
MLRA	Major Land Resource Area

MOA	Memorandum of Agreement
MSDS	Material Safety Data Sheets
MSHA	Mine Safety and Health Administration
NAAQS	National Ambient Air Quality Standards
NFIP	National Flood Insurance Program
NACD	Native American Consultation Database
NADP	National Atmospheric Deposition Program
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NHD	National Hydrography Dataset
NHPA	National Historic Preservation Act
NO_2	nitrogen dioxide
NO_X	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRC	National Research Council
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSPS	new source performance standard
NWI	National Wetlands Inventory
NWIS	National Water Information Service
NWP	Nationwide Permit
P.L.	Public Law
OSMRE	Office of Surface Mining, Reclamation, and Enforcement
PCR1	Primary Contact Recreation category 1
PFYC	Potential Fossil Yield Classification
PM_{10}	particulate matter with an aerodynamic diameter of 10 microns or less
$PM_{2.5}$	particulate matter with an aerodynamic diameter of 2.5 microns or less
ppm	parts per million
PSD	Prevention of Significant Deterioration
RCRA	Resource Conservation and Recovery Act
RCT	Railroad Commission of Texas
REA	Rural Electrification Administration
REIS	Regional Environmental Impact Statement
RFFA	reasonably foreseeable future action

RGP	Regional General Permit
RHA	Rivers and Harbors Act
ROG	reactive organic gas
ROW	right-of-way
RTHL	Recorded Texas Historic Landmark
RUSLE	Revised Universal Soil Loss Equation
SAL	State Antiquities Landmark
SARA	Superfund Amendment and Reauthorization Act
SHPO	State Historic Preservation Office
SMCRA	Surface Mining Control and Reclamation Act
SO_2	sulfur dioxide
SO_4	sulfates
SPCC Plan	Spill Prevention, Control, and Countermeasure Plan
SWPPP	Storm Water Pollution Prevention Plan
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
TDAT	Tribal Directory Assessment Tool
TDS	total dissolved solid
THC	Texas Historical Commission
THPO	Tribal Historic Preservation Officer
THSA	Texas Historic Sites Atlas
TMDL	Total Maximum Daily Load
TPDES	Texas Pollutant Discharge Elimination System
TPWD	Texas Parks and Wildlife Department
tpy	tons per year
TSHA	Texas State Historical Association
TWDB	Texas Water Development Board
TxDOT	Texas Department of Transportation
U.S.	United States
USACE	U.S. Army Corps of Engineers
USC	United States Code
USDA	U.S. Department of Agriculture
USDI	U.S. Department of the Interior
USDOT	U.S. Department of Transportation
USEPA	U.S. Environmental Protection Agency

USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VMT	vehicle miles traveled
yr BP	Years Before Present
WMA	Wildlife Management Area

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