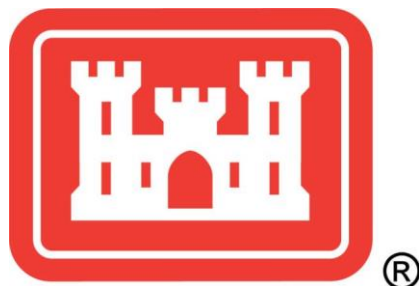


ENVIRONMENTAL ASSESSMENT

October 2017

SECTION 408 EVALUATION OF
BAYOU BRIDGE PIPELINE PROJECT
FEDERAL PROJECT AND FEDERAL EASEMENT CROSSINGS
EA # 16-169

CALCASIEU, JEFFERSON DAVIS, ACADIA, VERMILION, LAFAYETTE,
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LIST OF ACRONYMS

ACS	American Community Survey
APE	area of potential effect
API	American Petroleum Industry
ARO	abrasion resistant overcoat
BBP	Bayou Bridge Pipeline, LLC
BMP	best management practice
BP	before present
bpd	barrels per day
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	carbon monoxide
CPM	Computational Pipeline Monitoring System
CWA	Clean Water Act
dB	decibels
dBA	decibels of the A-weighted scale
DOTD	Louisiana Department of Transportation and Development
E2EM	estuarine intertidal emergent
E2SS	estuarine intertidal scrub-shrub
EA	Environmental Assessment
EFH	Essential Fish Habitat
EJ	Environmental Justice
EO	Executive Order
EPA	U.S. Environmental Protection Agency
FBE	fusion bonded epoxy
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FIRM	Flood Insurance Rate Maps
FONSI	Finding of No Significant Impact
FRP	Facility Response Plan
GIS	Geographic Information System
GIWW	Gulf Intracoastal Waterway
GHG	Greenhouse Gas
GRP	Geographic Response Plan
HAP	hazardous air pollutants
HDD	horizontal directional drill
HUC	hydrologic unit code
ICS	Incident Command System
LCZ	Louisiana Coastal Zone
LDA	Louisiana Division of Archeology
LDEQ	Louisiana Department of Environmental Quality
LDNR	Louisiana Department of Natural Resources
LDWF	Louisiana Department of Wildlife and Fisheries
LRAM	Louisiana Wetland Rapid Assessment Method

MOP	maximum operating pressure
MBTA	Migratory Bird Treaty Act
MVN	USACE New Orleans District
NAAQS	National Ambient Air Quality Standards
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NIMS	National Incident Management System
NO	nitrogen oxide
NPS	National Park Service
NRCS	National Resources Conservation Service
NRHP	National Register of Historic Places
O3	stratospheric ozone
OCC	Operations Control Center
OCM	Office of Coastal Management
OPA 90	Oil Pollution Act of 1990
OSRO	Oil Spill Response Organizations
PEM	palustrine emergent
PFO	palustrine forested
PHMSA	Pipeline and Hazardous Materials Safety Administration
PM	particulate matter
PREP	Preparedness for Response Exercise Program
PSS	palustrine scrub-shrub
RCRA	Resource Conservation and Recovery Act
RHA	Rivers and Harbors Act of 1899
ROW	right-of-way
SCADA	supervisory control and data acquisition
Section 408	Section 14 of the Rivers and Harbors Act of 1899
SO ₂	sulfur dioxide
SHPO	Louisiana State Historic Preservation Office
SPAR	Spill Prevention and Response Plan
SSA	sole source aquifer
SWPPP	Stormwater Pollution Prevention Plan
TMDL	total maximum daily loads
tpy	tons per year
UDP	Unanticipated Discovery Plan
USDA	U.S. Department of Agriculture
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOC	volatile organic compounds

1.0 INTRODUCTION

The U.S. Army Corps of Engineers (USACE), New Orleans District (MVN), has prepared this Environmental Assessment (EA) to evaluate the potential impacts of Bayou Bridge Pipeline, LLC's (BBP) request under 33 U.S. Code (USC) 408 to install the proposed Bayou Bridge Pipeline Project across eight federal projects and 14 federal easements as illustrated in the figures provided in Appendix A. This EA has been prepared in accordance with the National Environmental Policy Act of 1969, the Council on Environmental Quality's (CEQ) Regulation (40 Code of Federal Regulations [CFR] 1500-1508), as reflected in the USACE Engineering Regulation ER 200-2-2 (33 CFR 320), and EC 1165-2-216 (Policy and Procedural Guidance for Processing Requests to Alter U.S. Army Corps of Engineers Civil Works Projects Pursuant to 33 USC 408). This EA provides sufficient information on the potential effects of the requester's preferred alternative to allow the District Commander, USACE, MVN to make an informed decision on the appropriateness of an Environmental Impact Statement or Finding of No Significant Impact.

1.1 REQUESTED ALTERATION

BBP is proposing to construct the Bayou Bridge Pipeline Project, which is comprised of approximately 163 miles of 24-inch diameter crude oil pipeline from Lake Charles to St. James, Louisiana (Appendix A, Figure 1). The requester's preferred alternative assessed in this EA consists of the crossing of the following eight federal project boundaries: Calcasieu River, Mermentau River, Vermilion River, Bayou Teche, West Atchafalaya Basin Levee, Atchafalaya River, Gulf Intracoastal Waterway (GIWW), and East Atchafalaya Basin Levee. Additionally, the requester's preferred alternative includes crossing of 14 federal easements, herein referred to collectively as "Easements", located in Assumption, Iberville, and St. Martin Parishes (Appendix A, Figures 11 to 14).

1.1.1 Federal Project Crossings

Federal projects crossed by the requester's preferred alternative and the associated crossing lengths are identified in Table 1-1. The pipeline would be installed below all federal projects via the Horizontal Directional Drill method (HDD), which allows for construction across a feature without a trench or any direct impacts. An HDD is accomplished by drilling a hole significantly below conventional pipeline depth and pulling the pipeline through the pre-drilled hole. Following the completion of the pilot hole, reaming tools would be utilized to enlarge the hole to accommodate the pipeline diameter. The reaming tools would be attached to the drill string at the exit point and would then be rotated and drawn back to incrementally enlarge the

pilot hole. During this process, drilling mud consisting of bentonite clay and water would be continuously pumped into the pilot hole to remove cuttings and maintain the integrity of the hole. When the hole has been sufficiently enlarged, a prefabricated segment of pipe would be attached behind the reaming tool on the exit side of the crossing and pulled back through the drill hole towards the drill rig. The HDD equipment would be staged well outside of the federal project boundaries. By utilizing this trenchless technology, impacts to the federal projects would be avoided. HDD plan and profile drawings for each of the federal project crossings are provided in Appendix A.

Federal Project	Parish	Crossing Length (feet)	Depth Below Federal Project (feet)	Length of HDD across Federal Project
Calcasieu River	Calcasieu	3,745	53	4,600
Mermentau River	Jefferson Davis/ Acadia	345	35	2,250
Vermilion River	Vermilion / Lafayette	350	71	2,720
Bayou Teche	St. Martin	200	46	1,800
West Atchafalaya Basin Levee	St. Martin	155	170	2,525
Atchafalaya River	St. Martin	1,340	50	3,400
Gulf Intracoastal Waterway	Iberville	535	112	3,650
East Atchafalaya Basin Levee	Iberville	290	140	3,650

In addition to the federal project HDD crossings, BBP proposes to utilize the Atchafalaya River and the GIWW to transport equipment and materials via barges to the construction right-of-way (ROW). BBP does not propose to conduct dredging activities within these federal projects and would coordinate with all applicable federal, state, and local agencies regarding navigation along the Atchafalaya River and GIWW. BBP would also utilize an existing access road located on the West Atchafalaya Basin Levee to gain access to the construction ROW within the Atchafalaya Basin. BBP has stated that the road would be returned to like or better condition upon completion of construction.

1.1.2 Federal Easement Crossings

The pipeline would be installed at a minimum depth of five feet below natural grade across the Easements utilizing HDD (described in Section 1.1.1 above) and/or open trench methods. Due to the presence of inundated lowland or saturated wetland areas where conventional pipe laying equipment cannot be supported, a variation of the open trench method known as the push/float method would be utilized for several of the Easement crossings. This method can be utilized in areas that have a significant amount of water that would allow the pipe

to be floated through the open trench. Implementation of this method requires excavation of the trench using low-ground weight equipment, limiting the need for grubbing and grading activities over the trench line or working side of the construction ROW. Coated and weighted pipe would be welded at a staging area where floats are attached to the pipe. The welded pipe would be pushed along the water-filled trench until it is the target location, where the floats would be cut and the pipe would be allowed to sink into place. The trench would then be backfilled using previously excavated material. The push/float crossing method reduces wetland impacts and soil compaction by minimizing the number of construction passes necessary to install the pipe. Therefore, BBP proposes to utilize this method to minimize impacts to inundated wetlands located on the federal Easements that would not be crossed by HDD.

With the exception of Easements A-182E-4, 301E-3, 700-E-1, and 7, the requester's preferred alternative would also require additional temporary workspace on the Easements to allow for the offloading of equipment and materials from barges. Easements crossed by the requester's preferred alternative and the associated crossing lengths are identified in Table 1-2 below and depicted on maps provided as Appendix A.

Federal Easement Number	Parish	Federal Easement Project Name	Easement Type	Historical Imagery Date Range ^a	Crossing Length (feet)	Total Acres within the Requester's Preferred Alternative Area
145-E-1	St. Martin	West Access Channel	Perpetual Channel Easement	1972 - 2017	202	0.80
144 E-1	St. Martin		Perpetual Channel Easement	1972 - 2017	N/A ^b	0.03
145-E-2	St. Martin		Perpetual Dredged Material Disposal Easement	1972 - 2017	181	0.35
144 E-3	St. Martin		Perpetual Dredged Material Disposal Easement	1972 - 2017	1,117	2.73
A-182E-4	St. Martin	Bayou Chene Tarleton Bayou Cutoff	Comprehensive Easement (Perpetual Channel, Disposal, Levee, Road, and Flowage Easement)	1968 - 2016	816	1.40
A-163E-1	St. Martin		Perpetual Dredged Material Disposal Easement	1968 - 2016	2,236	6.57
A-182E-2	St. Martin		Perpetual Dredged Material Disposal Easement	1968 - 2016	604	0.92
A-111E-4	St. Martin		Perpetual Dredged Material Disposal Easement	1968 - 2016	639	1.75
A-163E-4	St. Martin		Perpetual Dredged Material Disposal Easement	1968 - 2016	197	1.02
A-111E-5	St. Martin		Perpetual Dredged Material Disposal Easement	1968 - 2016	1,768	5.06

Federal Easement Number	Parish	Federal Easement Project Name	Easement Type	Historical Imagery Date Range ^a	Crossing Length (feet)	Total Acres within the Requester's Preferred Alternative Area
301E-3	St. Martin	Atchafalaya River Chicot Pass Channel Improvement	Dredged Material Disposal Easement	1968 - 2016	100	0.13
700-E-2	Iberville	GIWW Plaquemines Morgan City	Perpetual Channel Easement	1968 - 2016	2,185	6.08
700-E-1	Iberville		Perpetual Channel Easement	1968 - 2016	711	0.61
7	Assumption	Bayou Lafourche Spoil Disposal Area	Perpetual Dredged Material Disposal Easement	1961 - 2016	358	0.41
^a Date range of available historical imagery reviewed to determine when easements were last utilized for dredge disposal. ^b N/A – Not applicable. Easement is not crossed by the pipeline but would be impacted by temporary workspace.						

Easements crossed by the requester's preferred alternative are classified as either a Perpetual Channel Easement, a Comprehensive Easement, or a Perpetual Dredged Material Disposal Easement. For those Easements that were established for dredge disposal, a review of publicly available historical imagery obtained from Google Earth and the U.S. Geological Survey (USGS) was performed to determine when these Easements were last utilized for this intended purpose. Based upon this review, there has been no apparent use of the Easements for the placement of dredged material in over 45 years. Table 1-2 provides the date range of the imagery reviewed for each of the dredge disposal Easements crossed by the requester's preferred alternative.

1.2 PURPOSE AND NEED

The purpose and need of the proposed Bayou Bridge Pipeline Project is to safely transport up to 480,000 barrels per day (bpd) of domestic crude oil from the Clifton Ridge Marine Terminal in Lake Charles, Louisiana to various crude oil terminals located near St. James, Louisiana. From the St. James terminals, the crude oil would be transported by other existing pipelines to refineries located along the Gulf Coast where 60 % of the U.S. refining capabilities exist today. The proposed Bayou Bridge Pipeline Project would provide the infrastructure necessary to transport domestic crude oil to these refining facilities in response to

growing U.S. market demands. Due to the location and length of the federal projects there is no reasonable pipeline route between Lake Charles and St. James that avoids these entirely.

According to BBP, the proposed Bayou Bridge Pipeline Project also provides economic benefits to the state by diversifying Louisiana's crude oil supply, expanding Louisiana's refining and petrochemical manufacturing base, and expanding the opportunities created by Louisiana's energy economy. The overall proposed Bayou Bridge Pipeline Project is a \$488 million dollar capital investment; \$471 million (or 97 %) of that investment would be made in Louisiana alone. Construction of the proposed Bayou Bridge Pipeline Project could result in an economic benefit of over \$829 million in economic output for Louisiana, including over 4,000 jobs, more than \$420 million dollars of total wages and over \$50 million in state and local tax revenues. During the first 5 years of operations, the proposed Bayou Bridge Pipeline Project could provide over \$9.5 million in direct Louisiana economic output, 19 permanent jobs/year, close to \$7 million in total wages and over \$200,000 in taxes. Post construction, annual operations could result in an increase of \$2 million in state-wide economic output (Louisiana State University Center for Energy Studies [at the request of Energy Transfer, the overall Bayou Bridge Pipeline Project developer], 2017; Appendix E).

1.3 AUTHORITY

The authority to grant permission for temporary or permanent use, or the occupation or alteration of any USACE civil works project is contained in Section 14 of the *Rivers and Harbors Act* (RHA) of 1899, as amended, codified at 33 USC 408 (Section 408). Section 408 authorizes the Secretary of the Army to grant permission for the alteration or occupation or use of a USACE project if the Secretary determines that the activity would not be injurious to the public interest and would not impair the usefulness of the project. On September 27, 2016, BBP submitted a formal request for authorization of the federal project crossings to the USACE MVN. Included in this request were the detailed HDD design packages and the letters of no objection obtained by BBP from the designated non-federal sponsors for the federal project crossings.

Additionally the crossing of the Easements would require real estate actions and issuance of a grant by the USACE. As previously noted, the scope of this EA is limited to the crossings of federal projects and Easements that would require Section 408 authorization and/or real estate actions by the USACE. Separate USACE authorizations are being sought by the requester pursuant to Section 404 of the *Clean Water Act* (CWA) and/or Section 10 of the RHA crossings along the entire Bayou Bridge Pipeline route.

1.4 PUBLIC CONCERNS

The USACE MVN solicited public comments for the requested alterations via Public Notice/File Number 16-169. The Atchafalaya Basinkeeper responded to the Section 408 Public Notice by letter dated March 9, 2017 with several comments. Most of the comments involved the interaction between the District's Section 408 process and the Section 10 and Section 404 processes being conducted by the District's Regulatory Functions Branch. In accordance with EC 1165-2-2016, where coordination is required, the District has undergone the appropriate intra-agency coordination; areas of coordination, for example, on wetlands mitigation issues, have been noted in this EA. Other comments involved possible environmental impacts from open cut installation methods, which have been addressed in this EA.

2.0 ALTERNATIVES TO THE REQUESTED ALTERATION

2.1 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

2.1.1 Alternative 1 – Modification of Existing Infrastructure

Although there are a number of pipelines that traverse southern Louisiana, there currently are no pipelines operated by Energy Transfer (the overall Bayou Bridge Pipeline Project developer) with available capacity to transport the required volume of crude oil from the Clifton Ridge Marine Terminal in Lake Charles, Louisiana to various crude oil terminals located near St. James, Louisiana. Modifications to existing Energy Transfer infrastructure to increase capacity would require the replacement of the existing infrastructure with new, larger diameter pipe and the construction/upgrade of appurtenant facilities along the existing infrastructure to ensure the existing pipeline is capable of transporting the required volume of crude oil. Additional pipelines would also need to be constructed to connect origin and terminus of the proposed Bayou Bridge Pipeline Project to the existing infrastructure. The upgrades and modifications to the existing Energy Transfer infrastructure would result in additional environmental impacts similar to those of the requester's preferred alternative. Furthermore, Energy Transfer would be required to build new infrastructure to continue to fulfil the purpose and need of the pipeline(s) that would be taken out-of-service and modified to transport crude oil. Construction of the new pipeline(s) would also result in additional environmental impacts. Therefore, modifications to existing Energy Transfer infrastructure is not a viable alternative to the proposed Bayou Bridge Pipeline Project.

A detailed analysis of potential system alternatives that do not involve pipelines owned and operated by Energy Transfer cannot be conducted as BBP does not have access to any proprietary information related to these other pipeline systems as they are owned and operated

by separate and distinct entities. Furthermore, BBP cannot speculate on available capacity to transport the required volume of crude oil from the Clifton Ridge Marine Terminal in Lake Charles, Louisiana to various crude oil terminals located near St. James, Louisiana or where a suitable interconnect would be located and/or what system modifications would be required to accommodate the necessary capacity to meet the purpose and need of the proposed Bayou Bridge Pipeline Project.

2.1.2 Alternative 2 – Trucking Transportation Alternative

While trucking is instrumental in the gathering and distribution of crude on a limited scale, trucking as an alternative for transporting the volume of crude oil the distances planned for the proposed Bayou Bridge Pipeline Project is not viable. Factors such as road safety, roadway capacity, and other logistical issues involving availability of labor force, trailer truck capacity, and economics, all contribute to truck transportation not being a realistic alternative.

Assuming the average oil tanker truck is capable of holding about 220 barrels of oil, the transportation of the capacity of the proposed project (480,000 bpd), would require a total of 2,181 (480,000/220) full trucks to depart the proposed tank terminals daily, and more than 90 (2,181/24) trucks would have to be filled every hour within a 24-hour/day operation. Time spent in transit, loading/offloading, and additional time for maintenance would add to the number of trucks needed to offset the proposed Bayou Bridge Pipeline Project. An increase in daily truck traffic would lead to an increase in the degradation of public roads as well as contribute to the noise pollution adjacent to the roads.

An increase in exhaust would be anticipated due to the combustion diesel fuel in the truck engines, which would lead to an increase in air pollution from emissions of criteria pollutants such as volatile organic compounds (VOCs), carbon monoxide (CO), nitrogen dioxide (NO_x), sulfur dioxide (SO₂), and particulate matter (PM₁₀ and PM_{2.5}). The estimated on-road vehicle emissions associated with the truck alternative are presented in Table 2-1.

Table 2-1 Potential Emissions Associated with Trucking Alternative							
Emission Source Description	Pollutant Emissions (tons per year)						
	NO _x	CO	SO ₂	VOC	PM ₁₀	PM _{2.5}	GHG (CO ₂ e)
On-road Truck Engine Emissions	1,852	734.4	4.2	196.3	72.9	67.0	496,289
Emissions are calculated based on 289,900,520 vehicle miles traveled per year. Transport of crude oil in trucks will result in particulate matter from the trucks driving on paved roads, which is not included in the calculated emissions. The truck engine values include both driving and idling emissions.							

Analysis of infrastructure considerations (e.g., the burden of thousands of additional trucks on county, state, and interstate highways, as well as the loading and offloading facilities that would have to be constructed which would incur their own environmental impacts), economic considerations (e.g., labor costs, purchase and maintenance of hauling equipment, fuel, public infrastructure, etc.), and reliability considerations (e.g., weather, mechanical, manpower, road closures) all contribute to making the truck transportation alternative unviable.

2.1.3 Alternative 3 – Rail Transportation Alternative

Transportation of crude oil via rail is not a viable alternative to the requester's proposed project due to issues associated with rail capacity, safety, and the environment. Assuming a carrying capacity of 600 barrels per car, a total of 800 rail cars would be required to depart the tank terminal daily to transport 480,000 barrels of crude oil to its final destination. Loading and offloading 800 rail cars in a day would require servicing more than 33 rail cars per hour. With an assumption of 125 rail cars per train, approximately seven trains would have to depart the tank terminal every day.

Rail operations on the scale of the proposed Bayou Bridge Pipeline Project do not exist in the U.S. An oil-by-rail facility designed to handle an average of 360,000 bpd has been proposed in the Port of Vancouver, Washington. Known as the Vancouver Energy proposal, the project would be the largest rail terminal in the country (Florip, 2014). A rail transportation alternative to handle the volumes of the proposed Bayou Bridge Pipeline Project would require the design and construction of approximately 135% of the Vancouver Energy proposal. A facility of this size would incur its own environmental consequences.

From a safety standpoint, railroad transport consistently reports a substantially higher number of transportation accidents than pipelines (U.S. Department of Transportation [USDOT], 2015). A series of major accidents taking place in 2013 to 2014 in Canada and the U.S. has heightened concern about the risks involved in shipping crude by rail (Fritelli, 2014).

Increases in rail traffic necessary to transport the volume of crude oil proposed by the Bayou Bridge Pipeline Project would increase the emissions of combustion products due to the use of diesel engines which could have an adverse impact on air quality in the region.

Construction of rail transfer terminals would result in emission of criteria pollutants such as VOCs, CO, NO_x, SO₂, PM₁₀, and PM_{2.5}. The estimated emissions associated with the rail alternative are presented in Table 2-2.

Table 2-2 Potential Emissions Associated with Rail Transportation Alternative							
Emission Source Description	Pollutant Emissions (tons per year)						
	NOx	CO	SO ₂	VOC	PM ₁₀	PM _{2.5}	GHG (CO _{2e})
Railroad Diesel Emissions	290.3	67.7	4.8	11.7	7.4	7.4	26,021
Emissions are calculated based on 2,310,450 gallons of diesel per year.							

This alternative would also directly affect communities along utilized rail lines by increasing noise and creating transportation delays due to the substantial increase in rail traffic across railroad crossings of roads. Nationwide increases in oil production has led to increased transportation of oil through railways, which in turn, has led to increased traffic congestion. There have been documented cases across the country, where public safety and emergency services have been delayed because of traffic congestion caused by railroad delays and delays in public safety services (GAO, 2014). If railroad shipments continue to increase, the congestion and safety issues will continue to be exacerbated.

While rail tanker cars are a vital part of the short-haul distribution network for crude oil, pipelines are a more reliable, safer, and more economical alternative for the large volumes transported and long distances covered by the Bayou Bridge Pipeline Project. This alternative would create delays on the rail lines due to the substantial increase in rail traffic, resulting in shipping delays in other industries such as agriculture that cannot rely on pipeline transportation. For example, an increase in shipment of petroleum products via rail has contributed to difficulties for agricultural producers to ship produce and agricultural products to customers and consumers, and can increase the costs of shipping these products (U.S. Department of Agriculture [USDA], 2015). Furthermore, the purpose and need of the project would not be attainable with the current oil-by-rail infrastructure in the country, because rail loading facilities of sufficient size do not exist. As such, rail transportation is not considered a viable alternative to the proposed Bayou Bridge Pipeline Project.

2.1.4 Alternative 4 – Route Alternatives

Although this EA is limited to the pipeline placement across the previously identified eight federal crossings and 14 federal easements, major route alternatives were evaluated for the pipeline route as a whole. During the proposed Bayou Bridge Pipeline Project fatal flaw analysis and early routing process, BBP utilized a sophisticated and proprietary Geographic Information System (GIS)-based routing program to determine the pipeline route based on multiple publicly available and purchased datasets. Datasets utilized during the project routing analysis included engineering (e.g., existing pipelines, railroads, karst, powerlines),

environmental (e.g., critical habitat, fault lines, state parks, national forests, brownfields, national registry of historic places), and land (e.g., fee owned federal lands, federal easements, dams, airports, cemeteries, schools, mining, tribal lands, and military installations).

Each of these datasets was weighted based on the risk associated with crossing or following certain features. In general, the route for the pipeline would follow features identified as low risk, avoid or minimize crossing features identified as moderate risk, and exclude features identified as high risk. For example, the existing pipelines dataset was weighted as a low risk feature, so that the routing tool followed existing pipelines to the extent practical to minimize potential impacts. An example of a high risk feature is the wildlife refuge dataset. Since wildlife refuges were weighted for the Bayou Bridge Pipeline Project as high risk, the GIS routing program excluded any wildlife refuges from the pipeline route to avoid impacts on these federal lands.

A total of four major route alternatives were analyzed during the initial routing study. As discussed below, each of the alternatives were evaluated to determine feasible and practicable measures to avoid and minimize potential environmental impacts. Pursuant to Section 404(b)(1) of the CWA, the USACE defines practicable alternatives as those which are "...available and capable of being done after taking into consideration cost, existing technology, and logistics in light of the overall project purpose."

For this assessment, alternatives were considered practicable with regard to cost if the alternative provided construction of the pipeline at competitive construction and operation costs to BBP as well as a minimal mitigation or reclamation cost to the surrounding environment. The number of HDDs that cross USACE civil works projects directly impact the total cost of the project. Alternatives that have the fewest number of levee/river crossings were considered practicable from a cost evaluation perspective due to the cost of a long HDD. An alternative is practicable with respect to technology if the pipeline design and development favor the best available technologies, which are both competitively priced and environmentally considerate. Alternatives are considered logistically practicable if the alternative adequately and efficiently meets the proposed project's purpose and need. Sensitive resources such as forested wetlands, critical habitat, Wetland Reserve Program crossings, and other protected land crossings impact the project's schedule and timeline. Therefore, alternatives that have the fewest intersections with sensitive resources were considered practicable with respect to logistics due to the associated significant regulatory actions and potential schedule constraints.

While not specifically quantified, the number of federal easement crossings located along the four major route alternatives were expected to be similar to that of the requester's preferred alternative as the federal easements are associated with major waterbodies that are also crossed, albeit at different locations, by the major route alternatives.

The requester's preferred route and each of the four route alternatives were individually evaluated using desktop analysis tools including topographic maps, National Wetlands Inventory maps, National Hydrography Dataset maps, and aerial imagery. BBP is proposing to reduce to a 75-foot-wide construction footprint for the project when crossing wetlands. Therefore, a 75-foot-wide footprint was also utilized for the route alternatives in order to provide a reasonable approximation of potential wetland impacts along each of the route alternatives.

A quantitative comparison of the requester's preferred alternative and the four route alternatives is presented in Table 2-3 and further discussed in the following sections.

Table 2-3 Bayou Bridge Pipeline Project Route Alternatives Comparison					
Category	Preferred Alternative	Route 1	Route 2	Route 3	Route 4
Route Length (miles)	161.56	152.91	163.24	163.80	162.10
Percent Adjacent to Existing Utility ROW ^a	72	6	74	76	72
Roads Crossed	110	89	106	118	108
Federal Lands Crossed ^b	0	0	0	0	0
Federal Lands within 0.25 mile ^c	0	0	0	0	0
Section 408 crossings / Number of Required HDDs	8 (7) ^d	9 (9)	8 (7) ^d	8 (9) ^e	8 (7) ^d
Atchafalaya Basin Crossing	Yes	Yes	Yes	Yes	Yes
State Lands Crossed ^b	0	0	0	0	0
State Lands within 0.25 mile ^c	0	0	0	0	0
Waterbodies Crossed					
Total Waterbody Crossings ^f	132	128	133	130	139
Major Waterbody Crossings	21	27	20	19	21
Section 10 Crossings	5	5	5	5	5
Natural and Scenic River Crossings	0	0	0	0	0
Wetland Impact (acres) ^g					
Non-forested Wetland	34.42	57.33	34.20	33.07	40.04
Forested Wetland	401.06	416.70	409.74	353.16	393.16
Total Wetland Impact	435.47	474.03	443.95	386.23	433.20

**Table 2-3
Bayou Bridge Pipeline Project Route Alternatives Comparison**

Category	Preferred Alternative	Route 1	Route 2	Route 3	Route 4
Previously Identified Cultural Sites Crossed^h	14	8	16	17	15
Census Block Groups Classified as EJ Communitiesⁱ	14	9	12	16	14
Increase in Cost Compared to Preferred Alternative^j	N/A	\$1,050,000	\$3,780,000	\$6,090,000	\$1,215,000

Note: For the purposes of this alternative analysis, impacts associated with the 1.12-mile lateral were not analyzed as the lateral route would be the same for the Proposed Route and the four alternative routes. Items bolded represent impacts/crossings that are greater than the requester's preferred alternative and we utilized to reject the alternative route.

^a Co-location values (Percent Adjacent to Existing Utility ROW) for all four alternative routes and the Preferred Alternative were based upon aerial interpretation for consistency of methodology. The actual percent co-location for the Preferred Alternative (88%) was based upon data obtained through civil surveys.

^b Includes only lands crossed by the pipeline centerline.

^c Distance is measured from the pipeline centerline.

^d East Atchafalaya Basin Protection Levee and GIWW crossed at same location.

^e Alternative 3 would require two HDDs to cross the East Atchafalaya Basin Protection Levee and the GIWW.

^f Includes only streams, canals, and waterbodies recognized in the National Hydrography Dataset that are crossed by the pipeline centerline.

^g Impacts for the proposed and alternative routes are based on a 75-foot-wide construction footprint corridor and does not account for workspace associated with aboveground facilities.

^h Cultural sites crossed include those documented during the Phase I Cultural Resources Survey and those identified in the Louisiana Division of Archaeology (LDA) Cultural Resource Viewer online database. The lower number of sites located along Route 1 could be reflective of the fact that this route has significantly less survey coverage than the preferred alternative and the other route alternatives.

ⁱ Census block groups that contain populations that have greater than 50 % minorities and/or greater than 20 % people below the poverty line are classified as EJ communities. Please note that additional analysis would be needed to determine if the preferred or route alternatives would have a disproportionate impact on the affected EJ communities.

^j Increases in cost compared to the preferred alternative are the result of increased length of pipeline and/or additional HDDs that would be required to cross federal projects.

Route 1

Route 1 is primarily located south of the requester's preferred route as it traverses east from Lake Charles to St. James (Appendix A). BBP developed Route 1 to provide the shortest pipeline route between the proposed Bayou Bridge Pipeline Project origin and terminus. In addition to being the shortest overall route, Route 1 would cross the fewest roads and waterbodies compared to all other alternatives and the requester's preferred alternative.

Route 1 would be considered a greenfield route, which is a route that is predominately not co-located with other existing utility ROWs and would result in the creation of a new pipeline corridor along most of the route. For example, of the 152.91 miles, only 6% of Route 1 is co-located with existing utility ROWs. The total wetland impacts associated with Route 1 (474.03 acres) is significantly greater than all other routes.

As a result of the increased impacts on environmental resources associated with Route 1 and the limited amount of co-location with other existing utility ROWs, this alternative was removed from further consideration.

Route 2

Route 2 begins approximately 0.60 mile east of MP 0.00 of the requester's preferred route and follows a southern route until converging with the requester's preferred route near MP 15.01 (Appendix A). Route 2 and the requester's preferred route are the same between MP 15.01 and the terminus in St. James. BBP developed Route 2 to evaluate a different potential route through the densely populated area located south of Lake Charles.

Route 2 would result in greater impacts on wetlands (443.95 acres) than the requester's preferred alternative (435.47 acres). Route 2 would also increase the proposed Bayou Bridge Pipeline Project impacts on areas located within the Louisiana Coastal Zone (LCZ). This alternative route would cross the LCZ for an additional 2.00 miles south of Lake Charles. The increase in crossing distance of the LCZ would also result in greater wetland impacts (63.40 acres) in the LCZ than the requester's preferred alternative (60.84 acres). Additionally, Route 2 would cross two more cultural sites than the requester's preferred alternative. Finally, Route 2 would be 1.68 miles longer than the requester's preferred route as a result of the deviation further to the south of the Lake Charles area. The additional 1.68 miles of pipeline would result in an increase in the overall proposed Bayou Bridge Pipeline Project cost of approximately \$3,780,000.

Route 2 was removed from further consideration due to the increase in impacts on both wetlands, previously identified cultural sites, and areas located within the LCZ. Additionally, the increased length associated with Route 2 would increase the overall project footprint, impacts, and cost.

Route 3

Route 3 deviates from the requester's preferred alternative route at MP 111.35 and then converges with the requester's preferred alternative route at MP 147.90 (Appendix A). Route 3 and the requester's preferred alternative are the same prior to and after MP 111.35 and MP 147.90, respectively. BBP developed Route 3 to evaluate an alternative route across the Atchafalaya Basin.

Route 3 would impact fewer wetlands (386.23 acres) than the requester's preferred alternative (435.47 acres). However, Route 3 would increase the overall Bayou Bridge Pipeline

Project length by 2.24 miles compared to the requester's preferred alternative. This increase in length would result in additional land disturbance, greater number of affected landowners, more road crossings, and increased impacts on agricultural land compared to the requester's preferred alternative route. Route 3 would also cross two additional census block groups that contain minority and/or impoverished communities that would not otherwise be crossed by the requester's preferred alternative. Additionally, this route alternative would cross a total of 17 known cultural sites compared to the requester's preferred alternative, which crosses a total of 14 cultural sites.

The crossing of approximately eight additional miles of agricultural land compared to the preferred alternative would result in increased costs and additional landowner impacts. The increased cost would be associated with the purchase of additional ROW, construction, and damages since it would take entire fields out of production for up to 2 seasons depending on construction timing. Route 3 would also require an additional HDD to cross the GIWW, which is regulated by the USACE under Section 10 and Section 408 of the RHA. The requester's preferred alternative route would cross the GIWW and the East Atchafalaya Basin Protection Levee with the same HDD. Finally, Route 3 would increase costs to the requester by approximately \$6,090,000. The additional 2.24 miles of pipeline length would cost approximately \$5,040,000 and the additional HDD needed to cross the GIWW would have an incremental cost of approximately \$1,050,000.

Route 3 was removed from further consideration due to the increase in land disturbance, impacts on landowners, number of HDDs under waterbodies regulated by the USACE under Section 10/Section 408, cultural site crossings, and the additional impacts on minority and/or impoverished communities. Furthermore, the increased length and number of HDD crossings associated with Route 2 would increase the overall project cost.

Route 4

Route 4 diverges from the requester's preferred alternative route at MP 144.06 and then converges with the requester's preferred alternative route at MP 158.53 (Appendix A). Route 4 and the requester's preferred alternative route are the same prior to MP 144.06 and after MP 158.53. BBP developed Route 4 to evaluate an alternative crossing of the LCZ near the eastern end of the proposed Bayou Bridge Pipeline Project route. Compared to the requester's preferred alternative route, Route 4 would reduce the overall crossing length of the LCZ from 16.50 miles to 9.83 miles. Furthermore, Route 4 would increase the amount of co-location

within the LCZ from 66% to 72%, and would slightly reduce potential impacts on wetlands compared to the requester's preferred alternative.

Although Route 4 would increase the amount of co-location within the LCZ, it would also result in an increase of the overall Bayou Bridge Pipeline Project length by 0.54 miles. This increase in length would result in additional land disturbance and an increase of the overall Bayou Bridge Pipeline Project cost by \$1,215,000. Route 4 would also result in a greater number of waterbody crossings (139) compared to the requester's preferred alternative route (132).

Based on a review of information provided by the U.S. Environmental Protection Agency (EPA), Route 4 would cross two areas (the Lapice Oil Field and the City of Donaldsonville Sewage System facility) that could potentially pose constructability issues. The Lapice Oil Field, located south of Donaldsonville, Louisiana, consists of many active and inactive wells. Construction through this area could require additional route modifications and specialized construction techniques to avoid impacts on existing infrastructure located within the Lapice Oil Field. Route 4 would also cross adjacent to the City of Donaldsonville Sewage System facility approximately 1.5 miles north of the Lapice Oil Field. This facility is utilized as a wastewater treatment facility with existing infrastructure to transport wastewater to and from the facility. According to the EPA, the facility has been either non-compliant with or has had a significant violation of their permit conditions over the last three years.

Route 4 was removed from further consideration due to the increase land disturbance, the increased in cost of the overall Bayou Bridge Pipeline Project, the potential constructability issues associated with the EPA-identified facilities located along the route, and the increase in potential impacts on waterbodies.

2.2 NO ACTION ALTERNATIVE

In accordance with EC 165-2-2016, only the requester's preferred alternative and the "no action" alternative are evaluated further in this EA. Under the no-action alternative, the requester would not construct the preferred alternative and the proposed Bayou Bridge Pipeline Project would not be completed. If the requester's preferred alternative is not constructed, the adverse impacts identified in Section 4.0, Environmental Consequences, of this EA would not occur. The no-action alternative would not fulfill the purpose and need of the requester's preferred alternative by failing to provide the infrastructure necessary to transport domestic crude oil to refining facilities in response to U.S. market demands. Other beneficial impacts of

the requester's preferred alternative, including increased employment, income, and tax revenues would not be realized under the no-action alternative.

3.0 AFFECTED ENVIRONMENT

3.1 ENVIRONMENTAL SETTING

The requester's preferred alternative is located in two ecoregions: the Western Gulf Coastal Plain and the Mississippi Alluvial Plain. The Western Gulf Coastal Plain ecoregion is characterized by relatively flat topography with savanna vegetation. Fertile soils in this region are widely used for soybean, cotton, and rice production. The Western Gulf Coastal Plain is categorized into four sub-regions including: 1) the Northern Humid Gulf Coastal Prairies, 2) the Floodplains and Low Terraces, 3) the Lafayette Loess Plains, and 4) the Texas – Louisiana Coastal Marshes. The requester's preferred alternative is located within all of these sub-regions, with the exception of the Northern Humid Gulf Coastal Prairies (Daigle, et al., 2006).

The Mermentau River Project crossing is located in the Floodplains and Low Terraces sub-region. In this sub-region, Holocene-age alluvial deposits represent bayous and larger streams with wetland deciduous forests. The Vermilion River Project crossing is located in the Lafayette Loess Plains. The Lafayette Loess Plains is a coastal environment where loess veneer overlays poorly drained soils that have developed on late Pleistocene-age terraces. Urban expansion in this sub-region has been extensive. Additionally, historical vegetation has been replaced by numerous agricultural crop and crawfish aquaculture activities. Marginal bands of hardwood forests still occur along streams and lowlands (Daigle, et al., 2006). The Calcasieu River Project crossing is located within the Texas-Louisiana Coastal Marshes. This sub-region is characterized by an extensive network of freshwater and saltwater marshes, with many bayous canals, lakes, rivers, and tidal channels (Daigle, et al., 2006).

The Mississippi Alluvial Plain ecoregion is defined as a riverine environment consisting primarily of broad, flat, alluvial plains with some natural relief in the form of levees, swales, and river terraces. This ecoregion contains one of the largest wetland systems in North America, the Atchafalaya Basin. Generally, soils in this ecoregion consist of fine grained, poorly drained soils supporting bottomland deciduous forests. The requester's preferred alternative is located within two sub-regions within the Mississippi Alluvial Plain, including: 1) the Inland Swamps and 2) the Southern Holocene Meander Belts (Daigle, et al., 2006).

The majority of the requester's preferred alternative is located within the Inland Swamps sub-region including the West Atchafalaya Basin Levee, Atchafalaya River, Gulf Intracoastal

Waterway, East Atchafalaya Basin Levee, and all the Easements except for federal Easement 7. The Inland Swamps sub-region is composed of a wetland swamp environment between the freshwaters of the Southern Backswamps region and the brackish and saline water of coastal areas. This ecoregion contains heavily inundated clayey soils with extensive bottomland deciduous forests that are dominated largely by bald cypress and water tupelo (Daigle, et al., 2006). The Bayou Teche Project crossing and Easement 7 crossing are located within the Southern Holocene Meander Belts sub-region. This sub-region is dominated by point bars, oxbow lakes, natural and artificial levees, and abandoned channels (Daigle, et al., 2006). Soils in this sub-region contain mixed alluvial deposits with deciduous forests.

For the purposes of analysis during the operational phase of the project, the area potentially affected by the worst case spill at each federal project and Easement, as depicted in the proposed Bayou Bridge Pipeline Project's Pipeline and Hazardous Materials Safety Administration (PHMSA) spill model, was utilized. Worst case spill analysis is required by PHMSA as part of BBP's obligation to develop a Facility Response Plan (FRP); response plan development and modeling that may influence that development are regulated and approved by PHMSA. The spill model is completed as part of the design and engineering phase of the project to aid in the placement of block valves and spill response planning, etc. The spill model includes a number of assumptions (not actual construction) to conservatively determine a hypothetical worst case scenario.

Actual documented spill volumes are typically significantly less than the maximum theoretical volumes calculated by the computer models due to the conservative factors that are incorporated into the model. For example, the model conservatively assumes that the pipeline is placed on top of the ground or is floating on top of the waterbodies. Because of this and other conservative factors, the predicted spills in the model are typically greater than the spills seen in actual crude oil releases. Other factors include:

- Most releases are not full ruptures or guillotine cuts of the line.
- Most releases do not suffer a full gravity drain down due to anti-siphoning effects.
- Oil releases typically do not happen when/where the pipeline is exposed (un-buried).

Under normal operating conditions, the proposed Bayou Bridge Pipeline would be buried a minimum of five feet below the surface and would be marked by pipeline warning markers at the federal project and Easement crossings. Therefore, the likelihood of a guillotine cut

occurring is low. Furthermore, the PHMSA model calculates the volume of the spill based on the entire release of oil between valves as a result of air entering the pipeline following a guillotine cut and evacuating the entire section of pipeline. In reality, air does not completely evacuate the pipeline, but rather only enters the immediate area of the pipeline adjacent to the opening. Beyond this localized area, anti-siphon effects take over and minimizes any further release of oil from the pipeline. Lastly, the proposed Bayou Bridge Pipeline would be buried. The presence of backfill on top of the pipe reduces the volume of the spill by creating back pressure. The amount that the backfill restricts the volume and area that a spill can affect depends on a number of factors including the weight of the overburden and the permeability of soil. It also depends on the size of the hole and the pressure of the liquid in the line. Therefore, in the event of a release, the backfill surrounding the pipeline would create backpressure limiting the amount and rate of release and also act as a barrier to fluid flow to the surface.

This position is supported by actual incident data from the “Hazardous Liquid Pipeline Risk Assessment” (California State Fire Marshal, 1993). This report indicates that actual documented spill volumes were significantly less than the maximum theoretical volumes calculated by the computer models. For example, in 50% of all documented incidents, the actual release volume was less than 0.75% of what the computer models predicted. Further, the actual release volume was less than 4.5% off what the computer model predicted in 75% of all documented incidents. However, taking a conservative analysis approach, a hypothetical worst case scenario was used in the spill model in accordance with PHMSA modeling requirements.

A release in a section of pipe that is located under a federal project or Easement crossing would be further mitigated by the installation of valves along the pipeline, utilizing thicker walled pipe for HDDs, additional coating (to avoid damage during installation of pipe via HDD and weights for conventional installation), and conducting routine internal inspections and surface patrols of the pipeline to identify potential issues. Additionally, oil released from the pipeline installed via HDD would likely follow the path of least resistance, which is typically along the drill profile rather than directly upward through native undisturbed soil profile and directly into overlying surface water.

The PHMSA spill model ultimately generates maps depicting the downstream location of the anticipated worst case spill scenario at any selected location along the pipeline. The model shows how far an unabated plume could propagate in 6 hours from a release located generally every 200 feet along the proposed pipeline route in accordance with PHMSA modeling protocols

for determining the relative impact from a hypothetical release. As detailed in Section 4.1.15, a risk analysis was then performed to determine the potential consequences associated with a spill occurring at each of the federal project and Easement crossings. The spill model is privileged and confidential information as determined by PHMSA and was submitted by BBP under separate cover due to the identification of sensitive receptors and security sensitive information. Before operation of the pipeline, BBP would submit a FRP, or modify BBP's existing FRP (for other pipeline areas not part of the current project evaluation), to PHMSA for approval under 49 CFR 190 *et seq.* The approved, un-redacted FRP and related documents would be available on the PHMSA secure site to the appropriate authorized individuals. USACE operations staff, if involved in spill planning and response, would have access to the secure website to facilitate spill response planning activities.

3.1.1 Watershed

All federal project and Easement crossings are located within six river basins and eight unique watersheds (Hydrologic Unit Code [HUC] 8) (EPA, 2017a). A description of each of the river basins and the associated watersheds crossed by the proposed Bayou Bridge Pipeline Project is provided below.

The Calcasieu River Basin, which includes the Lower Calcasieu watershed (HUC 08080206), is located in southwest Louisiana and has a drainage area of approximately 2.6 million acres. The portion of the Calcasieu River Basin located between Lake Charles and the Gulf of Mexico is subject to tidal variation. The basin supports a wide range of species and vegetation (Louisiana Department of Wildlife and Fisheries [LDWF], 2005).

The Mermentau River Basin, which includes the Mermentau watershed (HUC 08080202), is located in southwestern Louisiana and drains approximately 4.3 million acres. The Mermentau River Basin consists of a controlled system for drainage of the Mermentau River. There are three distinctive land forms which comprise the basin and these include: flatwoods, broad prairie, and marshlands (LDWF, 2005).

The Vermilion-Teche River Basin, which includes the Vermilion watershed (HUC 08080103) and the Bayou Teche watershed (HUC 08080102), starts in central Louisiana and extends south towards the Gulf of Mexico. This river basin covers approximately 2.6 million acres. The habitats found within the basin range from upland pine forest to agriculture. Through the Bayou Teche water project, water from the Atchafalaya River is diverted into the Vermilion-Teche River Basin (LDWF, 2005).

The Atchafalaya River Basin, which includes the Atchafalaya watershed (HUC 08080101), spans over 1 million acres in south-central Louisiana. It is contained on either side by flood protection levees. The Atchafalaya River Basin is the largest river-swamp system in the U.S., and is one of the last active river deltas in Louisiana. The Atchafalaya Basin supports a wide variety of wildlife and vegetation (LDWF, 2005; USACE, 2015).

The Terrebonne River Basin, which includes the Lower Grand watershed (HUC 08070300) and West Central Louisiana Coastal watershed (HUC 08090302), covers over 1.7 million acres in south-central Louisiana. The Terrebonne River Basin is bordered by the Atchafalaya River Basin floodway and Bayou Lafourche. The main sources of water in the basin are rain water and flood water from the Atchafalaya River. The northern portion of the basin consists of agricultural lands, the western half consists of bottomland hardwood forest and swamps, and the coastal zone consists of freshwater, intermediate, brackish, or salt marshes (LDWF, 2005).

The Barataria River Basin, which includes the East Central Louisiana Coastal watershed (HUC 08090301), is found in south-eastern Louisiana and is bordered on the north and east by the Mississippi River levees. The basin is approximately 1.5 million acres, and is comprised of agricultural land, bottomland hardwood forests, swamps, and fresh to salt water marshes. Most of the freshwater input is from a combination of precipitation and inflow from the Gulf Intracoastal Waterway, which cuts across the southern end of the basin (LDWF, 2005).

3.1.2 Climate

The requester's preferred alternative is located within southern Louisiana, which is characterized as a humid subtropical climate. Humid subtropical climates have mild winters with hot summers. Annual precipitation averages from 57 to 62 inches (U.S. Climate Data, 2017). The high humidity and subtropical characteristics of the region are the result of frequent rainfall, high temperatures, and the influence of the Gulf of Mexico.

3.1.3 Geology and Soils

Geologically, the requester's preferred alternative is located within two distinct geologic formations including: 1) Natural Levees (Qnl) and 2) Alluvium (Qal) (Natural Resources Conservation Service [NRCS], 2017). Natural Levee formations occur along the past and present water courses of major stream systems. Alluvium deposits consist of gray to brownish-gray clay and silty clay with some sand and gravels, locally. These deposits are present in all

alluvial valley deposits except along natural levees of major streams. Both Alluvium and Natural Levee Deposits formed during the Holocene-age.

Based on review of the NRCS Web Soil Survey, soil series are only mapped for the West Atchafalaya Basin Levee, East Atchafalaya Basin Levee, and the Easements (NRCS, 2017). The remaining federal projects are designated as water on the NRCS Web Soil Survey as they consist of major rivers, and therefore, are not discussed further in this section. The soils present along the levees of the Atchafalaya Basin and the Easements generally consist of silt loam, silty clay loam, and clay. Iron reduction-oxidation (redoximorphic) features are common due to the saturated nature of the soils. These soils are located either along the levees or within the backswamps common across the Atchafalaya Basin environment. The majority of the soils belong to the Inceptisol order with Vertisols also present. Inceptisols are poorly developed soils that do not exhibit the qualities of other well developed soil orders. Vertisols are typically described as clay-rich soils with considerable shrink and swell properties relating to the moisture content in the soils. During dry periods, large cracks can form in these soils. The cyclical shrinking and swelling of the soils typically prevents the formation of well-developed soil horizons. Overall, the soils present within the requester's preferred alternative area are characterized by having been formed from clayey alluvium parent material and are typically hydric, exhibiting extensive redoximorphic features.

3.2 RELEVANT RESOURCES

3.2.1 Groundwater Resources

The requester's preferred alternative crossing at the Atchafalaya River, West and East Atchafalaya Levees, GIWW, and all 14 Easements are underlain by the Lower Mississippi River alluvial aquifer (Data Basin, 2014; Louisiana Department of Transportation and Development [DOTD], 2004). The Lower Mississippi River alluvial aquifer is confined by layers of silt and clay that vary in thickness and extent. Recharge of the aquifer is achieved by direct infiltration of rainfall over river valleys, overbank flooding of streams, and lateral and upward movement from adjacent and underlying aquifers (Louisiana Department of Environmental Quality [LDEQ], 1996). Groundwater depths range from about 50 to 500 feet; however, depths of wells monitored by the LDEQ Aquifer Sampling and Assessment Program, ranged from 30 to 352 feet (LDEQ, 2008). Groundwater from this aquifer is not often utilized because of poor quality resulting from high concentrations of both iron and manganese commonly exceeding 0.3 mg/l (DOTD, 2003). When it is utilized, it is primarily for industrial and aquaculture purposes (USGS, 2017a).

The requester's preferred alternative crossings at the Calcasieu River, Vermilion River, Mermentau River, and Bayou Teche are underlain by a locally named, water yielding confining zone known as the Chicot aquifer. The Chicot aquifer covers approximately 5.8 million acres in southwestern Louisiana and is designated as a sole source aquifer (SSA) by the EPA because it is the principal source of fresh groundwater for the southwest region of Louisiana (DOTD, 2004). This designation is given to aquifers that supply 50 % or more of the drinking water for an area and for which there are no reasonably available alternative sources should the aquifer become contaminated (EPA, 2014). The Chicot aquifer is characterized by a surficial confining unit that consists of dense clays with thin units of coarser material (DOTD, 2004). Recharge of the Chicot aquifer system occurs through direct infiltration of rainfall at stream and upland outcrop areas. Groundwater depths vary within the requester's preferred alternative area from 13 feet to 344 feet (DOTD, 2004); however, wells evaluated by DOTD were characterized by groundwater depths greater than 50 feet. Water quality of this system changes as it moves southward. As the system approaches the coast and mixes with salt water, there is a marked increase in salinity (USGS, 2009).

An area of 400 feet from the proposed Bayou Bridge Pipeline Project was assessed following the industry standard established by Federal Energy Regulatory Commission (FERC) guidelines for the evaluation of construction impacts to water wells and springs. Although the proposed Bayou Bridge Pipeline Project is not under the jurisdiction of the FERC, FERC guidance was deemed to be an appropriate distance for this evaluation, as there is no specific appropriate distance accepted for oil pipelines. No springs, public or private water wells, including industrial and drinking water wells were identified within 400 feet of the requester's preferred alternative areas. Additionally there are no Well Head Protection Areas (WHPAs) within one mile of the requester's preferred alternative areas (SONRIS, 2017; LDEQ, 2017a).

3.2.2 Wetlands

Wetlands are transitional areas situated between upland and aquatic communities where the vegetation and soil substrates are influenced by intermittent to permanent inundation or flooding. Vegetative species present within a wetland determine its classification. Palustrine forested (PFO) wetlands are characterized by woody vegetation greater than 20 feet in height with more than 30 % canopy cover. Palustrine scrub-shrub (PSS) wetlands are similar to PFO wetlands in that they are characterized by greater than 30 % canopy cover of woody vegetation; however, dominant vegetation in a PSS wetland is less than 20 feet in height. Palustrine emergent (PEM) wetlands are characterized by dominance of rooted herbaceous (non-woody)

wetland plants. Estuarine intertidal scrub-shrub (E2SS) wetlands are similar to PSS wetlands in that they are characterized by greater than 30 % canopy cover of woody vegetation that is less than 20 feet in height; however, these wetlands are tidally influenced and have variable salinity. Estuarine intertidal emergent (E2EM) wetlands are similar to PEM wetlands, in that the dominant vegetation is rooted herbaceous wetland plants, but they are found in tidally influenced areas and have a variable salinity (Cowardin et al., 1979).

Wetland delineations of the requester’s preferred alternative areas were conducted by BBP between October 2015 and October 2016 in accordance with the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coast Region (Version 2.0) (USACE, 2010) and the routine determination guidelines provided in the USACE Wetland Delineation Manual (Technical Report Y-87-1) (USACE, 1987). A total of nine wetlands were identified in the requester’s preferred alternative areas and are associated with the Calcasieu River and 12 of the Easements. Wetlands were not identified within the federal project boundaries of the Mermentau River, Vermilion River, Bayou Teche, West Atchafalaya Basin Levee, Atchafalaya River, GIWW, East Atchafalaya Basin Levee, and two Easement crossings (700-E-1 and 7). Table 3-1 provides a summary of the wetlands crossings. Some of the nine wetlands are found on the border of two or more requester’s preferred alternative areas and are therefore listed more than once.

Federal Project / Federal Easement	Wetland ID	Wetland Type	Latitude	Longitude
Calcasieu River	WP1CA048	E2EM	30.155896°	-93.326603°
	WP3CA078	E2SS	30.153470°	-93.323142°
145 E-1	WP2SM045_PFO	PFO	30.120296°	-91.560692°
144 E-1	WP2SM045_PFO	PFO	30.120266°	-91.559890°
145 E-2	WP2SM045_PFO	PFO	30.119954°	-91.560144°
144 E-3	WP2SM045_PFO	PFO	30.119064°	-91.558785°
	WP2SM045_PFO_CYP	PFO - CYP	30.118148°	-91.557338°
A-182E-4	WP1SM026_PFO_CYP	PFO - CYP	30.091116°	-91.487207°
A-163E-1	WP1SM026_PFO_CYP	PFO - CYP	30.091171°	-91.483531°
	WP1SM026_PFO	PFO	30.091163°	-91.480233°
A-182E-2	WP1SM026_PFO	PFO	30.091201°	-91.478520°
A-111E-4	WP1SM025_PFO	PFO	30.091271°	-91.473151°
A-163E-4	WP1SM025_PFO	PFO	30.091310°	-91.472368°
A-111E-5	WP1SM025_PFO	PFO	30.091360°	-91.469939°
301E-3	WP1SM025_PFO	PFO	30.091481°	-91.466363°
700-E-2	WPIV022_PFO_CYP	PFO - CYP	30.090879°	-91.315285°
	WP2IV022_PFO	PFO	30.090867°	-91.311006°

Wetlands documented within the Calcasieu River federal project boundary were characterized as E2EM and E2SS wetlands. Dominant species observed within the E2EM wetland includes smooth cordgrass (*Spartina alterniflora*), black needlerush (*Juncus roemerianus*), and broadleaf cattail (*Typha latifolia*). Dominant species observed within the E2SS wetlands include salt cedar (*Tamarix ramosissima*), saltmeadow cordgrass (*Spartina patens*), alligatorweed (*Alternanthera philoxeroides*), and Jesuit's bark (*Iva frutescens*).

Wetlands documented within the 12 Easement crossings were characterized as both PFO and cypress and/or cypress-tupelo dominated PFO wetlands. Dominant species observed within the wetlands include green ash (*Fraxinus pennsylvanica*), black willow (*Salix nigra*), red maple (*Acer rubrum*), American sycamore (*Platanus occidentalis*), boxelder (*Acer negundo*), swamp tupelo (*Nyssa biflora*), bald cypress (*Taxodium distichum*), sugarberry (*Celtis laevigata*), Chinese tallow (*Triadica sebifera*), common buttonbush (*Cephalanthus occidentalis*), water locust (*Gleditsia aquatica*), lizard's tail (*Saururus cernuus*), little duckweed (*Lemna obscura*), and water hyacinth (*Elchhornia crassipes*).

3.2.3 Surface Water Resources

According to the Louisiana *Water Quality Standards* (33 Louisiana Administrative Code §1111), surface waters in Louisiana are characterized by the following classifications (LDEQ, 2017b):

- Primary Contact Recreation
- Secondary Contact Recreation
- Fish and Wildlife Propagation
- Limited Aquatic Life and Wildlife Use
- Drinking Water Supply
- Oyster Propagation
- Agriculture
- Outstanding Natural Resource Waters

Six of the federal projects (Calcasieu River, Mermentau River, Vermilion River, Bayou Teche, Atchafalaya River, and GIWW) and four Easements (A182E-2, A-111E-4, 700-E-1, and 7) encompass large perennial rivers. Easements 145-E-2, 144 E-3, A-163E-1, and 7 also contain surface waters characterized as open waters, canals, or ephemeral drainages. With the

exception of those surface waters located within Easements 145-E-2, 144 E-3, and A-163E-1, impacts to surface waters located within the requester's preferred alternative area would be avoided through the use of HDDs. Details of each waterbody located within the requester's preferred alternative area and its classification is provided in Table 3-2. Please note that the West and East Levees of the Atchafalaya Basin and Easements 145-E-1, 144 E-1, A-182E-4, A-163E-4, A-111E5, 301E-3, and 700-E-2 do not contain any surface waters and are excluded from the table.

Table 3-2 Waterbodies located within the Requester's Preferred Alternative Area					
Federal Project / Federal Easement	Waterbody ID	Waterbody Type	Latitude	Longitude	Designated Use^a
Federal Project Crossings					
Calcasieu River	Calcasieu River ^b	Perennial	30.156842°	-93.327942°	A, B, C
Mermentau River	Mermentau River ^b	Perennial	30.155853°	-92.612558°	A, B, C, F
Vermilion River	Vermilion River ^b	Perennial	30.112136°	-92.088914°	A, B, C, F
Bayou Teche	Bayou Teche ^b	Perennial	30.093500°	-91.834506°	A, B, C
Atchafalaya River	Atchafalaya River ^b	Perennial	30.091283°	-91.475683°	A, B, C
GIWW	Gulf Intracoastal Waterway ^b	Perennial	30.090886°	-91.309675°	A, B, C, D
Federal Easement Crossings					
145-E-2	Unnamed Open Water	Open Water	30.119872°	-91.560110°	N/A
144 E-3	Unnamed Open Water	Open Water	30.119677°	-91.559876°	N/A
	Unnamed Pipeline Canal	Canal	30.119459°	-91.559547°	N/A
A-163E-1	Unnamed Open Water	Open Water	30.091641°	-91.479769°	N/A
A-182E-2	Atchafalaya River ^b	Perennial	30.091209°	-91.477391°	A, B, C
A-111E-4	Atchafalaya River ^b	Perennial	30.091251°	-91.474228°	A, B, C
700-E-1	Gulf Intracoastal Waterway ^b	Perennial	30.090886°	-91.309675°	A, B, C, D
7	Bayou Lafourche ^b	Perennial	30.042144°	-91.048410°	A, B, C, D
	Unnamed tributary to Bayou Lafourche	Ephemeral	30.042417°	-91.048971°	N/A
^a A= Primary Contact Recreation; B= Secondary Contact Recreation; C:=Fish and Wildlife Propagation; D=Drinking Water Supply; F=Agriculture ^b Section 10 waterbodies N/A = Not Applicable Source: LDEQ, 2017b					

There are seven large perennial waterbodies located within the requester's preferred alternative area that are designated as Section 10 waterbodies under the jurisdiction of the USACE. There are no federally-listed Wild and Scenic Rivers or rivers listed on the National Park Services' (NPS) Nationwide Rivers Inventory located within the requester's preferred

alternative area (National Wild and Scenic Rivers, 2017; NPS, 2007). Additionally, there are no Louisiana Natural and Scenic Rivers or Outstanding Natural Resources Waters located within the requester's preferred alternative area (LDEQ, 2017b).

Water Quality

Water quality in the proposed Bayou Bridge Pipeline Project area is affected by both point source and non-point source discharges. Point sources include mainly industrial, municipal, and sewer discharges. Non-point sources include stormwater runoff, industrial discharges, landscape maintenance activities, agriculture, and natural sources.

Section 303(d) of the CWA requires states to identify waterbodies that are not meeting water quality standards and to develop total maximum daily loads (TMDLs) for those pollutants suspected of preventing the waterbodies from meeting their standards. This list of waterbodies has become known as the "TMDL list" or "Section 303(d) list." A TMDL is the amount of a particular pollutant a stream, lake, estuary, or other waterbody can "handle" without violating state water quality standards. The final 2014 Section 303(d) list, which was submitted to EPA as part of the 2014 Louisiana Water Quality Inventory: Integrated Report (305(b)/303(d)), includes a list of waterbodies not meeting water quality standards and those for which a TMDL is needed (LDEQ, 2017c). Table 3-3 identifies waterbodies listed on the Section 303(d) list which are crossed by the requester's preferred alternative. On May 20, 2016, the FINAL DRAFT of the 2016 Louisiana Water Quality Inventory: Integrated Report (305(b)/303(d)) was submitted to EPA for review and approval (LDEQ, 2017d). Although not final, the draft LDEQ Section 305(b) and 303(d) Reports for 2016 were reviewed to determine if there were any proposed changes to the 303(d) listing status of the waterbodies crossed by the requester's preferred alternative. The 2016 Louisiana Water Quality Inventory: Integrated Report (305(b)/303(d)) was approved by the EPA on February 10, 2017. The changes approved by the EPA are identified in Table 3-3.

Of the eight federal project crossings, three waterbodies, including the Mermentau River, Vermilion River, and GIWW, were listed as impaired waters in the Final 2014 Integrated Report of Water Quality in Louisiana. Subsequent to the submittal of the Louisiana's 2016 Water Quality Integrated Report draft, two additional waterbodies, including the Calcasieu River and Bayou Teche, were reported as impaired waters. Additionally, 2016 data reports the Mermentau River is in attainment for Fipronil TMDL and Vermilion River is in attainment for both Carbofuran TMDL and Total Dissolved Solids (TDS) TMDL. Impairments and status of TMDL are identified in Table 3-3.

Of the 14 Easement crossings, Easement 700-E-1 encompasses the federal project waterbody, GIWW, which was listed as an impaired waterbody in the Final 2014 Integrated Report of Water Quality in Louisiana. Subsequent to the submittal of the Louisiana's 2016 Water Quality Integrated Report draft, one additional waterbody, Bayou Lafourche within Easement 7, was reported as impaired.

**Table 3-3
Water Quality within the Requester's Preferred Alternative Area**

Federal Project / Federal Easement Tract Number	Waterbody ID	Parish	2014 303(d) Listing Reason	2014 303(d) TMDL Status	Changes identified the 2016 303(d) Report
Calcasieu River	Calcasieu River	Calcasieu	Not Listed	Not Listed	Calcasieu River added - Dissolved Oxygen
Mermentau River	Mermentau River	Jefferson Davis/ Acadia	Dissolved Oxygen; Fecal Coliform; Fipronil, Nitrate/Nitrite (Nitrite + Nitrate as N); Phosphorus, Total;	Dissolved Oxygen - Completed; Fecal Coliform - Needed; Fipronil – Completed; Nitrate/Nitrite (Nitrite + Nitrate as N) – Completed; Phosphorus, Total - Completed;	Fipronil removed - waterbody is in attainment for Fipronil TMDL
Vermilion River	Vermilion River	Vermilion/ Lafayette	Carbofuran; Dissolved Oxygen; Fecal Coliform; Nitrate/Nitrite (Nitrite + Nitrate as N); Total Dissolved Solids (TDS)	Carbofuran - Completed; Dissolved Oxygen - Completed; Fecal Coliform - Completed; Nitrate/Nitrite (Nitrite + Nitrate as N) – Completed; Total Dissolved Solids (TDS) - Needed	Carbofuran and Total Dissolved Solids (TDS) removed - waterbody is in attainment for Carbofuran TMDL and Total Dissolved Solids (TDS) TMDL
Bayou Teche	Bayou Teche	St. Martin	Not Listed	Not Listed	Bayou Teche added - Dissolved Oxygen, Fecal Coliform. Note: TMDL Complete
Gulf Intracoastal Waterway	Gulf Intracoastal Waterway	Iberville	Dissolved Oxygen	Dissolved Oxygen - Needed	N/A
700-E-1	Gulf Intracoastal Waterway	Iberville	Dissolved Oxygen	Dissolved Oxygen - Needed	N/A
7	Bayou Lafourche	Assumption	Not Listed	Not Listed	Bayou Lafourche added - Non-native Aquatic Plants, Fecal Coliform. Note: TMDL complete for fecal coliform. Other corrective actions in place for dissolved oxygen

Floodplains

Floodplains refer to the 100-year floodplain, as defined by Federal Emergency Management Agency (FEMA), and as shown on Flood Insurance Rate Maps (FIRM) or Flood Hazard Boundary Maps for all communities participating in the National Flood Insurance Program. The 100-year floodplain (Zones A and AE) is an area subjected to inundation by the 1 % chance of an annual flood event. Zone X is a moderate flood hazard area and is area between the limits of the base flood and the 0.2 %-annual-chance (or 500-year) flood (FEMA, 2017b). Executive Order (EO) 11988 (Floodplain Management) requires federal agencies to avoid direct or indirect support of development within the 100-year floodplain whenever there is a practical alternative. The proposed Bayou Bridge Pipeline Project areas fall within Zone AE, A, and X according to the FEMA FIRM map (FEMA, 2017a). Floodplain crossing information for the requester's preferred alternative is presented in Table 3-4.

Table 3-4 Requester's Preferred Alternative Floodplain Crossings			
Federal Project	Parish	Crossing Length (feet)	Flood Zone ^a
Federal Project Crossings			
Calcasieu River	Calcasieu	3,745	AE
Mermentau River	Jefferson Davis/ Acadia	345	AE
Vermilion River	Vermilion/ Lafayette	350	AE
Bayou Teche	St. Martin	200	A
West Atchafalaya Basin Levee	St. Martin	155	X
Atchafalaya River	St. Martin	1,340	A
Gulf Intracoastal Waterway	Iberville	535	A
East Atchafalaya Basin Levee	Iberville	290	Not in floodplain
Federal Easement Crossings			
145-E-1	St. Martin	202	A
144 E-1	St. Martin	N/A ^b	A
145-E-2	St. Martin	181	A
144 E-3	St. Martin	1,117	A
A-182E-4	St. Martin	816	A
A-163E-1	St. Martin	2,236	A
A-182E-2	St. Martin	604	A
A-111E-4	St. Martin	639	A
A-163E-4	St. Martin	197	A
A-111E-5	St. Martin	1,768	A
301E-3	St. Martin	100	A
700-E-2	Iberville	2,185	A
700-E-1	Iberville	711	A
7	Assumption	358	AE

Federal Project	Parish	Crossing Length (feet)	Flood Zone ^a
^a Zones A and AE are subject to inundation by the 1 % chance of an annual flood event. Zone X is a moderate flood hazard area and is an area between the limits of the base flood and the 0.2 %-annual-chance (500-year) flood. ^b N/A – Not applicable. Easement is not crossed by the pipeline but would be impacted by temporary workspace.			

3.2.4 Fisheries

All surface waters located along the requester's preferred alternative are classified as warmwater fisheries. Furthermore, all surface waters are classified as freshwater except for the Calcasieu River, which is classified as estuarine (USDA, 1980).

Commercial fisheries are active in the Calcasieu River, Atchafalaya River, and the GIWW. The majority of commercial harvests include shrimp, crawfish, crab, and finfishes. All waterbodies located along the requester's preferred alternative are utilized for recreational fishing, shrimping, and crabbing except for the ephemeral drainage located within Easement 7. Some of the commonly targeted species within these surface waters include largemouth bass (*Micropterus salmoides*), red-ear sunfish (*Lepomis microlophus*), channel catfish (*Ictalurus punctatus*), red swamp crawfish (*Procambarus clarkia*), white river crawfish (*Procambarus acutus*), blue crab (*Callinectes sapidus*), speckled trout (*Cynoscion nebulosus*), and red drum (*Sciaenops ocellatus*) (LDWF, 2017a; U.S. Fish and Wildlife Service [USFWS], 2006).

Essential Fish Habitat

An amendment to the *Magnuson-Stevens Act* in 1996 strengthened the ability of the National Marine Fisheries Service (NMFS) and associated councils to protect and conserve the habitat of certain marine, estuarine, and anadromous finfish, mollusks, and crustaceans. These specific habitats have been deemed Essential Fish Habitat (EFH). EFH can be broadly defined as "those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity."

The only portion of the requester's preferred alternative that is located in designated EFH is the Calcasieu River. The Calcasieu River contains EFH characterized as open water with soft mud substrates. Based on the 2004 Environmental Impact Statement for the 2005 amendment to the Gulf of Mexico Fishery Management Plans, EFH is present for all species and life stages requiring estuarine soft-bottom and estuarine pelagic habitats including adult gray snapper (*Lutjanus griseus*), juvenile lane snapper (*Lutjanus synagris*), juvenile yellowtail snapper (*Ocyurus chrysurus*), juvenile and adult Spanish mackerel (*Scomberomorus*

maculatus), juvenile blue fish (*Pomatomus saltatrix*), post larval and juvenile brown shrimp (*Farfantepenaeus aztecus*), and post larval and juvenile white shrimp (*Litopenaeus setiferus*).

3.2.5 Wildlife

Wildlife habitats within the requester's preferred alternative area include forested wetlands, open land, residential land, and open water.

Forested wetlands are the primary habitat type along the requester's preferred alternative. Wildlife species that utilize this habitat include a variety of wading birds such as great egret (*Ardea alba*), white-faced ibis (*Plegadis chihi*), and great blue heron (*Ardea herodias*); waterfowl such as green-winged teal (*Anas carolinensis*), mallard (*Anas platyrhynchos*), northern pintail (*Anas acuta*), and bufflehead (*Bucephala albeola*); mammals including American black bear (*Ursus americanus*), nutria (*Myocastor coypus*), beaver (*Castor canadensis*), and river otter (*Lontra canadensis*); and reptiles and amphibians including American alligator (*Alligator mississippiensis*), water moccasin (*Agkistrodon piscivorus*), spring peeper (*Pseudacris crucifer*), Blanchard's cricket frog (*Acris blanchardi*), Gulf Coast toad (*Incilius valliceps*), and southern leopard frog (*Lithobates sphenoccephalus*) (USFWS, 2013a; USGS, 2011; Atchafalaya Basinkeeper, 2016). Forested wetlands within the Atchafalaya Basin also provide suitable habitat for the recently delisted Louisiana black bear (*Ursus americanus luteolus*) (LDWF, 2017b). During the denning season (December 1 through April 30), Louisiana black bears utilize large, hollow trees with a diameter to breast height of 36 inches or greater.

Open land occurs along the West Atchafalaya Basin Levee and East Atchafalaya Basin Levee. These areas are routinely maintained uplands that provide habitat for more generalist species such as coyote (*Canis latrans*), Virginia opossum (*Didelphis virginianus*), eastern garter snake (*Thamnophis sirtalis sirtalis*), and mourning dove (*Zenaida macroura*).

Easement 7 is located within a residential area. Wildlife common in this area would be similar to that of open land, consisting of human commensal wildlife species such as house sparrow (*Passer domesticus*) and raccoon (*Procyon lotor*).

Open water in the requester's preferred alternative area consists of major rivers and canals. Wildlife species utilizing these waterbodies would primarily be fish species, as discussed in Section 3.2.4.

As discussed in Section 3.2.11, hunting is an important industry in the parishes where the federal project and Easements are crossed by the requester's preferred alternative. The primary areas where hunting could occur along the requester's preferred alternative are

Easements 145-E-1, 144 E-1, 145-E-2, 144 E-3, A-182E-4, A-163E-1, A-182E-2, A-111E-4, A-163E-4, A-111E-5, 301E-3, and 700-E-2. A variety of big and small game hunting could occur in the vicinity of these federal easement crossings. Species commonly targeted by hunters include white-tailed deer (*Odocoileus virginianus*), American alligator, swamp rabbit (*Sylvilagus aquaticus*), nutria, wild turkey (*Meleagris gallopavo silvestris*), and various waterfowl (USACE, 2017a).

Migratory Birds

Most native migratory birds are protected under the *Migratory Bird Treaty Act* (MBTA) originally passed in 1918. The MBTA implements the U.S.' commitment to four bilateral treaties, or conventions, for the protection of a shared migratory bird resource, protecting more than 800 species of birds. The MBTA states that it is unlawful to pursue, hunt, take, capture, kill, possess, sell, purchase, barter, import, export, or transport any migratory bird, or any part, nest, or egg of any such bird, unless authorized by the Secretary of the Interior. "Take" is defined in the regulations as "pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect" (50 CFR 10) (USFWS, 2013b). EO 13186 (January 2001) directs federal agencies to consider the effects of agency actions on migratory birds, with emphasis on bird species of concern.

Habitat for migratory birds would be similar to that described above for wildlife species in general as both forest nesting and ground nesting species have potential to occupy the general area.

Colonial Nesting Birds/Rookeries

Colonial wading birds and their rookeries are protected under the MBTA. Colonial wading birds, such as herons and egrets, typically inhabit bottomland hardwood forest and forested wetland areas. Suitable habitat for colonial nesting birds is present within all of the Easements with the exception of the Easement 7.

BBP conducted aerial surveys in April 2016 to determine the presence of colonial nesting birds and their rookeries utilizing a helicopter with a three-person survey team composed of biologists familiar with bird identification and aerial nest sighting techniques. The 2,000-foot-wide survey corridor was centered on the proposed pipeline, and complete coverage of the survey corridor was accomplished by traveling two transects that parallel the proposed pipeline. Both transects were located approximately 500 feet to the north and south of the proposed pipeline.

The aerial surveys focused on locating rookeries located in the trees of riparian habitat, edge-of-field habitat, trees bordering open water habitat, and mixed forest wetland habitat along the proposed pipeline. Only nests determined by the biologists to be large enough to support the size and weight of colonial wading birds were recorded. In areas of previously documented rookeries and in areas identified as high probability areas, the helicopter slowed to approximately 80 miles per hour. If needed, additional transects were flown to increase survey coverage in these areas.

When a rookery was observed, data such as the rookery location (latitude/longitude and approximate MP), distance from centerline, nest conditions (good, fair, poor), species (if birds were present), and nest status (inactive/active) were documented. The biologists also documented the rookery location by taking a GPS point and pictures of the rookery.

During the aerial surveys conducted in April 2016, no colonial nesting bird rookeries were identified in or within 1,000 feet of the requester's preferred alternative areas. The results of the aerial surveys were submitted to LDWF in May 2016.

Bald Eagles

Bald eagles and their nests are protected under the *Bald and Golden Eagle Protection Act* of 1940 and the MBTA. Suitable foraging habitat for bald eagles is present at all of the federal project and Easement crossings. Furthermore, suitable nesting habitat is present within in all of the Easements with the exception of Easement 7.

As described in detail above, BBP conducted aerial surveys in April 2016 to determine the presence of bald eagles and their nests utilizing a helicopter with a three-person survey team composed of biologists familiar with bird identification and aerial nest sighting techniques. If a bald eagle nest was observed, data such as the nest location (latitude/longitude and approximate MP), distance from centerline, nest conditions (good, fair, poor), and nest status (inactive/active) were documented. The biologists also documented the bald eagle nest location by taking a GPS point and pictures. If bald eagles were observed during the survey, the biologists recorded the approximate life stage of the bird (e.g., juvenile or adult) and the number observed. Due to the mobile nature of bald eagles, GPS points were not taken when an adult or juvenile bald eagle was observed during the survey.

A total of eight bald eagles were documented within the 2,000-foot-wide aerial survey corridor. Most bald eagles were observed east of the Atchafalaya Basin in areas characterized

as forested wetlands. Although both adult and juvenile bald eagles were observed during the survey, no nests were documented within the 2,000-foot-wide survey corridor.

3.2.6 Threatened and Endangered Species

The USFWS Information, Planning, and Conservation System and the Endangered, Threatened, and Candidate Species of Louisiana list provided by the USFWS Louisiana Ecological Services Office (USFWS, 2017a) were utilized to determine the federally listed or protected species that could inhabit or traverse the requester’s preferred alternative areas. A total of 11 federally listed threatened or endangered species have the potential to occur within these parishes, as identified in Table 3-5. During the initial planning stages of the requester’s preferred alternative, the Louisiana black bear was federally listed as threatened; however, the species was delisted by the USFWS on April 11, 2016 (USFWS, 2016a) and is therefore not included in Table 3-5.

With the exception of the Atlantic sturgeon and pallid sturgeon, suitable habitat for the federally listed threatened and endangered species is not present within the requester’s preferred alternative areas.

Common Name	Scientific Name	Federal Status	Parish	Suitable Habitat Present within Requester’s Preferred Alternative Area
Piping Plover	<i>Charadrius melodus</i>	T	Vermilion	No
Red Knot	<i>Calidris canutus rufa</i>	T	Vermilion	No
Red-cockaded Woodpecker	<i>Leuconotopicus borealis</i>	E	Calcasieu	No
Atlantic Sturgeon	<i>Acipenser oxyrinchus desotoi</i>	T	Iberville, Vermilion	Yes
Pallid Sturgeon	<i>Scaphirhynchus albus</i>	E	Iberville, St. Martin	Yes
West Indian Manatee	<i>Trichechus manatus</i>	E	Vermilion	No
Green Sea Turtle	<i>Chelonia mydas</i>	T	Vermilion	No
Hawksbill Sea Turtle	<i>Eretmochelys imbricata</i>	E	Vermilion	No
Kemp’s Ridley Sea Turtle	<i>Lepidochelys kempii</i>	E	Vermilion	No
Leatherback Sea Turtle	<i>Dermochelys coriacea</i>	E	Vermilion	No
Loggerhead Sea Turtle	<i>Caretta caretta</i>	T	Vermilion	No

Table 3-5 Federally Listed Threatened and Endangered Species Potentially Occurring within the Requester's Preferred Alternative Area				
Common Name	Scientific Name	Federal Status	Parish	Suitable Habitat Present within Requester's Preferred Alternative Area
Federal Status Abbreviations: E - Endangered species T - Threatened species Source: USFWS, 2017				

Potentially suitable habitat for the Atlantic sturgeon is present within the Vermilion and GIWW federal project crossings and Easement 700-E-1. Potentially suitable habitat for the pallid sturgeon is present within the Atchafalaya River and GIWW federal project crossings and Easements A-182E-2, A-111E-4, and 700-E-1. A detailed description of the habitat requirements for the Atlantic sturgeon and pallid sturgeon is provided in the following sections.

Atlantic Sturgeon

The Atlantic sturgeon is federally listed as threatened. It lives in the marine and estuarine areas of the Gulf Coast for parts of the year and then migrates up rivers to spawn in the spring. It then returns to the Gulf of Mexico in the fall. The young will remain in the river habitats for two years before making the journey to the Gulf of Mexico. The fish will return to their natal stream between March and May to take part in the spawning season every year after they reach maturity (USFWS, 2002). Atlantic sturgeon are typically bottom feeders whose diets primarily consist of small crustaceans as well as other fish species (National Oceanic and Atmospheric Administration, 2016).

Pallid Sturgeon

Pallid sturgeon are federally listed as endangered. Unlike Atlantic sturgeon, this species spends its entire life in freshwater. Large, excessively turbid rivers with strong currents and firm gravel or sandy bottoms provide suitable foraging and spawning habitat (NatureServe, 2015). Spawning occurs in the spring or early summer in water with a swift current. Eggs are often carried downstream where larvae will remain for several years before reaching sexual maturity.

3.2.7 Land Use

Land use within the requester's preferred alternative areas was assigned a classification based on the principal land characteristics in a given area. Aerial photography and the National Land Cover Database (Multi-Resolution Land Characteristics Consortium, 2011), were used to identify and classify general land use for the requester's preferred alternative areas.

Forested Wetlands are the primary land use within the requester's preferred alternative areas. These lands are characterized by woody vegetation greater than 20 feet in height with more than 30 % canopy cover (Cowardin et al., 1979). Forested wetlands occur within Easements 301E-1, A-182E-4, A-163E-1, A-182E-2, A-111E-4, A-163E-4, A-111E-5; 700-E-2, 700-E-1, 145-E-1, 144-E-1, 145-E-2, and 144-E-3.

Open water consists of major rivers and canals within the requester's preferred alternative area. The Calcasieu River, Mermentau River, Vermilion River, Bayou Teche, Atchafalaya River, GIWW, and Bayou Lafourche are all considered open water.

Open land consists of land that is not agricultural or developed land within the requester's preferred alternative area. Open land is the land use classification given to the West Atchafalaya Basin Levee and the East Atchafalaya Basin Levee.

Residential land is developed land that includes both single and multiple family dwellings and may be in developed subdivisions as well as rural areas. This land use also includes landscaped areas associated with residential areas. Within the requester's preferred alternative areas, Easement 7 is partially located within a residential area.

3.2.8 Aesthetics

The requester's preferred alternative areas are generally in remote uninhabited areas. The federal projects and Easements crossing locations are primarily visible to the public traveling navigable waterways via boat. The requester's preferred alternative crossing locations already contain a variety of structures that are visible to the public including barge loading/offloading facilities, overhead transmission lines, roads, levees, aboveground utility sites, and few residences. Existing utility ROWs, pasture land, and forested wetlands are also prevalent within the view sheds at the federal project and Easement areas. The requester's preferred alternative crossings and the associated permanent easement are 100 % co-located with other existing utility lines (i.e. underground pipelines and/or overhead powerlines). As indicated in Section 3.2.3, there are no known federal or state designated scenic rivers or streams near the requester's preferred alternative areas.

3.2.9 Cultural Resources

Cultural resources documented throughout the Western Gulf Coastal Plain and the Mississippi Alluvial Plain eco-regions of Louisiana span from the Paleoindian period, through the Historic period. The general chronology of the Southern Louisiana region can be grouped into the following cultural-historical time periods: Paleoindian (ca. 11,500 to 10,000 before present

[BP]); Archaic (ca. 10,000 to 2,000 BP); Woodland Period (ca. 2,800 to 800 BP); Mississippian Period (ca. 1,000 to 250 BP); Historic Period (Post 250 BP). Documented archaeological sites throughout these regions are most commonly associated with the Troyville-Coles Creek components of the Mississippian Period (ca. 700-1000 CE), and sites dating to the Paleoindian and Archaic periods are considerably less represented due to the relatively young age of the Deltaic geological formation.

The cultural resources studies conducted for the requester's preferred alternative included an in-depth background and literature review, Phase I surveys, as well as consultation with the Louisiana State Historic Preservation Office (SHPO) and federally-recognized Indian Tribes.

Prior to the initiation of field surveys, an in-depth records and literature review was conducted utilizing the Louisiana Division of Archaeology (LDA) Cultural Resource Viewer online database and the National Register of Historic Places (NRHP) database to identify previously recorded cultural resource sites, historic structures, properties listed in the NRHP, designated historic districts, or State Landmarks within a 1-mile radius of the federal projects and easements. The background review determined that 17 previously recorded archaeological sites are located within this review radius. Out of the 17 sites, eight are prehistoric in nature, while the remaining nine sites are historic in nature. There are no cultural resources located within the federal project crossing limits or federal easements.

A Phase I cultural resources inventory survey was conducted in accordance Section 106 of the National Historic Preservation Act (NHPA), and in compliance with the LDA survey standards from October 2015 to October 2016. Specifically, the cultural resources investigations covered a broad 300-foot-wide linear corridor (*survey corridor*) along the pipeline centerline, and included a combination of pedestrian surveys and systematic shovel testing at 30 to 50-m intervals along fixed transects within the survey corridor. For swamps, sloughs, expansive wetlands, or other inundated portions of the proposed Bayou Bridge Pipeline Project, surveys included the excavation of shovel tests at select, non-inundated locations, including any upland features, pimple mounds, or any other topographic high points within the low-lying landscape. Additionally, the cultural resources investigation included an assessment of all historic-age structures (i.e., older than 50 years) located within or directly adjacent to the proposed Bayou Bridge Pipeline Project survey corridor. The Phase I surveys across the federal projects and easements resulted in negative findings with no cultural materials identified on the ground surface or within any of the 216 shovel tests.

3.2.10 Environmental Justice

EO 12898 of 1994 and the Department of Defense's Strategy on Environmental Justice of 1995, direct federal agencies to identify and address any disproportionately high adverse human health or environmental effects of federal actions to minority and/or low-income populations. Minority populations are those persons who identify themselves as African American, Hispanic, Asian, American Indian/Alaskan Native, Pacific Islander, one or more race, or two or more races. A minority population exists where the percentage of minorities in an affected area either exceeds 50 % or is meaningfully greater than in the general population. The U.S. Census Bureau defines a "poverty area" as a census tract with 20 % or more of its residents below the poverty threshold and an "extreme poverty area" as one with 40 % or more below the poverty level.

A potential disproportionate impact may occur when the percent minority in the study area exceeds 50 % and/or the percent low-income exceeds 20 % of the population. In addition, a disproportionate impact may occur when the percent minority and/or percent low-income are meaningfully greater than those in the reference community.

Methodology

The methodology, consistent with EO 12898, to accomplish this Environmental Justice (EJ) analysis included identifying low-income and minority populations within the proposed Bayou Bridge Pipeline Project area using up-to-date economic statistics, aerial photographs, and U.S. Census Bureau 2011-2015 American Community Survey (ACS) estimates. The newly released ACS estimates provide the latest socioeconomic community characteristic data released by the U.S. Census Bureau and are based on data collected between January 2011 and December 2015.

There are numerous geographic levels at which U.S. Census Bureau data is typically available. Potentially relevant geographic levels for this project include: state level, parish level, block group level, and block level. For the purposes of this EJ analysis, census block group data was selected as the appropriate level due to the overall rural setting of the requester's preferred alternative.

To determine whether the requester's preferred alternative has any disproportionate negative impacts on minority and/or impoverished communities, a three-step analysis was utilized. First, those census block groups impacted by construction and/or operation of the requester's preferred alternative that meet the statutory requirements for low-income and

minority communities were identified. Second, the census block group population was compared to the parish level data, which was utilized as the reference community for this analysis. If there was a meaningful difference between the census block group impacted by the requester's preferred alternative and the parish in which it is located, a third step was taken to analyze the project to determine if the routing of the requester's preferred alternative would cause a disproportionate adverse impact on minority and/or impoverished communities.

There is no accepted standard for the spatial limit for the analysis of impacts on EJ communities associated with the construction of oil pipelines. However, transportation projects, such as under the Federal Transit Administration (a division of DOT), and natural gas pipeline projects under the FERC (e.g., Docket Nos. CP12-507-000 and CP12-508-000, DOE FE 12-97-LNG, and FERC/EIS-0252F), have used a 0.5-mile buffer area to examine EJ effects for linear construction projects. Although the requester's preferred alternative is not a transportation project or natural gas project, the design and operation of oil pipelines (and natural gas pipelines) are under the jurisdiction of PHMSA, which is also a division of the DOT. Census block groups in rural areas, such as that covered by the proposed project, may cover a larger area because of the lower density of population and may include large areas without any communities. Therefore, the additional review of census block groups under the third step included a determination if there are any communities located within 0.5 mile of the requester's preferred alternative.

An analysis was also performed to determine the potential effects that a worse case release during operation of the proposed pipeline could have on EJ communities located downstream of the pipeline. The extent of the analysis took into account the census block groups located within the plume limits as determined by the PHMSA model resulting from a potential release originating at the federal project and/or Easements.

Results

Demographic information for minority and poverty population in all requester's preferred alternative areas is presented in Table 3-6. Areas impacted by the requester's preferred alternative and identified as EJ communities are indicated by the red italicized text and are discussed further in Section 4.1.10. A map depicting the census block groups crossed by the requester's preferred alternative and their EJ status is provided in Appendix A.

**Table 3-6
Summary of Demographic Conditions for the Requester's Preferred Alternative Area**

Census Tract and Block Group	Requester's Preferred Alternative	Total Population	White Non-Hispanic (%)	Minority (%)	Highest Minority Population (%)	Native American Population (%)	Persons Below Poverty Level (%)
State of Louisiana		4,625,253	59.48	40.52	31.88 (African American)	0.53	19.76
Acadia Parish	-	62,163	77.70	22.30	17.42 (African American)	0.16	20.63
Tract 9611, Block Group 2	Mermentau River	1,434	89.75	10.25	8.72 (African American)	0.35	10.99
Assumption Parish	-	23,057	66.24	33.76	29.86 (African American)	0.65	15.97
Tract 501, Block Group 1	Easement 7	1,509	23.06	<i>76.94</i>	<i>70.31</i> (African American)	0	19.09
Tract 501, Block Group 2		1,722	45.41	<i>54.59</i>	<i>53.02</i> (African American)	0	10.96
Calcasieu Parish	-	195,887	68.72	31.28	24.67 (African American)	0.35	17.11
Tract 18.01, Block Group 2	Calcasieu River	1,912	92.63	7.37	4.03 (Hispanic)	0	0.73
Tract 32, Block Group 1		2,426	90.15	9.85	5.19 (African American)	0	13.44
Iberville Parish	-	33,229	47.85	52.15	48.01 (African American)	0.36	19.10
Tract 9529, Block Group 4	East Atchafalaya Levee, Gulf Intracoastal Waterway, Easements 700-E-1, 700-E-2, A- 111E-5	1,400	100	0	0	0	<i>20.43</i>

**Table 3-6
Summary of Demographic Conditions for the Requester's Preferred Alternative Area**

Census Tract and Block Group	Requester's Preferred Alternative	Total Population	White Non-Hispanic (%)	Minority (%)	Highest Minority Population (%)	Native American Population (%)	Persons Below Poverty Level (%)
Jefferson Davis Parish	-	31,434	78.18	21.82	17.10 (African American)	0.49	21.06
Tract 4, Block Group 1	Mermentau River	1,376	88.44	11.56	5.16 (Two or More Races)	0.80	18.60
Lafayette Parish	-	231,811	66.62	33.38	25.48 (African American)	0.19	16.02
Tract 14.02, Block Group 1	Vermilion River	2,105	95.44	4.56	4.56 (African American)	0	2.52
St. Martin Parish	-	53,126	64.72	35.28	29.59 (African American)	0.30	17.88
Tract 201, Block Group 2	Atchafalaya River, West Atchafalaya Levee, Easements A- 182E-4, A-163E-1, A- 182E-2, A-111E-4, A- 111E-5, A-163E-A, 301E-3, A-111E-5, 145E-1, 145E-2, 144E-3, 144E-1	743	100	0	0	0	36.61
Tract 208, Block Group 2	Bayou Teche	1,868	43.31	56.69	41.65 (African American)	0	9.65
Tract 209, Block Group 2		966	78.88	21.12	13.56 (African American)	0	9.42
Vermilion Parish	-	59,110	78.76	21.24	14.09 (African American)	0.57	17.81
Tract 9501, Block Group 2	Vermilion River	3,753	79.64	20.36	9.54 (African American)	0	11.72

**Table 3-6
Summary of Demographic Conditions for the Requester's Preferred Alternative Area**

Census Tract and Block Group	Requester's Preferred Alternative	Total Population	White Non-Hispanic (%)	Minority (%)	Highest Minority Population (%)	Native American Population (%)	Persons Below Poverty Level (%)
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Source: U.S. Census Bureau, 2015

Note: Red italicized text indicates minority population or poverty population in respective columns. Reference parish level data are not demarcated utilizing red italicized text.

There are five census block groups crossed by the requester's preferred alternative where either the poverty level is greater than 20% (Tract 9529/Block Group 4 and Tract 201/Block Group 2) or the minority population exceeds 50% (Tract 501/Block Group 1, Tract 501/Block Group 2, and Tract 208/Block Group 2). A review of each of the five census block groups was performed to determine if there are any communities located within 0.5 mile of the requester's preferred alternative. Based on this review, each of the five census block groups have communities located within 0.5 mile of the requester's preferred alternative except for Tract 201/Block Group 2. If there are no communities within 0.5 mile of the requester's preferred alternative, such as in Tract 201/Block Group 2 which is located approximately 1.20 mile northeast from the nearest community, then further analysis to determine if the requester's preferred alternative would have a disproportionate impact on low income and/or minority populations was not performed.

Demographic information for minority and poverty populations in areas that could be impacted downstream of the proposed crossings by a worst case release of crude oil during operation of the proposed pipeline is presented in Table 3-7.

Census Tract and Block Group	Requester's Preferred Alternative	Total Population	White Non-Hispanic (%)	Minority (%)	Highest Minority Population (%)	Native American Population (%)	Persons Below Poverty Level (%)
State of Louisiana	-	4,625,253	59.48	40.52	31.88 (African American)	0.53	19.76
Acadia Parish	-	62,163	77.70	22.30	17.42 (African American)	0.16	20.63
Tract 9611, Block Group 2	Mermentau River	1,434	89.75	10.25	8.72 (African American)	0.35	10.99
Assumption Parish	-	23,057	66.24	33.76	29.86 (African American)	0.65	15.97
Tract 501, Block Group 1	Easement 7	1,509	23.06	76.94	70.31 (African American)	0	19.09
Tract 501, Block Group 2		1,722	45.41	54.59	53.02 (African American)	0	10.96
Tract 503, Block Group 1 ^a		1,338	50.75	49.25	49.03 (African American)	0.22	20.40
Calcasieu Parish	-	195,887	68.72	31.28	24.67 (African American)	0.35	17.11
Tract 18.01, Block Group 2	Calcasieu River	1,912	92.63	7.37	4.03 (Hispanic)	0	0.73
Tract 32, Block Group 1		2,426	90.15	9.85	5.19 (African American)	0	13.44
Tract 18.01, Block Group 1 ^a		2,286	92.08	7.92	7.31 (African American)	0	6.08

Census Tract and Block Group	Requester's Preferred Alternative	Total Population	White Non-Hispanic (%)	Minority (%)	Highest Minority Population (%)	Native American Population (%)	Persons Below Poverty Level (%)
Iberia Parish	-	73,938	59.74	40.26	31.41 (African American)	0.10	19.59
Tract 302, Block Group 1 ^a	Bayou Teche	1,845	71.27	28.73	15.99 (African American)	0	2.66
Tract 305, Block Group 4 ^a		896	85.04	14.96	5.13 (Two or More Races)	0	13.50
Tract 306, Block Group 1 ^a		1,708	81.97	18.03	12.65 (African American)	0	1.05
Tract 301, Block Group 1 ^a	East Atchafalaya Levee, Atchafalaya River, Easements A-182E-2, A-111E-4, A-163E-1, A-182E-4	2,134	70.90	29.10	29.10 (African American)	0	18.32
Iberville Parish	-	33,229	47.85	52.15	48.01 (African American)	0.36	19.10
Tract 9529, Block Group 4	East Atchafalaya Levee, Gulf Intracoastal Waterway, Easements 700-E-1, 700-E-2	1,400	100	0	0	0	20.43
Tract 9530, Block Group 1 ^a	East Atchafalaya Levee	657	97.11	2.89	2.28 (Two or More Races)	0	5.94
Jefferson Davis Parish	-	31,434	78.18	21.82	17.10 (African American)	0.49	21.06
Tract 4, Block Group 1	Mermentau River	1,376	88.44	11.56	5.16 (Two or More Races)	0.80	18.60

Census Tract and Block Group	Requester's Preferred Alternative	Total Population	White Non-Hispanic (%)	Minority (%)	Highest Minority Population (%)	Native American Population (%)	Persons Below Poverty Level (%)
Lafayette Parish	-	231,811	66.62	33.38	25.48 (African American)	0.19	16.02
Tract 14.02, Block Group 1	Vermilion River	2,105	95.44	4.56	4.56 (African American)	0	2.52
Tract 14.02, Block Group 3 ^a		2,544	86.71	13.29	4.91 (Asian)	0	10.40
St. Martin Parish	-	53,126	64.72	35.28	29.59 (African American)	0.30	17.88
Tract 208, Block Group 2	Bayou Teche	1,868	43.31	56.69	41.65 (African American)	0	9.65
Tract 209, Block Group 2		966	78.88	21.12	13.56 (African American)	0	9.42
Tract 201, Block Group 2	West Atchafalaya Levee, Atchafalaya River, Easements 145E-1, 145E-2, 144E-3, 144E-1, A-182E-2, A-111E-4, A-163E-1, A-182E-4, A-163E-4, A-111E-5, 301E-3	743	100	0	0	0	36.61
Tract 210, Block Group 1 ^a	Atchafalaya River, Easements A-182E-2, A-111E-4, A-163E-1	177	100	0	0	0	40.68
St. Mary Parish	-	53,441	56.55	43.45	31.06 (African American)	1.15	22.43
Tract 410, Block Group 1 ^a	Atchafalaya River, Easements A-182E-2, A-111E-4, A-163E-1	882	93.76	6.24	3.17 (African American)	2.04	5.79

**Table 3-7
Summary of Demographic Conditions for Areas Potentially Impacted during Operation of the Requester's Preferred Alternative Areas**

Census Tract and Block Group	Requester's Preferred Alternative	Total Population	White Non-Hispanic (%)	Minority (%)	Highest Minority Population (%)	Native American Population (%)	Persons Below Poverty Level (%)
Vermilion Parish	-	59,110	78.76	21.24	14.09 (African American)	0.57	17.81
Tract 9501, Block Group 2	Vermilion River	3,753	79.64	20.36	9.54 (African American)	0	11.72
Tract 9501, Block Group 1 ^a		3,368	91.98	8.02	4.51 (African American)	0	8.52
9509.02, Block Group 1 ^a		2,724	89.32	10.68	9.69 (African American)	0	14.53
Tract 9502, Block Group 3 ^a	Mermentau River	992	100	0	0	0	5.85

Source: U.S. Census Bureau, 2015

Note: Red italicized text indicates minority population or poverty population in respective columns. Reference parish level data are not demarcated utilizing red italicized text.

^a Census block group located downstream of federal project and/or Easement crossing.

In addition to the five census block groups identified in Table 3-7 as containing an EJ community, a release from the proposed pipeline could result in impacts on two additional census block groups (Tract 210/Block Group 1 and Tract 503/Block Group 1) having a poverty level greater than 20%. There are no additional census block group with minority communities greater than 50% that would be impacted by a release from the proposed pipeline.

3.2.11 Socioeconomics

The total population for the state of Louisiana as well as each of the census block groups crossed by the requester’s preferred alternative is provided in Table 3-7. Median income for the state of Louisiana and the census block groups crossed by the requester’s preferred alternative is provided in Table 3-8. Additionally, the top three industries providing employment for the state of Louisiana and each of the parishes the requester’s preferred alternative is located within are provided in Table 3-8.

Overall, the median income for the state of Louisiana is \$45,047, and the top industry is educational services / health care and social assistance. Other industries that are common within the parishes in which the requester’s preferred alternative is located include retail trade and agriculture, forestry, fishing and hunting, and mining.

Table 3-8 Median Income and Top Industries Employing Persons			
Census Block Group	Requester’s Preferred Alternative	Median Income (\$)	Top Three Industries
State of Louisiana		45,047	Educational Services / health care and social assistance; Retail trade; Arts, entertainment, and recreation, and accommodation and food services
Acadia Parish			
Tract Block Group 2	Mermentau River	60,469	Educational Services / health care and social assistance; Agriculture, forestry, fishing and hunting, and mining; Retail trade
Assumption Parish			
Tract 501, Block Group 1	Easement 7	36,757	Educational Services / health care and social assistance; Construction; Manufacturing
Tract 501, Block Group 2		31,750	
Calcasieu Parish			
Tract 18.01, Block Group 2	Calcasieu River	137,900	Educational Services / health care and social assistance;

Table 3-8 Median Income and Top Industries Employing Persons			
Census Block Group	Requester's Preferred Alternative	Median Income (\$)	Top Three Industries
Tract 32, Block Group 1		53,607	Arts, entertainment, and recreation, and accommodation and food services; Retail trade
Iberville Parish			
Tract 9529, Block Group 4	East Atchafalaya Levee, Gulf Intracoastal Waterway, Easements 700-E-1, 700-E-2, A-111E-5	N/A	Educational Services / health care and social assistance; Manufacturing; Retail trade
Jefferson Davis Parish			
Tract 4, Block Group 1	Mermentau River	47,232	Educational Services / health care and social assistance; Agriculture, forestry, fishing and hunting, and mining; Retail trade
Lafayette Parish			
Tract 14.02, Block Group 1	Vermilion River	89,063	Educational Services / health care and social assistance; Arts, entertainment, and recreation, and accommodation and food services; Retail trade
St. Martin Parish			
Tract 201, Block Group 2	Atchafalaya River, West Atchafalaya Levee, Easements A-182E-4, A-163E-1, A-182E-2, A-111E-4, A-111E-5, A-163E-A, 301E-3, A-111E-5, 145E-1, 145E-2, 144E-3, 144E-1	59,583	Educational Services / health care and social assistance; Retail trade; Agriculture, forestry, fishing and hunting, and mining
Tract 208, Block Group 2	Bayou Teche	48,490	
Tract 209, Block Group 2		56,397	
Vermilion Parish			
Tract 9501, Block Group 2	Vermilion River	62,500	Educational Services / health care and social assistance; Agriculture, forestry, fishing and hunting, and mining; Retail trade
N/A – Median income data was not available for Tract 9529/Block Group 4. Source: U.S. Census Bureau, 2015			

3.2.12 Noise

Sound is a sequence of waves of pressure that propagates through compressible media such as air or water. When sound becomes excessive, annoying, or unwanted it is referred to as noise. Decibels (dB) are the units of measurement used to quantify the intensity of noise.

To account for the human ear’s sensitivity to low level noises, the decibel values are corrected for human hearing to weighted values known as decibels of the A-weighted scale (dBA; see Table 3-9). The EPA has set values that should not be exceeded. While the primary responsibility of regulating noise was transferred from the EPA to state and local governments in 1981, the Noise Control Act of 1972 and the Quiet Communities Act of 1978 are still in effect.

Table 3-9 Noise Values		
Area	Noise Level	Effect
All areas	Leq (24) < 70 dBA	Hearing
Outdoors in residential areas and farms where people spend varying amounts of time in which quiet is a basis for use	Ldn < 55 dBA	Outdoor activity interference and annoyance
Outdoor areas where people spend limited time such as school yards, playgrounds, etc.	Leq (24) < 55 dBA	Outdoor activity interference and annoyance
Indoor residential areas	Ldn < 45 dBA	Indoor activity interference and annoyance
Indoor areas with human activities such as schools, etc.	Leq (24) < 45 dBA	Indoor activity interference and annoyance
Source: (The Engineering ToolBox, 2017) Leq: 24-hr equivalent sound level Ldn: day-night average sound level		

3.2.13 Air Quality

The Clean Air Act (CAA) of 1970 requires that states adopt ambient air quality standards. The CAA (42 USC 7401 et seq.) establishes ambient air quality standards, permit requirements for both stationary and mobile sources, and standards for acid deposition and stratospheric ozone (O₃) protection. The standards have been established in order to protect the public from potentially harmful amounts of pollutants. Under the CAA, the EPA establishes primary and secondary air quality standards. Primary air quality standards protect public health, including the health of “sensitive populations, such as people with asthma, children, and older adults.” Secondary air quality standards protect public welfare by promoting ecosystem health, and preventing decreased visibility and damage to crops and buildings.

Areas that do not meet the National Ambient Air Quality Standards (NAAQS) are referred to as non-attainment areas. The GIWW, East Atchafalaya Basin Levee federal project, and two Easements (700-E-2 and 700-E-1) are located in Iberville Parish, which is designated as a non-attainment (marginal) area for 2008 8-hour ozone. In geographic areas designated as "non-attainment" and "maintenance" under the CAA, federal actions must be analyzed for conformity applicability pursuant to regulations implementing Section 176(c) of the CAA. The General Conformity Rule divides the air conformity process into two parts, including applicability

analysis and determination. The applicability process (40 CFR 93.153) requires federal agencies to determine if a requester's preferred alternative within non-attainment areas and maintenance areas would increase emissions of criteria pollutants above present threshold levels (EPA, 2017b). The applicability thresholds vary based on the severity of the non-attainment area. *De minimis* levels are the minimum threshold for the rates of total direct and indirect emissions of a criteria pollutant by a federal action in a non-attainment area or maintenance area that require a conformity determination.

For new sources within a marginal ozone non-attainment area (such as Iberville Parish), the *de minimis* thresholds for emissions of NO_x and VOCs, which are precursors to O₃, is 100 tons per year (tpy) (for marginal non-attainment areas outside an ozone transport region). If a source exceeds these thresholds, a general conformity determination is required.

The remaining federal project and Easement crossings occur within areas that are designated as in attainment for all criteria pollutants; therefore, these activities do not require a review for conformity with the CAA.

4.0 ENVIRONMENTAL CONSEQUENCES & MITIGATION

4.1.1 Groundwater Resources

Future Conditions with No Action

Under the "no action" alternative, BBP would not construct the proposed Bayou Bridge Pipeline Project and no impacts on groundwater resources would occur.

Future Conditions with the Requester's Preferred Alternative

As stated in Section 3.2.1, depending on the location of the federal project or Easement crossing, there are two primary aquifers that are utilized for groundwater: the Chicot aquifer (Calcasieu River, Vermilion River, Mermentau River, and Bayou Teche) and the Lower Mississippi River alluvial aquifer (Atchafalaya River, West and East Atchafalaya Levees, GIWW, and all 14 Easements). More shallow, surficial aquifers may exist, but are not the sources of groundwater use (i.e., potable, industrial, etc.) in these areas. The depths of the primary aquifers vary within the vicinity of the requester's preferred alternative, but typically occur at depths greater than 13 feet (DOTD, 2004). Thus, direct and indirect impacts on groundwater resources associated with conventional pipeline construction at six Easement crossings (144 E-3, A-182E-4, A-163E-1, A-111E-5, 301E-3, and 700-E-2) would not be expected to occur as a result of conventional pipeline construction, because the trench would be excavated to a depth

of approximately eight feet or less to install the pipeline approximately 5 feet below the ground surface.

Installation of the pipeline using the HDD method is likely to interface with groundwater. However, due to the nature of HDD methodology, this construction method is inherently not a risk to groundwater resources as it uses benign substances (bentonite and water) to remove cuttings and maintain the integrity of the hole. Similarly, the Chicot Aquifer, an EPA designated SSA, would not be directly or indirectly impacted by construction of the requester's preferred alternative, because the HDD installation method and non-toxic drilling mud would be utilized. Further, any obstruction to the flow of groundwater would be negligible and limited to the area immediately surrounding the pipeline.

As discussed in greater detail in Section 4.1.15, BBP has stated that they would maintain and inspect the pipeline in accordance with or in exceedance of PHMSA regulations, industry codes, and prudent pipeline operating protocols and techniques. Therefore, operation of the proposed pipeline would, in general, not result in direct or indirect impacts on groundwater. However, in the event that a release were to occur at a federal project or easement crossing, the crude oil would negatively affect groundwater if the release occurs in a buried pipeline section that is at or below groundwater level. If a release occurs above the groundwater, the oil could migrate downward through the unsaturated soil zone until it reaches the groundwater table. As the oil migrates downward, a portion of the oil is retained in soil pore spaces by capillary forces and attached to soil particles by adsorption.

At the groundwater interface, pore spaces in the soil are occupied by water and the oil begins to move laterally. The oil would continue to spread laterally and accumulate until the saturation capacity of the soil is reached. This accumulation of oil forms a lens at the groundwater table. If there is a sufficient supply of oil from above, the lens would continue to increase in thickness and areal extent, lengthening in the direction of groundwater flow.

Because groundwater elevations naturally fluctuate, the lens of oil can be smeared upward when groundwater rises and, conversely, the oil can migrate deeper if the groundwater elevation falls. This smear zone or lens becomes the source of soluble oil compounds that dissolve into the groundwater.

Groundwater flows from areas with a higher water table elevation to areas with a lower water table elevation. Contaminants dissolved in groundwater are carried with the water and move in the direction of groundwater flow. Flow is both horizontal and vertical, although

groundwater primarily moves horizontally. The concentration of contaminants is highest at the source, with contaminants decreasing in concentration as they travel away from the source because of processes such as dispersion, sorption, and biodegradation. The dissolved contaminants create a plume that can extend outward depending on the concentration of the compounds and subsurface conditions.

Crude oil constituents coming in contact with groundwater would dissolve into the aqueous phase. The rate at which these constituents go into solution is attributable to several factors such as solubility of the constituents and velocity of the groundwater. In general, higher dissolution is associated with higher solubility compounds and relatively high groundwater velocities (EPA, 1995).

Factors that would influence the extent of impact on groundwater include:

- Volume of product released and characteristics of oil
- Location of the release relative to the groundwater table
- Surface topography
- Type and thickness of soil deposits
- Rate and direction that groundwater flows
- Weather and soil conditions

Shallow aquifers are more at risk for impacts from spills and leaks because of the proximity to the pipeline and the land surface where spills and leaks could occur.

As discussed in Section 3.2.1 and above in this section, groundwater levels in the vicinity of the requester's preferred action vary depending on location and the underlying aquifer. A majority of the groundwater obtained from wells for drinking water in the vicinity of the western half of the Bayou Bridge Pipeline originates from the Chicot aquifer. However, 70% of the groundwater obtained from the Chicot aquifer is utilized for industrial purposes. The mean screen bottom depth for wells that withdraw potable water from this aquifer is generally located between 36 and 98 feet below ground surface (DOTD, 2004). Water obtained from the Lower Mississippi River alluvial aquifer is utilized primarily for industrial and agricultural purposes (USGS, 2017a). The primary source of drinking water for people living in communities underlain by the Lower Mississippi River alluvial aquifer is surface waters, and as stated in Section 4.1.3 there are no surface water intakes within 15 miles downstream of the federal project and Easement crossings.

The portions of the pipeline installed at the federal Easement crossings via traditional open cut methods would be located a minimum of 5 feet below the surface. A significant release from the pipeline in these areas would likely migrate upward to the surface due to the pressure. Although flow is both horizontal and vertical, groundwater primarily moves horizontally and a spill would likely be detected and remediation efforts initiated before a significant amount travels downward to reach groundwater resources located within the Lower Mississippi River alluvial aquifer due to the slow rate of migration. Minor surficial aquifers could be impacted from a release if the local water table is high (i.e., located within 5 feet of the surface) when a release occurs in these areas; however, the closest active well is located approximately 1 mile from of the open cut crossings. Furthermore, BBP has detailed provisions for protecting and mitigating potential impacts associated with a release in Section 4.1.15. Emergency response and remediation efforts have the potential for dramatically reducing the appreciable adverse environmental effects. Therefore, the likelihood of a release at these crossings impacting utilized groundwater is low.

The pipeline installed via HDD would interface with groundwater due to the pipeline depth. In the event of a release, the groundwater in the immediate area could be impacted. However, a release at these locations would not be anticipated to extend far outward and impact any wells, which are located greater than 500 feet from the crossings, as BBP would work aggressively to isolate the source through the use of remote-controlled shut-off valves; thereby, reducing the amount of crude oil that could impact groundwater at these crossings. As stated previously, BBP would implement measures outlined in Section 4.1.15 to quickly and efficiently contain and remediate a release; thereby potentially reducing the appreciable adverse environmental effects.

If a release is determined to impact groundwater, specific cleanup procedures and remediation activities would be determined by groundwater remediation specialists within BBP and contracted professional consultants. Each groundwater mitigation situation is unique and would be treated according to the actual circumstances present. The first step in the mitigation process consists of the delineation of the plume to define the nature and extent of the release. BBP would recover product as soon as practical to prevent the spread of contamination using excavators to remove the impacted soils, oil skimmers installed within collection wells, pumps, and storage containers or vacuum trucks at collection areas or some other method appropriate for the site conditions. BBP has stated that they would develop a groundwater remediation plan in coordination with the applicable federal, state, and other governmental authorities. In the

event that a well was contaminated as a result of a release, BBP has stated that they could provide an alternate source until remediated.

Overall, impacts on groundwater resources as a result of construction of the pipeline would be negligible. Furthermore, as a result of the response and mitigation measures that would be implemented in the event of a release during operations, impacts on groundwater would be limited to the time it takes to successfully remediate the release and no permanent impacts are anticipated.

4.1.2 Wetlands

Future Conditions with No Action

Under the “no action” alternative, BBP would not construct the proposed Bayou Bridge Pipeline Project and no impacts on wetland resources would occur.

Future Conditions with the Requester’s Preferred Alternative

None of the federal project crossings would result in direct impacts to wetland resources as a result of the utilization of the HDD crossing method (Appendix A). Twelve of the Easement crossings would result in wetland impacts, all of which are forested. The break out of temporary impacts and the permanent conversion of forested wetlands to herbaceous wetlands are depicted in Table 4-1.

Federal Project / Federal Easement	Wetland ID	Wetland Type	Crossing Method	Temporary Impacts (Acres)	Permanent Conversion Impacts (Acres)	Permanent Loss (Acres)
145 E-1	WP2SM045_PFO	PFO	HDD	0.80	0	0
144 E-1	WP2SM045_PFO	PFO	Workspace Only	0.03	0	0
145 E-2	WP2SM045_PFO	PFO	HDD	0.32	0	0
144 E-3	WP2SM045_PFO	PFO	HDD / Open Cut	1.52	0.60	0
	WP2SM045_PFO_CYP	PFO - CYP	Open Cut	0.30	0.17	0
A-182E-4	WP1SM026_PFO_CYP	PFO - CYP	Open Cut	0.84	0.56	0
A-163E-1	WP1SM026_PFO	PFO	HDD / Open Cut	3.65	0.67	0
	WP1SM026_PFO_CYP	PFO - CYP	Open Cut	1.38	0.86	0
A-182E-2	WP1SM026_PFO	PFO	HDD	0.76	0.07	0
A-111E-4	WP1SM025_PFO	PFO	HDD	1.52	0.23	0
A-163E-4	WP1SM025_PFO	PFO	HDD	0.89	0.13	0
A-111E-5	WP1SM025_PFO	PFO	HDD / Open Cut	3.84	1.22	0
301E-3	WP1SM025_PFO	PFO	Open Cut	0.06	0.07	0

Federal Project / Federal Easement	Wetland ID	Wetland Type	Crossing Method	Temporary Impacts (Acres)	Permanent Conversion Impacts (Acres)	Permanent Loss (Acres)
700-E-2	WPIV022_PFO_CYP	PFO - CYP	HDD / Open Cut	3.25	1.01	0
	WP2IV022_PFO	PFO	HDD	1.82	0	0
Totals Impacts				20.98	5.59	0

Temporary impacts on wetlands would result from the clearing activities necessary to facilitate the installation of the pipeline across the Easements via a combination of open cut and HDD methods; these areas would be allowed to revegetate. Comments were received during the public comment period about the potential for open cut methods to result in spoil banks. Soil materials resulting from the trench installation of the pipeline would be temporarily side cast adjacent to the trench and replaced to backfill the pipeline that would be buried at least 4 feet below natural grade. The surface would be restored to pre-construction contours and the areas would be allowed to revegetate. The permanent conversion of forested wetlands to herbaceous wetlands would result from the permanent maintenance of a 30-foot corridor centered on the pipeline through wetlands that are open cut and a 15-foot corridor over a portion of 5 select areas (i.e., Easements A-163E-1, A-182E-2, A-111E-4, A-163E-4, and A-111E-5) where the pipeline is installed via HDD to facilitate access for periodic integrity inspection surveys and maintenance activities.

BBP proposes to minimize direct impacts on wetland resources during construction through implementation of the following best management practices (BMPs):

- Reducing the construction ROW from 100 feet to 75 feet in wetlands;
- Utilizing topsoil segregation in unsaturated wetlands;
- Utilizing board mats in wetlands where possible to prevent rutting;
- Reducing the width of the permanently maintained corridor from 50 feet to 30 feet in wetlands;
- Not conducting clearing activities between HDD entry and exit points except where necessary to facilitate construction of the proposed Bayou Bridge Pipeline Project;
- Not permanently maintaining the 30-foot corridor between HDD entry and exit points except where necessary to gain access to pipe installed via open-cut;

- Implementing best management practices outlined in the project-specific Stormwater Pollution Prevention Plan (SWPPP) (Appendix B);
- Returning all impacted wetlands to pre-construction contours upon completion of construction;
- Allowing the wetlands impacted only temporarily to facilitate construction to revegetate post construction and return to a forested state; and
- Reseeding all non-inundated areas with a native seed mix to establish vegetation cover quickly while natural succession contributes to overall restoration.

The requester also proposes to mitigate for all impacts on forested wetlands through the purchase of mitigation credits. A detailed discussion of the requester's proposed compensatory mitigation plan is provided in Section 6.0.

Indirect impacts on wetland resources that could result from the requester's preferred alternative include the introduction of sediments from the cleared construction ROW to wetlands in or adjacent to the action areas; the introduction of drilling mud from an inadvertent return associated with the HDD crossings; an inadvertent spill of fluids used during construction, such as fuels, lubricants, and solvents; and modifications to the hydrology of the wetlands as the result of subsurface flow along the pipeline.

The requester proposes to minimize potential indirect impacts on wetland resources during construction through the implementation of measures outlined in the project-specific SWPPP (Appendix B). As outlined in the Plan for Containment of Inadvertent Release of Drilling Mud during Horizontal Directional Drilled Wetland and Waterbody Crossings (Appendix B), the requester would address an inadvertent release of drilling mud immediately upon discovery. Containment equipment including portable pumps, hay bales, and silt fencing would be utilized to prevent the spread of the release. The requester would consult with the appropriate regulatory agencies as warranted to determine any final cleanup requirements for an inadvertent release that impacts wetlands. In the event of an inadvertent spill of fluids used during construction, measures outlined in the project-specific Spill Prevention and Response (SPAR) Plan (Appendix B) would be implemented by the requester. The SPAR Plan also contains a list of potential materials that could be stored on the ROW during construction. To ensure that the hydrology of wetlands is maintained, BBP proposes to return wetlands to pre-construction contours and use trench plugs where necessary at the entry/exit of the wetlands to

ensure the wetlands would not be drained along the pipeline post construction. Therefore, the requester's preferred alternative would only result in minimal indirect impacts on wetlands.

Normal operational impacts on wetlands as a result of the requester's preferred alternative would be limited to the aforementioned maintenance of a corridor through wetlands that are open cut and the 5 select areas (i.e., Easements A-163E-1, A-182E-2, A-111E-4, A-163E-4, and A-111E-5) where the pipeline is installed via HDD to facilitate access for periodic integrity inspection surveys and maintenance activities. In the event of a release of oil during operations, impacts on wetlands would be greatest at the federal project and Easement crossings located within the Atchafalaya Basin. A release of crude oil at the Calcasieu River crossing could also result in impacts on wetlands located within and along the banks of the river downstream of the crossing.

Impacts on wetlands would vary depending on the location of the release, the volume of the release, water flow within the wetlands, and the timing of BBP's response efforts. The concentration of contaminants would be highest at the source of the release, with contaminants decreasing in concentration as they travel away from the source due to processes such as dispersion, sorption, and biodegradation. The PHMSA spill model predicts that the area affected by a worst case release at any one of the federal Easements located within the Atchafalaya Basin could impact up to approximately 51 acres of wetlands. Although the amount in a release could be somewhat greater, as indicated in Section 3.1, the actual documented spill volumes are typically significantly less than the maximum theoretical volumes calculated by the computer models. Regardless, a spill of this general magnitude would comprise only a small portion of the more than 800,000 acres of wetlands located within the basin (USFWS, 2017b). While the impacted area would be unavailable during the release and subsequent cleanup activities, the fact that there is a significant number of non-impaired wetland areas available makes the potential impact minor.

In general, a release of crude oil could result in the death of aquatic vegetation that comprise the impacted wetlands. However, most species have been shown to reestablish in the impacted area following successful cleanup efforts (USFWS, 2010). A release of oil within a wetland could also directly and indirectly impact species that rely on wetlands for habitat. Impacts on aquatic and terrestrial species are discussed in greater detail in Sections 4.1.4 and 4.1.5.

BBP has stated that it would implement measures outlined in the FRP and Geographic Response Plans (GRP) to minimize and mitigate potential impacts of a release on wetlands.

The site-specific GRPs have been developed for each of the federal project and Easement crossings. These security sensitive documents, submitted to the USACE as Privileged and Confidential, identify site-specific resources and response measures for an immediate, safe, and effective response to a release of crude oil from the proposed Bayou Bridge Pipeline. In the event of a leak, BBP would work aggressively to contain the leak, initiate cleanup activities, and contact the appropriate authorities, including the USACE and in compliance with PHMSA requirements. Additional details regarding BBP's proposed response measures are provided in Section 4.1.15.

Overall, construction of the requester's preferred alternative would result in direct impacts on wetland resources; however, a majority of the direct impacts would be temporary in nature, and all impacts to forested wetlands would be mitigated for through the purchase of mitigation credits. These impacts are temporary and there is no fill of wetlands as result of the project. Indirect impacts on wetlands resources would be avoided and minimized to the greatest extent practicable by implementing measures outlined in project-specific construction plans. It is anticipated that impacts on wetlands as a result of an inadvertent oil release during operations would be minor and temporary due to the implementation of the response and mitigation measures. Future function and use of the wetlands would not be precluded once the release has been remediated and wetland vegetation has reestablished in the impacted area.

4.1.3 Surface Water Resources

Future Conditions with No Action

Under the "no action" alternative, BBP would not construct the proposed Bayou Bridge Pipeline Project, and no impacts on surface water resources would occur.

Future Conditions with the Requester's Preferred Alternative

The requester's preferred alternative at the eight federal projects and four of the seven Easements that contain waterbodies would not result in direct impacts on surface water resources as a result of the utilization of HDD crossing method (Appendix A). Although the surface waters located on Easements 145-E-2, 144 E-3, and A-163E-1 would not be directly crossed by the proposed pipeline, they are located in the workspace and would be temporarily impacted during construction to facilitate the installation of the pipeline via open cut and HDD methods. Table 4-2 provides a summary of the direct impacts on surface water resources that would occur as a result of the requester's preferred alternative.

Table 4-2 Summary of Requester's Preferred Alternative Impacts on Surface Water Resources					
Federal Project / Federal Easement	Waterbody Type	Crossing Method	Crossing Length (Feet)	Temporary Impacts (Acres)	Permanent Loss (Acres)
Federal Project Crossings					
Calcasieu River	Perennial	HDD	3,745	0	0
Mermentau River	Perennial	HDD	345	0	0
Vermilion River	Perennial	HDD	350	0	0
Bayou Teche	Perennial	HDD	200	0	0
Atchafalaya River	Perennial	HDD	1,340	0	0
GIWW	Perennial	HDD	535	0	0
Federal Easement Crossings					
145-E-2	Open Water	Workspace Only	N/A ^a	0.03	0
144 E-3	Open Water	Workspace Only	N/A ^a	0.02	0
	Canal	Workspace Only	N/A ^a	0.09	0
A-163E-1	Open Water	Workspace Only	N/A ^a	0.01	0
A-182E-2	Perennial	HDD	404	0	0
A-111E-4	Perennial	HDD	270	0	0
700-E-1	Perennial	HDD	535	0	0
7	Perennial	HDD	130	0	0
	Ephemeral	HDD	2	0	0
Totals			7,856	0.15	0
^a Surface water is not crossed directly by the proposed pipeline, but would be impacted by temporary workspace during construction.					

Water Quality

The requester's preferred alternative would not result in direct impacts to water quality within the federal project crossings because the pipeline would be installed well below ground surface via HDD resulting in no surface disturbance. Minor indirect impacts to water quality could result in temporary and minor increases in turbidity associated with construction activities such as water withdrawal for drill mud preparation and hydrostatic testing, an inadvertent release of non-hazardous drilling mud which could occur during HDD activities, or an inadvertent release of fluids used during construction, such as fuels, lubricants, and solvents. Water withdrawal for drill mud preparation and hydrostatic testing would have negligible indirect impacts on the federal projects given the average volume of flow of the surface waters compared to the amount of water that would be required for the HDD mud preparation and hydrostatic testing.

The requester's preferred alternative would result in minor impacts to the water quality of the waterbodies on the Easement crossings where the pipeline would be installed via conventional trenching methods, as well as HDD. Minor indirect impacts to water quality could result in temporary and minor increases in turbidity resulting from sedimentation associated with

construction activities and/or water discharges, an inadvertent release of non-hazardous drilling mud which could occur during HDD activities, and an inadvertent release of fluids used during construction, such as fuels, lubricants, and solvents (a list of potential fluids stored on the ROW during construction is provided in the SPAR Plan).

Direct and indirect impacts to water quality would be minimized through implementation of the following BMPs during construction of the proposed Bayou Bridge Pipeline Project:

- Erosion and sediment control measures specified in the Environmental Construction Plans (Appendix B) and SWPPP (Appendix B);
- Discharge of hydrostatic test water through energy dissipating structures to reduce erosion, sedimentation, and scour potential;
- Placing any water intakes suspended within the water column to avoid disrupting the sediments at the bottom of the waterbodies;
- Implementation of measures outlined in the Plan for Containment of Inadvertent Release of Drilling Mud during Horizontal Directional Drilled Wetland and Waterbody Crossings (Appendix B), such as continual monitoring of HDDs for fluid loss, utilization of containment measures to prevent the migration of any release, and notification and coordination with the LDEQ and USACE if the inadvertent release impacts a waterbody; and
- Implementation of the SPAR Plan.

Section 401 Water Quality Certification (WQC-160921-03) is being sought from LDEQ concurrently with the Section 404/Section 10 authorization from the USACE. A Section 401 Water Quality Certification prior to construction would be a requirement of any permission approved under Section 408.

Operation of the proposed pipeline would, in general, not result in direct or indirect impacts on water quality. However, in the event that a release were to occur at a federal project or easement crossing, the crude oil would negatively affect water quality at and downstream of the release. Depending on the specific crossing, the extent of the impacts would vary from localized to greater than 15 miles downstream. The distance the crude oil could travel downstream would be determined by a combination of factors including spill volume, stream flow, evaporation, shore adhesion, and BBP's response time. Based on a High Consequence

Area analysis conducted by BBP, there are no known drinking water intakes that would be impacted by a release of crude oil at the federal project and Easements crossings.

If oil were to come in contact with surface water it would spread and create a thin film. This thin film would result in more exposed surface area and more rapid evaporation of the lighter compounds. Oil movement on water is primarily influenced by the speed of the current and can be affected by meteorological conditions such as wind and rain.

Oil is lighter than water and relatively insoluble in water and would therefore tend to float; however, some of the more soluble chemicals, including benzene, do have the potential to dissolve in water. As mentioned above, some of the volatile compounds would also evaporate.

Oil that remains after evaporation and dissolution can become dense enough to sink. Following the 2010 Enbridge spill near Marshall, Michigan, EPA determined that weathering and evaporation of the lighter components of the crude oil had increased the density of the remaining material such that it sank and mixed with the sediments in the river bottom. This submerged mixture of oil and sediments moved through the river system as part of the bed load. (EPA, 2016).

Turbulent water can cause oil globules to break free from the larger oil mass and become suspended in the water column. If the oil particles are small enough they can remain in suspension; this is known as emulsification. Because emulsified oils remain in suspension, they are more difficult to capture in a cleanup process.

Oil reaching surface water would have a direct impact, affecting the water surface, the water column, and the stream or pond bed and banks. The extent of the spill depends on the volume of oil released and the dynamics of the environment. For flowing waters, the flow rate at the time of a spill would be an important factor in determining the extent of the impact.

To minimize and mitigate any potential impacts on the general public and the environment as the result of a release of oil, BBP has stated that they would employ measures outlined in both the FRP and the GRPs. Response measures include, but would not be limited to, the deployment of containment or diversionary booms at predetermined locations and oil collection/recovery activities to prevent further migration of crude oil. In coordination with the response contractors, BBP anticipates that the response time to a release at any one of the federal projects or Easements could vary from approximately 15 minutes to 1 ½ hours depending on the location. The response times for each location are calculated based on the location of the release relative to the location of the necessary response personnel and

equipment, and additional details regarding response timing are provided in the site-specific GRPs. BBP anticipates that a spill at any one of the federal projects or Easements would be contained within a maximum of 6 hours from the time the release occurs. Emergency response notifications would be made to federal, state, and local agencies as outlined in the FRP. Section 4.1.15 provides additional details regarding spill prevention, detection, and response measures.

In summary, direct impacts on surface waters and water quality as a result of construction activities would be minor and temporary. These impacts would be minimized through the implementation of BMPs outlined in the project-specific construction plans. During operations, impacts on surface waters as a result of a release would be temporary and minor due to the response and remediation measures that would be implemented by BBP. Once a release has been successfully remediated, it is anticipated that the water quality of impacted surface waters would return to pre-release conditions and use of the features would not be precluded.

Floodplains

The requester's preferred alternative would not result in direct impacts to the floodplains of the federal project and easement crossings as the crossings would be installed below ground with no permanent aboveground facilities. Further, the requester's preferred alternative has been designed in accordance with accepted floodplain management practices; therefore, no permanent fill would be placed in the requester's preferred alternative areas, and no impacts on floodplain elevations or velocities are anticipated. During construction, the requester's preferred alternative could result in minor, short-term impacts on surface flow as the result of trench excavation and the placement of spoil piles adjacent to the trench. However, following the completion of construction, disturbed areas would be restored to pre-construction grades and contours, as practicable. Measures implemented to ensure hydrology is maintained and the pipeline trench does not negatively impact shallow subsurface hydrology or drain areas, include the use of trench plugs where necessary on slopes and at the entry/exit of water features.

4.1.4 Fisheries

Future Conditions with No Action

Under the "no action" alternative, BBP would not construct the proposed Bayou Bridge Pipeline Project, and no impacts on fisheries and EFH would occur.

Future Conditions with the Requester's Preferred Alternative

By utilizing the HDD crossing method, the requester has avoided direct impacts on fishery resources located within the requester's preferred alternative areas at each of the federal projects and four of the seven Easements that contain surface waters. Direct and indirect impacts on fisheries associated with the requester's preferred alternative at Easements 145-E-2, 144 E-3, and A-163E-1 would be temporary and minor. The potential near-term impacts associated with construction activities at these three Easements may be caused by increased sedimentation and turbidity or introduction of water pollutants as a result of an inadvertent spill of fluids from construction vehicles and equipment. Additionally, the requester's preferred alternative would indirectly impact fishery resources as a result of the withdrawal of water for hydrostatic tests and HDD mud preparation from the large perennial waterbodies that comprise the federal projects and Easements 700-E-1 and 7. However, the total amount of water to be withdrawn would be negligible compared to the overall volume of water flowing within these large perennial waterbodies. Best management practices for water withdrawals would be implemented and include suspending the intake within the water column to avoid disturbance to features at the bottom of the waterbody and to avoid the resuspension of sediments that would potentially impact fishery resources. Further, the rate of the water withdraw would be such that impact to flow volume is negligible and avoids any downstream impacts. Therefore, the potential indirect impacts on fishery resources as a result of water withdraws would be negligible.

The requester would minimize the potential impacts on fishery resources as a result of construction by:

- Implementing best management practices outlined in the project-specific SWPPP (Appendix B);
- Implementing measures outlined in the SPAR Plan should an inadvertent spill occur during construction (Appendix B);
- Allowing all disturbed areas to revegetate upon completion of construction;
- Utilizing screens on intake hoses to limit the potential for the entrainment or entrapment of aquatic life;
- Placing intake hoses suspended within the water column so as not to disturb the bottom of the water feature and benthic organisms;

- Implementing measures outlined in the Plan for Containment of Inadvertent Release of Drilling Mud during Horizontal Directional Drilled Wetland and Waterbody Crossings (Appendix B), such as continual monitoring of HDDs for fluid loss, utilization of containment measures to prevent the migration of any release, and notification and coordination with the LDEQ and USACE if the inadvertent release impacts a waterbody; and
- Returning all impacted aquatic resources to pre-construction contours upon completion of construction.

As a result of these measures, no permanent or long-term effects on water temperature, dissolved oxygen, pH, benthic invertebrates, or fish communities are expected to occur as a result of the requester's preferred alternative.

In the event that a release were to occur at a federal project or Easement crossing, the crude oil would negatively impact fisheries. A large oil spill into one of the waterways would likely cause a localized fish kill with very limited impacts to the immediate area surround the site of the spill. Unlike terrestrial game species, fish cannot as easily avoid spills in their habitat and could be susceptible to the detrimental effects of an oil spill should one occur during operation of the pipeline.

Direct impacts to fish can occur through uptake by the gills, ingestion of oil or oiled prey, effects on eggs and larval survival, or changes in the ecosystem that support the fish. Adult fish exposed to oil may suffer mortality or reduced growth, enlarged livers, changes in heart and respirations rates, fin erosion, and reproductive impairment (USFWS, 2010). If a release were to result in decline in the population of recreationally and/or commercially important species, then the release could have an indirect impact on the respective fisheries as discussed in greater detail in Section 4.1.11. However, the extent of the impact a release would have on fishery resources would be directly linked to the location and volume of the release. Based on the PHMSA spill model, the affected river mileage at any of the federal project waterbodies or Easements ranges from approximately 3 to 14 miles. Therefore, the area affected by a spill would comprise a small portion of the overall length of the impacted rivers, which range from approximately 70 miles to 200 miles in length. While the impacted area would be unavailable during the release and subsequent cleanup activities, the fact that there is a significant number of non-impaired river miles available makes the potential impact minor.

Crude oil's toxicity is a function of the concentration of its constituent compounds and their toxic effects, along with their solubility and bioavailability in water. Most crude oil constituents are not very soluble in water. Based on the combination of toxicity, solubility, and bioavailability, benzene is commonly considered to pose the greatest toxicity threat from crude oil spills (Muller, 1987). The oil would have to be present at high enough concentrations to be acutely toxic to fish and other organisms or it would have to be persistent long enough at high enough levels to exceed chronic toxicity levels. For example, although exposure of crawfish to crude oil could result in mortality or other chronic impacts, studies have shown that adult crawfish are able to survive short-term exposure of crude oil up to 30,000 parts per million (Chichester, 2015). It is anticipated that acute and chronic impacts on crawfish as a result of a release would be limited due to BBP's containment and remediation efforts. Once the oil release is successfully remediated, the affected area could be repopulated by crawfish that survived the initial oil release as well as those from adjacent, non-affected populations. Therefore, the impact of an oil release on the overall crawfish population would be temporary and minor.

BBP has committed to implementing mitigation measures during construction and operation of the pipeline that would minimize the potential for a release and the detrimental effects should one occur. Although a release of crude oil at the federal projects and easements could have an adverse effect on fish species, adherence to the site-specific GRPs would reduce impacts on fish species should a spill occurring during operation of the pipeline. In the event of a leak, BBP would work aggressively to contain the leak, initiate cleanup activities, and contact the appropriate authorities, including the USACE. Impacts on fishery resources would be further mitigated by following the cleanup procedures and remediation activities described in the FRP.

In summary, construction of the requester's preferred alternative would result in both direct and indirect impacts on fisheries resources; however, these impacts would be minor and temporary. These impacts would be minimized to the greatest extent practicable through the implementation of the measures outlined above. An isolated release event is assumed to be of relatively short duration based on BBP's spill response procedures and response times. Therefore, any acute impacts on fishery resources from an isolated release would likely be short term. Any lasting impacts to the fishery resources (e.g. chronic impacts to growth or behavioral changes) would also likely be limited due to the cleanup and restoration activities and through dispersion, sorption, and biodegradation of the released product.

Essential Fish Habitat

As discussed in Section 3.2.4, the federal project at the Calcasieu River is the only portion of the requester's preferred alternative where EFH is present. Direct impacts on EFH would be avoided as the Calcasieu River would be crossed via HDD. However, BBP is proposing to withdraw water from the Calcasieu River for use in HDD activities and hydrostatic testing. Water withdrawal activities would be conducted in a manner so as not to adversely affect EFH such as using screens on small diameter intake hoses (i.e., typically 6-inch diameter) to avoid entrainment and entrapment of aquatic life, including species for which EFH is present, and placement of the intake hoses so as not to disturb the water bottom. Furthermore, the rate of water withdrawal (2,000 to 5,000 gallons per minute, unless otherwise required by permit conditions) would be such that impacts to flow volume within the Calcasieu River are negligible and avoids downstream impacts. According to BBP, the water withdrawal would likely be limited to a maximum of two days and a total of 250,000 gallons. No discharges directly to the Calcasieu River are anticipated as part of the requester's preferred alternative.

During the HDD of the Calcasieu River, there is potential for an inadvertent return of non-hazardous drilling mud, consisting of non-toxic bentonite and water, to the Calcasieu River. BBP would minimize this potential through the implementation of its Plan for Containment of Inadvertent Release of Drilling Mud during Horizontal Directional Drilled Wetland and Waterbody Crossings (Appendix B). Furthermore, BBP has designed the Calcasieu River HDD to minimize the likelihood of an inadvertent return by utilizing a pilot hole intersect to complete the pilot hole, the use of conductor casing at each HDD entry point, and implementing defined pressure limitations with monitoring of downhole annular drilling fluid pressures throughout drilling and reaming (a brief discussion of the HDD process is provided in Section 1.1.1). If an inadvertent return of drilling mud reaches the Calcasieu River, it could result in minor, short-term impacts on EFH. Initially, the benign drilling mud would temporarily increase turbidity and sedimentation within the water column. However, bentonite is denser than water and it would eventually settle; potentially impacting some larvae or eggs of EFH species on the water bottom downstream from the inadvertent return. Typical benthic biological activities and the flow within the waterbody would mix the bentonite with the naturally occurring sediments; therefore, the impact on the benthic community would be temporary. Although not likely, if an inadvertent return of drilling mud did reach the Calcasieu River, the impacts on EFH are likely to be negligible as the bentonite would mix with the existing waters where the turbidity levels are already high.

During operation of the proposed Bayou Bridge Pipeline, the only potential impact on EFH would be associated with a release of crude oil. Impacts on EFH within the Calcasieu River include damage to nursery habitat. For example, oil could result in the death of aquatic vegetation and benthic organisms, which in turn, could impact the life cycles of the species identified in Section 3.2.4 as utilizing the EFH. As stated previously, BBP would work aggressively to contain the leak, initiate and complete cleanup activities, and contact the appropriate authorities including the USACE and NOAA. A detailed description of the measures that would be implemented by BBP should a release occur is provided in Section 4.1.15. Once the impacts of the oil release are successfully remediated, it is anticipated that the impacted EFH would recover to pre-release conditions.

Overall, direct impacts on EFH as a result of construction activities would be avoided through the use of a HDD to cross the Calcasieu River. Significant indirect adverse impacts on EFH due to construction activities were not identified. During operations, impacts on EFH would be limited to those associated with an inadvertent release of crude oil. These impacts are unlikely and would be temporary as BBP contains and remediates any release of crude oil. Further, once the oil release is successfully remediated, the impacted EFH would recover to pre-release conditions. Therefore, the proposed project has been determined to have no effect to EFH or managed species.

4.1.5 Wildlife

Future Conditions with No Action

Under the “no action” alternative, BBP would not construct the proposed Bayou Bridge Pipeline Project, and no impacts on wildlife would occur.

Future Conditions with the Requester’s Preferred Alternative

The federal project areas as well as the entirety of Easement 7 and Easement 700-E-1 would be crossed via HDD; therefore, no direct impacts on wildlife would occur. Within the remaining Easements, wildlife habitat that would be impacted consists entirely of forested wetlands that are adjacent to an existing cleared and maintained utility corridor. Mobile species would likely avoid the areas of direct impact and relocate to nearby suitable habitat, which is vastly abundant adjacent to and throughout the area of all of the Easements. Direct mortality of smaller, less mobile species such as amphibians or small mammals may occur during initial clearing activities within the Easements. However, these species are not threatened or endangered and existing populations from adjacent areas would allow them to re-populate

areas disturbed by the requester's preferred alternative; thereby minimizing overall population impacts.

As further discussed in Sections 4.1.2 and 4.1.7, impacts on forested wetlands would be permanent in the form of conversion within a 30-foot-wide ROW that would be routinely maintained during operation of the requester's preferred alternative on the Easements. No permanent easement would be maintained through forested wetlands located over the HDDs except where necessary to gain access to pipe installed via open-cut, and in these instances, the permanently maintained ROW would be limited to 15 feet wide. All impacted areas outside the permanently maintained ROW would be allowed to revegetate post construction from natural succession.

Areas disturbed and immediately following construction activities could provide conditions for the establishment of invasive plant species which can dominate and out-compete native species. To minimize the introduction or spread of invasive plant species to the project area, BBP has stated that they would implement several management strategies within the construction corridor and other temporary workspaces, where soil disturbance and/or removal of native vegetation may occur. Management and control measures that would be used to control invasive species include the following:

- Minimize sediment movement and the associated movement of invasive species seeds;
- Use construction techniques that minimize the time that bare soil is exposed, thus minimizing the opportunity for invasive species to become established;
- Utilize topsoil segregation in unsaturated wetlands to maintain existing seed bank; and
- Monitor the construction corridor and other disturbed areas following construction to verify that revegetation has been successful. In areas where invasive species have become widely established, manage invasive species in accordance with landowner approvals.

BBP minimized impacts on wildlife habitat by co-locating with an existing maintained utility corridor, reducing workspace to the minimum necessary to safely construct the requester's preferred alternative, and reducing the width of the maintained portion of the permanent easement to either 30 or 15 feet where necessary to provide access, as compared to the entirety of the 50 foot easement acquired for operation. BBP has designed the

requester's preferred alternative so that there would be no impacts to potential Louisiana black bear den trees within the federal project and Easements. Further, as discussed in Section 6.0, impacts on forested wetlands would be mitigated. Given the abundance of suitable forested wetland habitat in the areas surrounding the Easements and the proposed mitigation measures that would be implemented to offset and minimize these impacts, the requester's preferred alternative would have a minor impact on wildlife habitat which would be offset by the proposed mitigation.

Wildlife located adjacent to the requester's preferred alternative workspace may be indirectly impacted by noise, vibration, and increased human presence in the area during construction. Due to the limited duration of construction activities and use of equipment with mufflers these indirect impacts would be temporary, with all impacted areas returning to pre-construction conditions upon completion of construction.

In the event that a release were to occur at a federal project or easement crossing, the crude oil would negatively impact wildlife. For example, oil floating on the surface would adversely affect waterfowl using the stream surface and oil washing onto the banks could adversely affect riparian vegetation as well as wildlife utilizing the affected wetlands or waterbodies. For a majority of the federal projects and Easement crossings, the potential impacts associated with a release would be to aquatic species as the oil would be transported downstream of the pipeline via surface waters. A detailed description of impacts on surface waters and fishery resources are provided in Sections 4.1.3 and 4.1.4, respectively.

Wildlife most susceptible to the effects of an oil spill are typically birds and shoreline mammals that would come into physical contact with spilled oil. Terrestrial species could be impacted by a release if the oil were to coat their fur and prevent it from providing insulation from cold. Similarly, waterfowl and upland birds could be affected by oiling of plumage. Other direct effects include toxicological effects as a result of ingesting oil or ingesting prey that is covered in oil. Indirect effects such as habitat impacts, food source and nutrient cycling disruptions, and alterations in ecosystem relationships are also possible in the event of a release. The extent of these effects would depend on the volume of material released, the size of the dispersal area, the type, age, and reproductive state of species present, climate, and the effectiveness of spill response measures implemented.

Behavioral responses of terrestrial species would help to reduce potential adverse effects of a release. When unaffected alternative habitat is available nearby, the mortality of these species would be limited (Stubblefield et al., 1995). Mobile species would be able to

utilize the adjacent, unaffected habitat during containment and remediation efforts. Furthermore, the modeled extent of a release at any one of the federal projects and/or Easement crossings would impact between 3 and 14 miles along the waterbodies and up to approximately 51 acres of terrestrial habitat (i.e., wetlands). These impacts are minor in comparison with the overall length and size of the affected waterbodies and habitats.

To minimize potential impacts on terrestrial species in the event of a release, BBP would implement measures outlined in Section 4.1.15. Should BBP come across terrestrial species that have come into contact with oil during the remediation efforts, BBP has stated that they would implement measures to clean and rehabilitate the oil covered species using techniques that have been proven successful in past oil spill responses, such as those outlined by the University of California at Davis Oiled Wildlife Care Network (OWCN, 2017) and the EPA (EPA, 2016). For example, the oiled animals would be collected as soon as possible and would be receive immediate care at field stabilization sites. From there, the oiled animals would be transported to the primary care facility where they would be treated and washed to remove the oil. It is anticipated that following successful remediation of a release, wildlife would be able to repopulate an affected area from existing populations in the surrounding area. Furthermore, individual species that have been captured and successfully rehabilitated would be released to the wild following successful pre-release conditioning. Therefore, it is anticipated that the overall impacts on wildlife would be minor due to the behavioral responses, the availability of unaffected alternative habitat in the immediate area, and the execution of the response plans and cleanup efforts.

Under the Oil Pollution Act (OPA 90), BBP would be responsible for mitigating for injuries to natural resources from an incident involving an oil discharge. OPA regulation defines “natural resources” as “land, fish, wildlife, biota, air ground water, drinking water supplies, and other such resources belonging to, managed by, held in trust by, appertaining to, or otherwise controlled by the U.S., any state or local government or Indian tribe”. Therefore, BBP would be required by OPA 90 to mitigate any impacts that resulted in the loss of wildlife in accordance with OPA regulations.

In summary, direct impacts on wildlife as a result of construction activities would be minor as a result of the measures that would be implemented during construction and the proposed mitigation that would offset impacts on forested wetlands. Indirect impacts on wildlife during construction would also be temporary as all species are expected to return to the area upon completion of construction. As a result of the behavioral responses of terrestrial species,

the availability of unaffected alternative habitat in the immediate area, and the execution of the response plans and cleanup efforts, it is anticipated that operational impacts on wildlife would be minor.

Migratory Birds

Direct and indirect impacts on migratory birds would be similar to that discussed above for wildlife species as a whole. In addition to minimizing impacts through a reduced maintenance area of the permanent easement and mitigation for forested wetland impacts, BBP would minimize clearing during the nesting season as practical.

Colonial Nesting Birds/Rookeries

Suitable habitat for colonial nesting birds is present within the requester's preferred alternative areas, with the exception of Easement 7. As a result of aerial surveys conducted in April 2016 (see Section 3.2.5), no colonial nesting bird rookeries were identified in or within 1,000 feet of the requester's preferred alternative areas. If construction activities occur during the nesting season (February 15 through August 1), BBP would conduct surveys where suitable habitat is present no more than two weeks prior to the start of construction activities. If rookeries are identified, BBP would restrict construction activities in areas within 300 meters of active rookeries to the non-nesting period, to the extent practicable. Through the implementation of these measures, no impacts on colonial nesting bird rookeries are anticipated as a result of the requester's preferred alternative.

Although no colonial nesting bird rookeries were identified within 1,000 feet of the requester's preferred alternative, a release of crude oil during operation of the pipeline could have both a direct and indirect impact on colonial nesting bird species. Colonial nesting birds that utilize areas impacted by a release could become covered by oil, which could lead to thermoregulatory challenges caused by oiling of plumage. Other direct effects include toxicological effects, which can cause sickness or mortality. Colonial nesting bird species could be indirectly impacted by a release of crude oil if the release has a negative impact on their prey species.

As stated previously, the abundance of similar habitat in the proximity of a release would limit impacts on colonial nesting bird species. Furthermore, BBP would implement measures outlined in Section 4.1.15 to contain and remediate a release. BBP has stated that commonly practiced procedures, such as those outlined by the University of California at Davis Oiled Wildlife Care Network (OWCN, 2017) and the EPA (EPA, 2016), would be implemented to clean

and rehabilitate any oil covered colonial nesting birds identified during the spill response efforts. Upon completion of successful remediation efforts, it is anticipated that colonial nesting birds impacted by a release would return to the affected area and those that were rehabilitated would be released to the wild. OPA 90 regulations would also require BBP to mitigate for the loss of any colonial nesting birds as the result of a release. Therefore, the overall impact of a release on colonial nesting bird populations would be minor.

Overall, construction of the requester's preferred alternative would not result in impacts on colonial nesting bird rookeries. Although an inadvertent release of crude oil could impact colonial nesting birds, it is anticipated that these impacts would be minor as a result of BBP's response and remediation efforts.

Bald Eagles

Suitable foraging habitat for bald eagles is present within the proposed federal project and Easement crossings, while suitable nesting habitat is present within all of the proposed Easement crossings except for Easement 7. As discussed in Section 3.2.5, a total of eight bald eagles and no nests were documented during the aerial surveys. If bald eagles and/or their nests are documented within the federal project or Easement crossings during or immediately prior to construction, BBP would adhere to the buffer requirements established in the USFWS National Bald Eagle Management Guidelines (2007) to avoid and/or minimize potential impacts on the individuals or the nests.

In the event of a release of crude oil during operations, bald eagles could be both directly and indirectly impacted in manners similar to that of colonial nesting birds as described above. For example, direct impacts include physiological and toxicological effects should the bald eagles come into contact with the released oil. Bald eagles could be indirectly impacted by a release of crude oil if the release has a negative impact on their prey species.

The abundance of similar habitat in the proximity of a release would limit impacts on bald eagles. Furthermore, BBP would implement measures outlined in Section 4.1.15 to contain and remediate a release. BBP has stated that commonly practiced procedures, such as those outlined by the University of California at Davis Oiled Wildlife Care Network (OWCN, 2017) and the EPA (EPA, 2016), would be implemented to clean and rehabilitate any oil covered bald eagles identified during the spill response efforts. Upon completion of successful remediation efforts, it is anticipated that bald eagles impacted by a release would return to the affected area and those that were rehabilitated would be released to the wild. OPA 90 regulations would also

require BBP to mitigate for the loss of any bald eagles as the result of a release. Therefore, the overall impact of a release on bald eagle populations would be minor.

Overall, construction of the requester's preferred alternative would not result in impacts on bald eagles as a result of the implementation of the measures outlined in the USFWS *Bald Eagle Management Guidelines*. Although an inadvertent release of crude oil could impact bald eagles, it is anticipated that these impacts would be minor as a result of BBP's response and remediation efforts.

4.1.6 Threatened and Endangered Species

Future Conditions with No Action

Under the "no action" alternative, BBP would not construct the proposed Bayou Bridge Pipeline Project, and no impacts on threatened and endangered species would occur.

Future Conditions with the Requester's Preferred Alternative

The requester's preferred alternative would not impact critical habitat for federally listed species. As stated in section 3.2.6, suitable habitat is not present within the requester's preferred alternative area for federally listed piping plover, red knot, red-cockaded woodpecker, West Indian manatee, green sea turtle, hawksbill sea turtle, Kemp's ridley sea turtle, leatherback sea turtle, or loggerhead sea turtle; therefore, the requester's preferred alternative would have no effect on these species. This no effect determination was concurred with by the USFWS in letters dated March 14, 2016 and February 27, 2017 (Appendix D). The only federally protected species with suitable habitat are the Atlantic sturgeon and the pallid sturgeon. Within Louisiana, Atlantic sturgeon are only known to occur within the Pearl River and Lake Pontchartrain drainages (LDWF, 2017c), which the requester's preferred alternative does not cross; therefore, the requester's preferred alternative would have no effect on Atlantic sturgeon, and the USFWS also concurred with this determination (Appendix D).

Suitable habitat for the pallid sturgeon is present in the Atchafalaya River and GIWW federal project crossings and Easements A-182E-2, A-111E-4, and 700-E-1, all of which would be crossed via HDD thereby avoiding direct impacts during pipeline installation. BBP may withdraw water from the Atchafalaya River and/or the GIWW for use during HDD operations and/or hydrostatic testing of the pipeline. A total of 224,000 gallons and 229,000 gallons would be withdrawn from the Atchafalaya River and GIWW, respectively, through a small diameter hose (typically 6-inch diameter) with an intake velocity of less than 0.5 feet per second. Impacts on pallid sturgeon as a result of water withdrawal would be avoided or minimized through use of

0.25-inch mesh screens on the intake hoses to prevent entrainment or impingement. Furthermore, the intake hoses would be placed at depths greater than 15 feet, but no closer than 2 feet from the bottom, and would not be placed within eddies. The minimal amount of water to be withdrawn compared with the amount in the waterbodies, along with the short duration of the water withdraws (i.e. no more than 2 days), would further minimize potential impacts on the species. As a result of the measures outlined above, the proposed water withdrawals are not likely to adversely affect the pallid sturgeon; which the USFWS has concurred with (Appendix D).

Indirect impacts could occur in the event of an inadvertent release non-hazardous drilling mud (as discussed in Sections 4.1.2, 4.1.3, and 4.1.4). An inadvertent release of drilling mud could temporarily increase sedimentation and turbidity in the immediate area of the release; however, these impacts would be temporary and localized. Sturgeons are highly mobile species and if an inadvertent release were to occur, they would likely temporarily avoid the affected area until conditions returned to normal. Therefore, the requester's preferred alternative is not likely to adversely affect the pallid sturgeon; which the USFWS has concurred with (Appendix D).

As indicated in Section 3.2.6, the Louisiana black bear was federally listed as threatened during the initial planning stages of the requester's preferred alternative, and the concurrence letter issued by the USFWS on March 14, 2016 indicates that the requester's preferred alternative is not likely to adversely affect the species (Appendix D). However, the Louisiana black bear was delisted by the USFWS on April 11, 2016 and is not further addressed in this section or in the USFWS concurrence letter issued on February 27, 2017 (Appendix D).

As described in Section 4.1.4, operation of the requester's preferred alternative could impact aquatic species, including the federally listed pallid sturgeon, if a release of crude oil were to occur within the Atchafalaya River and GIWW. Direct impacts on the pallid sturgeon could include sickness, reduced reproductive success, and mortality. Furthermore, released oil could indirectly impact the pallid sturgeon by impacting prey species and foraging habitat. BBP has stated that they would implement measures outlined in the FRP and site-specific GRPs for the Atchafalaya River and GIWW to minimize and mitigate potential impacts on the federally listed species. BBP would also notify all applicable agencies should a release occur, including the USACE and USFWS.

As stated previously in Section 4.1.5, BBP would be responsible for mitigating for injuries to natural resources from an incident involving an oil discharge in accordance with OPA 90.

Therefore, in the event of a crude oil release that resulted in impacts to federally listed pallid sturgeons, the operator would be held responsible to mitigate for the impacts in accordance with OPA regulations.

Overall, direct impacts on federally listed species would be avoided through the utilization of HDDs to cross major waterways. Direct impacts on federally listed species from the withdrawal of water would be avoided or minimized through the implementation of measures recommended by the USFWS. Furthermore, indirect impacts on federally listed species as a result of construction would be minimized through the implementation of BMPs outlined in the project-specific construction plans. Operational impacts on federally listed species would be limited to the inadvertent release of oil into local waterways. By implementing containment and remediation efforts outlined in the FRP and site-specific GRPs and mitigating for any loss of federally listed species, it is anticipated that the impacts on federally listed species from a release would be minor. On March 14, 2016, the USFWS Louisiana Ecological Field Office issued a letter indicating concurrence with the determination that the Bayou Bridge Pipeline Project is “not likely to adversely affect” the federally listed pallid sturgeon and would have “no effect” on all other federally listed species. Subsequently, the USFWS reissued letters concurring with these findings on February 28, 2017 and May 10, 2017.

4.1.7 Land Use

Future Conditions with No Action

Under the “no action” alternative, BBP would not construct the proposed Bayou Bridge Pipeline Project, and no impacts on land use would occur.

Future Conditions with the Requester’s Preferred Alternative

Land use impacts associated with the requester’s preferred alternative would be limited to areas which are directly disturbed by construction or operation activities. Indirect impacts would not occur in the areas adjacent to the requester’s preferred alternative, as the existing types or uses of land outside of the requester’s preferred alternative boundaries would not be affected by construction or operation activities. Construction activities would require both temporary and permanent impacts associated with the requester’s preferred alternative, as presented below in Table 4-3 and Table 4-4. For the purposes of this analysis, temporarily impacted areas would be allowed to return to pre-construction conditions upon completion of the requester’s preferred alternative, while areas that would not be allowed to return to pre-existing conditions would be considered to be permanently impacted. Areas impacted during

construction would not be precluded from future uses, with the exception of the permanent easement, which would limit future development over the pipeline.

The federal project areas and Easements 700-E-1 and 7, which are characterized by open water, open land, wetlands, and residential areas, would be wholly crossed via HDD; therefore, no temporary or permanent changes in land use would occur. The remaining 12 Easement crossings would require temporary and/or permanent land use impacts. The majority of the land uses associated with these 12 Easements consists of forested wetlands and open water.

**Table 4-3
Land Use Acres on the Federal Project Crossings**

Federal Project	Wetlands		Open Land		Open Water		Residential		Total	
	Const. (acres)	Perm. ROW (acres)	Const. (acres)	Perm. ROW (acres)	Const. (acres)	Perm. ROW (acres)	Const. (acres)	Perm. ROW (acres)	Const. (acres)	Perm. ROW (acres)
Calcasieu Parish										
Calcasieu River	0 ^a	2.91	0 ^a	0.16	0 ^a	1.23	0	0	0 ^a	4.30
Jefferson Davis/Acadia Parishes										
Mermentau River	0	0	0	0	0 ^a	0.40	0	0	0 ^a	0.40
Vermilion/Lafayette Parishes										
Vermilion River	0	0	0	0	0 ^a	0.40	0	0	0 ^a	0.40
St. Martin Parish										
Bayou Teche	0	0	0	0	0 ^a	0.23	0	0	0 ^a	0.23
West Atchafalaya Basin Levee	0	0	0 ^a	0.18	0	0	0	0	0 ^a	0.18
Atchafalaya River	0	0	0	0	0 ^a	1.54	0	0	0 ^a	1.54
Iberville Parish										
Gulf Intracoastal Waterway	0	0	0	0	0 ^a	0.61	0	0	0 ^a	0.61
East Atchafalaya Basin Levee	0	0	0 ^a	0.33	0	0	0	0	0 ^a	0.33
^a Federal project would be crossed utilizing a HDD; therefore, there would be no construction impacts to this land use type.										

**Table 4-4
Land Use Acres on the Federal Easement Crossings**

Federal Easement Tract Number	Wetlands		Open Land		Open Water		Residential		Total	
	Const. (acres)	Perm. ROW (acres)	Const. (acres)	Perm. ROW (acres)	Const. (acres)	Perm. ROW (acres)	Const. (acres)	Perm. ROW (acres)	Const. (acres)	Perm. ROW (acres)
St. Martin Parish										
145-E-1	0.80	0.23	0	0	0	0	0	0	0.80	0.23
144 E-1	0.03	0	0	0	0	0	0	0	0.03	0
145-E-2	0.32	0.19	0	0	0.03	0.02	0	0	0.35	0.21
144 E-3	2.59	1.25	0.03	0	0.11	0.04	0	0	2.73	1.29
A-182E-4	1.40	0.94	0	0	0	0	0	0	1.40	0.94
A-163E-1	6.56	2.57	0	0	0	0	0	0	6.57	2.57
A-182E-2	0.92	0.23	0	0	0 ^a	0.47	0	0	0.92	0.70
A-111E-4	1.75	0.39	0	0	0 ^a	0.34	0	0	1.75	0.73
A-163E-4	1.02	0.23	0	0	0	0	0	0	1.02	0.23
A-111E-5	5.06	2.04	0	0	0	0	0	0	5.06	2.04
301E-3	0.13	0.11	0	0	0	0	0	0	0.13	0.11
Iberville Parish										
700-E-2	6.08	2.48	0	0	0	0	0	0	6.08	2.48
700-E-1	0	0	0	0	0 ^a	0.61	0	0	0 ^a	0.61
Assumption Parish										
7	0	0	0	0	0 ^a	0.15	0 ^a	0.26	0 ^a	0.41

^a Easement would be crossed utilizing a HDD; therefore, there are no construction impacts to this land use type.

Land use impacts within forested wetlands where the pipeline is installed via open trench (not HDD) would be permanent within a 30-foot-wide corridor that would be maintained in an herbaceous state (cleared of large diameter woody vegetation) to facilitate inspection of the pipeline, operational maintenance, and compliance with the federal pipeline safety regulations. BBP would not permanently maintain a corridor between HDD entry/exit points except where necessary to gain access to sections of pipe installed via the open cut method. In these locations, BBP would maintain a 15-foot corridor to minimize impacts. All impacts to forested wetlands outside of the maintained easement would be allowed to revegetate to pre-construction conditions thus resulting in no permanent impacts to land use.

BBP has stated that they would obtain and comply with applicable state regulations, parish permits, and zoning and land use regulations.

Although a release of crude oil at any one of the proposed federal projects and Easement crossings is a low probability, a release could impact land use. Detailed descriptions of the impacts on wetlands and open waters (i.e., surface waters) are provided in Sections 4.1.2 and 4.1.3. Impacts to any areas would be temporary as BBP has stated that they would implement measures outlined in the FRP and GRPs to minimize and mitigate impacts from an oil release. Future use and/or development of areas classified as residential and open land would not be precluded once the oil release has been successfully remediated by BBP.

In summary, a majority of impacts on land use as a result of construction would be temporary. Permanent impacts on land use associated with the conversion of forested habitat to herbaceous habitat along the maintained easement would be mitigated through the purchase of mitigation credits. Areas impacted during construction would not be precluded from future uses, with the exception of the permanent easement, which would limit future development over the pipeline. Therefore, the overall impacts on land use as a result of construction would be minor. Operational impacts on land use as a result of a release would be temporary and limited to the time it would take BBP to successfully contain and remediate the spill.

4.1.8 Aesthetics

Future Conditions with No Action

Under the “no action” alternative, BBP would not construct the proposed Bayou Bridge Pipeline Project, and no impacts on aesthetics resources would occur.

Future Conditions with the Requester's Preferred Alternative

Impacts to aesthetics would be negligible where the requester's preferred alternative would be installed via HDD (federal projects and Easements 700-E-1 and 7) since there would be no aboveground structures or changes to existing visual conditions.

The remaining 12 Easement areas, with the exception of Easements 700-E-1 and 7, would incur temporary direct impacts to visual resources due to the presence of heavy equipment operating during active construction. However, these impacts would be limited to the brief construction period and would not be significant as these areas are largely remote, inaccessible to the general public, and adjacent to an existing utility corridor. The clearing of vegetation within the Easements would also result in a direct and indirect impact to visual resources. Permanent impacts to visual resources within the Easements are limited to a 30-foot-wide maintained permanent easement that would be generally centered on the pipeline (15 feet on either side of the centerline). BBP does not propose to permanently maintain an easement over the portions of the pipe installed via HDD except where it is necessary to gain access to segments of pipe installed via the open-cut method. At these locations, the permanently maintained corridor would be limited to 15 feet to minimize impacts. The 30-foot-wide and 15-foot-wide corridors would be maintained for the life of the pipeline in a largely herbaceous state (cleared of large diameter woody vegetation) in order to facilitate inspection, operational maintenance, and compliance with the federal pipeline safety regulations. All areas cleared of vegetation outside the maintained corridors would be restored to pre-construction contours and allowed to revegetate; however, the impacts to visual resources would be long-term due to the time it would take for trees to reestablish. The pipeline route at Easement crossing locations is wholly co-located with existing pipeline utility corridors which have already been cleared of vegetation, thus, concentrating the utility ROWs to a single location visible to the public. The addition of the requester's preferred alternative's ROW adjacent to existing ROWs at these crossing locations would not significantly alter the existing visual conditions. Therefore, implementing the requester's preferred alternative would result in negligible impacts to aesthetic resources.

Beyond the impacts on aesthetics as a result of the construction and permanent maintenance of a corridor centered on the pipeline as described above, operation of the requester's preferred alternative would not permanently impact visual resources. In the event of a crude oil release during operations, impacts on visual resources would be temporary and limited primarily to the cleanup and restoration efforts. As described in Section 4.1.2, wetland

vegetation impacted by a release is anticipated to reestablish in the affected area following the successful cleanup effort. Therefore, it is anticipated that there would be no long-term impacts on aesthetics as the result of an oil release.

Overall, impacts on aesthetics as a result of construction activities would be negligible. Furthermore, visual resource impacts associated with a release of crude oil during operations would be limited to the cleanup and restoration activities. The loss of vegetation as a result of an inadvertent release could also impact aesthetics of the affected area. However, there would be no long-term impacts on aesthetics as all impacted vegetation is anticipated to reestablish in the affected area following the successful cleanup.

4.1.9 Cultural Resources

Future Conditions with No Action

Under the “no action” alternative, BBP would not construct the proposed Bayou Bridge Pipeline Project, and no impacts to cultural resources would occur.

Future Conditions with the Requester’s Preferred Alternative

CEMVN archaeologists have reviewed the cultural resources surveys and geospatial data (shapefiles and maps) provided by the requester, correspondence between the applicant and SHPO, comments from Tribes, and have researched the Louisiana Cultural Resources Viewer database and other sources to assess potential effects the proposed undertaking may have on cultural resources.

A Phase I cultural resources survey was conducted by Perennial Environmental Services, LLC in compliance with the LDA survey standards from October 2015 to October 2016. Specifically, the cultural resources investigations covered a 300-foot-wide linear corridor (*survey corridor*) along the pipeline centerline, and included a combination of pedestrian surveys and systematic shovel testing at 30 to 50-m intervals along fixed transects within the survey corridor. For swamps, sloughs, expansive wetlands, or other inundated portions of the proposed Bayou Bridge Pipeline Project, surveys included the excavation of shovel tests at select, non-inundated locations, including any upland features, pimple mounds, or any other topographic high points within the low-lying landscape. Additionally, the cultural resources investigation included an assessment of all historic-age structures (i.e., older than 50 years) located within or directly adjacent to the proposed Bayou Bridge Pipeline Project survey corridor.

Perennial Environmental Services, LLC transmitted survey results to the SHPO in four draft reports each covering different segments of the overall survey corridor (these are LDA Report Nos. 22-5173, 22-5173-1, 22-5173-2, and 22-5173-3). In a letter dated April 14, 2016, SHPO concurred with Perennial's recommendation in Report No. 22-5173 that the following sites, or the portion of these sites within the proposed project area, are not eligible for nomination to the National Register of Historic Places (NRHP): 16CU90, 16JD58, 16VM79, 16VM80, 16LY148, 16LY149, 16LY150, 16LY151, 16IB170, 16IB171, 16SM121, 16SM122, 16SM123, 16SM124, 16SM125, 16SM126, 16SM127, 16SM128, 16SM129, 16JD10, 16JD49, 16AC63, 16AC64, 16VM73, 16LY139, 16IV3, and 16AS54. In this letter, SHPO also concurred that none of the structures identified in the proposed project area are eligible for nomination to the NRHP. In a letter dated July 12, 2016, SHPO concurred with Perennial's recommendation in Report No. 22-5173-1 that the portion of site 16AS123 lying within the current rice field and sugar cane field is not eligible for nomination to the NRHP and that the remainder of the site is undetermined with respect to its eligibility for nomination to the NRHP. In this letter, SHPO stated also that they have no further concerns for this project within its currently proposed boundaries. In a letter dated November 22, 2016, SHPO concurred with Perennial's recommendation in Report No. 22-5173-2 that no historic properties would be impacted by this project and stated there were no further concerns for this project. In a letter dated February 16, 2016, SHPO concurred with Perennial's recommendation in Report No. 22-5173-3 that no historic properties would be impacted by this project and stated there were no further concerns for this project.

CEMVN initiated Section 106 consultation pursuant to 36 CFR § 800.3(c) with Federally recognized Indian Tribes with a known interest in CEMVN boundaries in letters dated March 1, 2017 regarding the proposed undertaking. In that letter, CEMVN requested information concerning the proposed undertaking and its potential to significantly affect cultural resources, protected tribal resources, tribal rights, Traditional Cultural Properties, or Indian lands. Compliance with Section 106 of the National Historic Preservation Act is discussed in Section 7.1.4.

4.1.10 Environmental Justice

Future Conditions with No Action

Under the "no action" alternative, BBP would not construct the proposed Bayou Bridge Pipeline Project, and no disproportionately high or adverse effects on minority and/or low-income populations would occur.

Future Conditions with the Requester's Preferred Alternative

Construction Impacts

As demonstrated in Section 3.2.10, there are five census block groups crossed by the requester's preferred alternative where either the poverty level is greater than 20% (Tract 9529/Block Group 4 and Tract 201/Block Group 2) or the minority population exceeds 50% (Tract 501/Block Group 1, Tract 501/Block Group 2, and Tract 208/Block Group 2). Additional analysis was performed to determine if the statistics for the five census block groups are meaningfully different from their respective reference communities (i.e., parishes). If the differences were meaningful, then an analysis was performed to determine if the requester's preferred alternative would have a disproportionate impact on the minority or impoverished communities.

The requester's preferred alternative is a sealed steel pipeline that is buried beneath the ground surface with no surface facilities at the federal project and Easement crossings, and is being designed, installed, and operated/maintained to meet or exceed all federal standards.

As described in Section 4.1.15, an analysis of incident frequencies within the active 2004 to 2016 database maintained by PHMSA (PHMSA, 2017) indicates that the calculated incident frequency for "onshore pipeline, including valve sites" is 0.00079 incidents per mile-year. For the relatively short crossings of federal project and Easements associated with the requester's preferred alternative, the calculated incident frequency would be even lower. Additionally, if any release did occur, it is likely that the total release volume of a spill would be 4 bbls or less based on historical spill volumes.

Based on the information provided in the risk assessment presented in Section 4.1.15, it was determined that risk of a spill resulting in significant adverse environmental impacts to any particular community was not determined to be significant and the requester has safeguards in place to reduce the likelihood and severity of a spill. Therefore, it is reasonable to determine that the requester's preferred alternative is not anticipated to have releases to the air, water, or soils that would result in high adverse human health or environmental impacts to any populations, including those examined in this EJ analysis.

Easement 7

Easement 7 contains two census block groups as a result of the center of Bayou Lafourche being a census block group border; therefore, census block groups on the east and west side of the bayou must be considered in this EJ analysis. Both block groups contain

minority populations greater than 50% and are relatively higher than the reference community, Assumption Parish, which has a minority population of 33.76% (Table 4-5).

Table 4-5 Census Data for Easement 7 Crossing and the Surrounding Areas					
	Area (sq. mi.)	Total Population	Non- White (%)	Minority Population ^a	Persons Below Poverty Level (%)
State of Louisiana	47,184.72	4,625,253	40.52	1,874,153	19.76
Assumption Parish	364.48	23,057	33.76	7,784	15.97
West side: Tract 501, Block Group 1	19.24	1,509	<i>76.94</i>	1,161	19.09
East side: Tract 501, Block Group 2	4.46	1,722	<i>54.59</i>	940	10.96
^a Calculated by multiplying the total population by the minority percentage. Note: Red italicized text indicates minority population or poverty population in respective columns. Reference parish level data are not demarcated in red italicized text.					

Although the requester’s preferred alternative would impact two EJ communities at the Easement 7 crossing, these impacts are not disproportionate when considering other factors that influenced the routing of the requester’s preferred alternative. The requester’s preferred alternative was routed to be co-located with other existing utilities to the greatest extent practicable in order to reduce the overall project’s impacts. By co-locating the proposed Easement 7 crossing, the requester attempted to minimize impacts on environmental resources (i.e., Bayou Lafourche), avoid the creation of a new ROW through the affected communities, and reduce impacts on current land uses.

Additionally, there is a predefined beginning and end of the requester’s preferred alternative as a result of the overall project’s purpose and need. As such, a crossing of Easement 7 in the same general area as the requester’s preferred alternative would be required. However, three of the four census block groups located immediately to the north (Tract 309/Block Group 3 and Tract 310/Block Group 2) and south (Tract 503/Block Group 2 and Tract 503/Block Group 1) of the proposed Easement 7 crossing have greater than 50% minority populations and/or have greater than 20% impoverished populations. Therefore, a reroute to the north or south of the proposed alignment to avoid impacting the two EJ communities at the Easement 7 crossing would result in impacts to other EJ communities.

Furthermore, the construction of the requester’s preferred alternative potentially offers some positive economic benefit to the local community as construction workers could utilize local gas stations, convenience stores, and restaurants that are along existing access roads to the construction area. Details regarding the potential economic benefits of the requester’s preferred alternative are provided in Appendix E. Routing the project away from the EJ

communities could be perceived as intentionally depriving the subject EJ communities of this commercial opportunity.

Because of the reasons above, it was determined that the requester’s preferred alternative would not disproportionately affect EJ communities at the Easement 7 crossing.

East Atchafalaya Basin Levee, GIWW, and Easements

Census Tract 9529/Block Group 4 is a very large block (roughly 20 miles east/west by 14 miles north/south) and contains two federal projects (East Atchafalaya Basin Levee and GIWW) and two Easements (700-E-1 and 700-E-2) crossings. This census block group is less than one half of a percent above the impoverished level at 20.43% impoverished. As provided in Table 4-6, the reference community, Iberville Parish, contains an impoverished population that is only 1.33%, less than the community impacted by the requester’s preferred alternative. Therefore, the requester’s preferred alternative does not cross an impoverished population that is meaningfully greater than the reference community. Additionally, the routing of the pipeline at the proposed East Atchafalaya Basin Levee, GIWW, and Easement crossing was also partially pre-determined by the proposed route across the Atchafalaya Basin, which is co-located with other existing utilities to minimize impacts on sensitive environmental resources.

Because of the reasons above, it was determined that the requester’s preferred alternative would not disproportionately affect EJ communities at the East Atchafalaya Basin Levee, GIWW, Easement 700-E-1, and Easement 700-E-2 crossings.

	Area (sq. mi.)	Total Population	Minority (%)	Minority Population ^a	Persons Below Poverty Level (%)
State of Louisiana	47,184.72	4,625,253	40.52	1,874,153	19.76
Iberville Parish	652.78	33,229	52.15	17,329	19.10
Tract 9529, Block Group 4	98.06	1,400	0	0	<i>20.43</i>

^a Calculated by multiplying the total population by the minority percentage.
 Note: Red italicized text indicates minority population or poverty population in respective columns. Reference parish level data are not demarcated in red italicized text.

Bayou Teche

The Bayou Teche federal project contains two census block groups as a result of the center of the bayou being a census block group border; therefore, census block groups on the east and west side of the bayou must be considered in this EJ analysis. As provided in Table 4-

7, one of the blocks (Tract 208/Block Group 2) contains a minority population greater than 50%. The minority population of Tract 208/Block Group 2 is meaningfully different than the minority population of the reference community, St. Martin Parish, which has a minority population of 35.28%.

	Area (sq mi.)	Total Population	Minority (%)	Minority population ^a	Persons Below Poverty Level (%)
State of Louisiana	47,184.72	4,625,253	40.52	1,874,153	19.76
St. Martin Parish	816.38	53,126	35.28	18,743	17.88
East: Tract 208, Block Group 2	7.21	1,868	<i>56.69</i>	1,059	9.65
West: Tract 209, Block Group 2	18.68	966	21.12	204	9.42
^a Calculated by multiplying the total population by the minority percentage.					
Note: Red italicized text indicates minority population or poverty population in respective columns. Reference parish level data are not demarcated in red italicized text.					

Although the requester’s preferred alternative would impact one EJ community at the Bayou Teche crossing, this impact is not meaningfully disproportionate as the crossing would impact both an EJ community and a non-EJ community. Furthermore, the requester’s alternative was routed to be co-located with other existing utilities to the greatest extent practicable in order to reduce the overall project’s impacts. By co-locating the proposed Bayou Teche crossing, the requester attempted to minimize impacts on environmental resources (i.e., Bayou Teche), avoid the creation of a new ROW through the affected communities, and reduce impacts on current land uses. Additionally, the routing of the pipeline at the proposed Bayou Teche crossing was also partially pre-determined by the proposed route across the Atchafalaya Basin, which is co-located with other existing utilities to minimize impacts on sensitive environmental resources.

Furthermore, the construction of the requester’s preferred alternative potentially offers some positive economic benefit to the local community as construction workers could utilize local gas stations, convenience stores, and restaurants that are along existing access roads to the construction area. Details regarding the potential economic benefits of the requester’s preferred alternative are provided in Appendix E. Routing the project away from the EJ community could be perceived as intentionally depriving the subject EJ community of this commercial opportunity.

Because of the reasons above, it was determined that the requester’s preferred alternative would not disproportionately affect the EJ community located on the east side of the Bayou Teche federal project crossing.

West Atchafalaya Basin Levee, Atchafalaya River, and Easements

Census Tract 201/Block Group 2 is a very large block group (roughly 16 miles east/west by 17 miles north/south) and contains two federal projects (West Atchafalaya Basin Levee and Atchafalaya River) and 12 Easements (A-182E-4, A-163E-1, A-182E-2, A-111E-4, A-111E-5, A-163E-A, 301E-3, A-111E-5, 145E-1, 145E-2, 144E-3, and 144E-1). Approximately 36.61% of the population within Tract 201/Block Group 2 is considered impoverished, which is meaningfully different than the reference community, St. Martin Parish (Table 4-8). However, the federal project and Easement crossings located within Tract 201, Block Group 2 are located greater than 0.5 mile from a community. Additionally, the routing of the pipeline at these two federal project and 12 Easement crossings was also partially pre-determined by the proposed route across the Atchafalaya Basin, which is co-located with other existing utilities to minimize impacts on sensitive environmental resources. Therefore, the requester’s preferred alternative at the crossings located within Tract 201/Block Group 2 would not have a disproportionate impact on impoverished communities and further analysis is not required. Note: There are a small number of structures located approximately 0.28 mile north of the proposed West Atchafalaya Basin Levee crossing. These structures are assumed to be fishing/hunting camps or seasonal residences as the U.S. Census Bureau data for the census block (Tract 201/Block 2047) indicates there are no permanent residents (U.S. Census Bureau, 2010).

Table 4-8 Census Data for the West Atchafalaya Basin Levee and Atchafalaya River Federal Project Crossings, Easements A-182E-4, A-163E-1, A-182E-2, A-111E-4, A-111E-5, A-163E-A, 301E-3, A-111E-5, 145E-1, 145E-2, 144E-3, and 144E-1 Crossings, and the Surrounding Areas					
	Area (sq mi.)	Total Population	Minority (%)	Minority population ^a	Persons Below Poverty Level (%)
State of Louisiana	47,184.72	4,625,253	40.52	1,874,153	19.76
St. Martin Parish	816.38	53,126	35.28	18,743	17.88
Tract 201, Block Group 2	200.66	743	0	0	<i>36.61</i>
^a Calculated by multiplying the total population by the minority percentage.					
Note: Red italicized text indicates minority population or poverty population in respective columns. Reference parish level data are not demarcated utilizing red italicized text.					

In summary, construction of the requester’s preferred alternative would impact both minority and/or impoverished communities as well as non-minority and/or not impoverished communities along the 22 federal project crossings and easements. EJ communities in five block groups were identified, which equates to 42% of the total number of block groups impacted by the federal project and Easement crossings. Conversely, construction of the requester’s preferred alternative would impact a total of seven block groups that are not minority

or low income at the federal project and Easement crossings, which represents 58% of the total number of block groups impacted by the federal project and Easement crossings. For the reasons stated in the above EJ analysis, there are no disproportionate impacts on minority and/or impoverished communities from construction of the pipeline.

Operational Impacts

A separate analysis was performed to determine if a release of crude oil from the pipeline during operations would disproportionately impact communities where the poverty level is greater than 20% or the minority population exceeds 50%. The majority of the federal project and Easement crossings (68%) potentially impacted by inadvertent releases do not impact EJ communities. As discussed in Section 3.2.10, there are a total of seven census block groups located along the estimated release pathways that have a poverty level greater than 20% or a minority population that exceed 50%.

The following paragraphs present the result of the EJ analysis for the census block groups that would be impacted by a release of crude oil at each of the respective federal projects and Easement crossings.

Calcasieu River

According to the PHMSA spill model, a release of crude oil at the Calcasieu River federal project crossing could potentially impact a total of three census block groups. However, based on a review of the census data presented in Table 4-9, the release would not result in an impact on any EJ communities.

	Total Population	Minority (%)	Minority population ^a	Persons Below Poverty Level (%)	Impoverished Population ^b
State of Louisiana	4,625,253	40.52	1,874,153	19.76	913,950
Calcasieu Parish	195,887	31.28	61,273	17.11	33,516
Tract 18.01, Block Group 2	1,912	7.38	141	0.73	14
Tract 32, Block Group 1	2,426	9.85	239	13.44	326
Tract 18.01, Block Group 1 _c	2,286	7.92	181	6.08	139
^a Calculated by multiplying the total population by the minority percentage. ^b Calculated by multiplying the total population by the persons below poverty level percentage. ^c Census block group located downstream of federal project and/or Easement crossing. Note: Red italicized text indicates minority population or poverty population in respective columns. Reference parish level data are not demarcated utilizing red italicized text.					

Mermentau River

A release of crude oil at the Mermentau River federal project crossing could potentially impact portions of three census block groups. However, based on a review of the census data presented in Table 4-10, the release would not result in an impact on any EJ communities.

	Total Population	Minority (%)	Minority population ^a	Persons Below Poverty Level (%)	Impoverished Population ^b
State of Louisiana	4,625,253	40.52	1,874,153	19.76	913,950
Acadia Parish	62,163	22.30	13,862	20.63	12,824
Tract 9611, Block Group 2	1,434	10.25	147	10.99	158
Jefferson Davis Parish	31,434	21.82	6,859	21.06	6,620
Tract 4, Block Group 1	1,376	11.56	159	18.60	256
Vermilion Parish	59,110	21.24	12,555	17.81	10,527
Tract 9502, Block Group 3 ^c	992	0	0	5.85	58

^a Calculated by multiplying the total population by the minority percentage.
^b Calculated by multiplying the total population by the persons below poverty level percentage.
^c Census block group located downstream of federal project and/or Easement crossing.

Note: Red italicized text indicates minority population or poverty population in respective columns. Reference parish level data are not demarcated utilizing red italicized text.

Vermilion River

According to the PHMSA spill model, a release of crude oil at the Vermilion River federal project crossing could potentially impact portions of five census block groups. However, based on a review of the census data presented in Table 4-11, the release would not result in an impact on any EJ communities.

	Total Population	Minority (%)	Minority population ^a	Persons Below Poverty Level (%)	Impoverished Population ^b
State of Louisiana	4,625,253	40.52	1,874,153	19.76	913,950
Lafayette Parish	231,811	33.38	77,379	16.02	37,136
Tract 14.02, Block Group 1	2,105	4.56	96	2.52	53
Tract 14.02, Block Group 3 ^c	2,544	13.29	338	10.40	265
Vermilion Parish	59,110	21.24	12,555	17.81	10,527
Tract 9501, Block Group 2	3,753	20.36	764	11.72	440
Tract 9501, Block Group 1 ^c	3,368	8.02	270	8.52	287
9509.02, Block Group 1 ^c	2,724	10.68	291	14.53	396

^a Calculated by multiplying the total population by the minority percentage.
^b Calculated by multiplying the total population by the persons below poverty level percentage.
^c Census block group located downstream of federal project and/or Easement crossing.

Note: Red italicized text indicates minority population or poverty population in respective columns. Reference parish level data are not demarcated utilizing red italicized text.

Bayou Teche

Analysis of the inadvertent release scenario indicates that a worst case release of crude oil at the Bayou Teche federal project crossing would impact portions of five census block groups. Of the five census blocks, one census block group (Tract 208/Block Group 2) has a minority population greater than 50% and is meaningfully different than the reference community, St. Martin Parish (Table 4-12).

	Total Population	Minority (%)	Minority population ^a	Persons Below Poverty Level (%)	Impoverished Population ^b
State of Louisiana	4,625,253	40.52	1,874,153	19.76	913,950
St. Martin Parish	53,126	35.28	18,743	17.88	9,499
Tract 208, Block Group 2	1,868	<i>56.70</i>	1,059	9.65	180
Tract 209, Block Group 2	966	21.12	204	9.42	91
Iberia Parish	73,938	40.26	29,767	19.59	14,484
Tract 302, Block Group 1 ^c	1,845	28.73	530	2.66	49
Tract 305, Block Group 4 ^c	896	14.96	134	13.50	121
Tract 306, Block Group 1 ^c	1,708	18.03	308	1.05	18

^a Calculated by multiplying the total population by the minority percentage.
^b Calculated by multiplying the total population by the persons below poverty level percentage.
^c Census block group located downstream of federal project and/or Easement crossing.

Note: Red italicized text indicates minority population or poverty population in respective columns. Reference parish level data are not demarcated utilizing red italicized text.

At the Bayou Teche crossing, an inadvertent release would not only impact one EJ community (Tract 208, Block Group 2), but it would also impact four non-EJ communities. Therefore, the impacts of an inadvertent release from the Bayou Teche crossing would not have a disproportionately high adverse impact on the EJ community.

Furthermore, BBP has stated that the pipeline would be designed to meet or exceed all applicable federal and state requirements, and the likelihood of a release would be minimal as discussed further in Section 4.1.15. However, in the event of a release, BBP has stated that they would implement measures outlined in their FRP and site-specific GRP to minimize and reduce impacts on all affected communities.

Because of the reasons above, it was determined that an inadvertent release at the Bayou Teche crossing would not have a disproportionate impact on the human health and environment within the identified minority community.

West Atchafalaya Basin Levee and Easements

A worst case release of crude oil at the West Atchafalaya Basin Levee federal project and Easements 145-E-1, 144 E-1, 145-E-2, 144 E-3, A-163E-4, A-111E-5, and 301E-3 would impact a portion of one census block group. Based on a review of the census data presented in Table 4-13, the release of crude oil at these locations would impact Tract 201, Block Group 2, which has an impoverished population that is meaningfully different than the reference community (St. Martin Parish). With the exception of the West Atchafalaya Basin Levee, the areas that would be impacted by an inadvertent release from the Easement crossings located within Tract 201, Block Group 2 are located greater than 0.5 mile from a community. Therefore, the requester’s preferred alternative at these crossings would not have a disproportionate impact on impoverished communities and further analysis for these crossings is not required.

	Total Population	Minority (%)	Minority population ^a	Persons Below Poverty Level (%)	Impoverished Population ^b
State of Louisiana	4,625,253	40.52	1,874,153	19.76	913,950
St. Martin Parish	53,126	35.28	18743	17.88	9,499
Tract 201, Block Group 2	743	0	0	<i>36.61</i>	272
^a Calculated by multiplying the total population by the minority percentage. ^b Calculated by multiplying the total population by the persons below poverty level percentage. ^c Census block group located downstream of federal project and/or Easement crossing. Note: Red italicized text indicates minority population or poverty population in respective columns. Reference parish level data are not demarcated utilizing red italicized text.					

As noted in the Construction section above, there are no communities located within 0.5 mile of the proposed West Atchafalaya Basin Levee crossing; however, there is a small community located downstream of the proposed crossing that would be potentially impacted in the event of an oil release.

The requester’s preferred alternative was routed to be co-located with other existing utilities to the greatest extent practicable in order to reduce the overall project’s impacts. By co-locating the proposed West Atchafalaya Basin Levee crossing, the requester attempted to minimize impacts on environmental resources (i.e., wetlands and waterbodies), avoid the creation of a new ROW through the affected communities, and reduce impacts on current land uses.

Furthermore, BBP has stated that the pipeline would be designed to meet or exceed all applicable federal and state requirements. The likelihood of a release would be minimal as discussed further in Section 4.1.15. However, in the event of a release, BBP has stated that

they would implement measures outlined in their FRP and site-specific GRP to minimize and reduce impacts on all affected communities.

Because of the reasons above, it was determined that an inadvertent release at the West Atchafalaya Basin Levee crossing would not have a disproportionate impact on the human health and environment within the identified impoverished community.

Atchafalaya River and Easements

A worst case release of crude oil at the Atchafalaya River federal project and Easements A-182E-2, A-111E-4, and A-163E-1 would impact portions of four census block groups in three parishes. Based on a review of the census data presented in Table 4-14, an inadvertent release of crude oil at these federal project and Easement crossings would impact two census block groups with impoverished populations that are meaningfully greater than the reference community, St. Martin Parish. However, the areas that would be impacted by an inadvertent release from the Atchafalaya River federal project and Easement A-182E-1, A-111E-4, and A-163E-1 crossings are located greater than 0.5 mile from a community. Therefore, a release of oil at the Atchafalaya River federal project and Easements A-182E-2, A-111E-4, and A-163E-1 would not have a disproportionate impact on impoverished communities.

	Total Population	Minority (%)	Minority population ^a	Persons Below Poverty Level (%)	Impoverished Population ^b
State of Louisiana	4,625,253	40.52	1,874,153	19.76	913,950
St. Martin Parish	53,126	35.28	18,743	17.88	9,499
Tract 201, Block Group 2	743	0	0	<i>36.61</i>	272
Tract 210, Block Group 1 ^c	177	0	0	<i>40.68</i>	72
Iberia Parish	73,938	40.26	29,767	19.59	14,484
Tract 301, Block Group 1 ^c	2,134	29.1	621	18.32	391
St. Mary Parish	53,441	43.45	23,220	22.43	11,987
Tract 410, Block Group 1 ^c	882	6.24	55	5.79	51

^a Calculated by multiplying the total population by the minority percentage.
^b Calculated by multiplying the total population by the persons below poverty level percentage.
^c Census block group located downstream of federal project and/or Easement crossing.

Note: Red italicized text indicates minority population or poverty population in respective columns. Reference parish level data are not demarcated utilizing red italicized text.

Easement A-182E-4

A worst case release at Easement A-182E-4 would impact portions of two census block groups, one of which has an impoverished community that is meaningfully greater than the reference community, St. Martin Parish (Table 4-15). However, the areas that would be

impacted by an inadvertent release from Easement A-182E-4 crossing is located greater than 0.5 mile from a community. Therefore, a release of oil at the Easement A-182E-4 crossing would not have a disproportionate impact on the impoverished community.

	Total Population	Minority (%)	Minority population ^a	Persons Below Poverty Level (%)	Impoverished Population ^b
State of Louisiana	4,625,253	40.52	1,874,153	19.76	913,950
St. Martin Parish	53,126	35.28	18,743	17.88	9,499
Tract 201, Block Group 2	743	0	0	<i>36.61</i>	272
Iberia Parish	73,938	40.26	29,767	19.59	14,484
Tract 301, Block Group 1 ^c	2,134	29.1	621	18.32	391

^a Calculated by multiplying the total population by the minority percentage.
^b Calculated by multiplying the total population by the persons below poverty level percentage.
^c Census block group located downstream of federal project and/or Easement crossing.

Note: Red italicized text indicates minority population or poverty population in respective columns. Reference parish level data are not demarcated utilizing red italicized text.

GIWW and Easements

A worst case release at the GIWW federal project and Easements 700-E-1 and 700-E-2 crossings would impact a portion of one census block group, which contains an impoverished community (Table 4-16). However, the percent of persons below the poverty level (20.43%) within Tract 9529/Block Group 4 is not meaningfully different than the poverty level within the reference community, Iberville Parish (19.10%). Therefore, a release of oil at the GIWW federal project and Easements 700-E-1 and 700-E-2 crossings would not have a disproportionate impact on the impoverished community.

	Total Population	Minority (%)	Minority population ^a	Persons Below Poverty Level (%)	Impoverished Population ^b
State of Louisiana	4,625,253	40.52	1,874,153	19.76	913,950
Iberville Parish	33,229	52.15	17,329	19.10	6,347
Tract 9529, Block Group 4	1,400	0	0	<i>20.43</i>	286

^a Calculated by multiplying the total population by the minority percentage.
^b Calculated by multiplying the total population by the persons below poverty level percentage.
^c Census block group located downstream of federal project and/or Easement crossing.

Note: Red italicized text indicates minority population or poverty population in respective columns. Reference parish level data are not demarcated utilizing red italicized text.

East Atchafalaya Basin Levee

A release of crude oil at the East Atchafalaya Basin Levee federal project would impact a portion of three census block groups in two parishes (Table 4-17). One of the census block

groups (Tract 9529/Block Group 2) contains an impoverished community; however, the poverty level for this census block group (20.43%) is not meaningfully different than the reference community, Iberville Parish (19.10%). Therefore, a release of oil at the East Atchafalaya Basin Levee federal project crossing would not have a disproportionate impact on the impoverished community.

	Total Population	Minority (%)	Minority population ^a	Persons Below Poverty Level (%)	Impoverished Population ^b
State of Louisiana	4,625,253	40.52	1,874,153	19.76	913,950
Iberville Parish	33,229	52.15	17,329	19.10	6,347
Tract 9529, Block Group 4	1,400	0	0	<i>20.43</i>	286
Tract 9530, Block Group 1 ^c	657	2.89	19	5.94	39
Iberia Parish	73,938	40.26	29,767	19.59	14,484
Tract 301, Block Group 1 ^c	2,134	29.10	621	18.32	391

^a Calculated by multiplying the total population by the minority percentage.
^b Calculated by multiplying the total population by the persons below poverty level percentage.
^c Census block group located downstream of federal project and/or Easement crossing.

Note: Red italicized text indicates minority population or poverty population in respective columns. Reference parish level data are not demarcated utilizing red italicized text.

Easement 7

Portions of three census block groups would be impacted by a release of crude oil from the Easement 7 crossing, two of which contain minority communities and the third is an impoverished community (Table 4-18). Furthermore, each of the minority or impoverished communities are meaningfully different than the reference community, Assumption Parish.

	Total Population	Minority (%)	Minority population ^a	Persons Below Poverty Level (%)	Impoverished Population ^b
State of Louisiana	4,625,253	40.52	1,874,153	19.76	913,950
Assumption Parish	23,057	33.76	7,784	15.97	3,682
Tract 501, Block Group 1	1,509	<i>76.94</i>	1,161	19.09	288
Tract 501, Block Group 2	1,722	<i>54.59</i>	940	10.96	189
Tract 503, Block Group 1 ^a	1,338	49.25	659	<i>20.40</i>	273

^a Calculated by multiplying the total population by the minority percentage.
^b Calculated by multiplying the total population by the persons below poverty level percentage.
^c Census block group located downstream of federal project and/or Easement crossing.

Note: Red italicized text indicates minority population or poverty population in respective columns. Reference parish level data are not demarcated utilizing red italicized text.

As noted in the discussion under the Construction section above, the requester's preferred alternative was routed to be co-located with other existing utilities to the greatest

extent practicable in order to reduce the overall project's impacts. By co-locating the proposed Easement 7 crossing, the requester attempted to minimize impacts on environmental resources (i.e., Bayou Lafourche), avoid the creation of a new ROW through the affected communities, and reduce impacts on current land uses. Additionally, a reroute of the requester's preferred alternative to the north or south of the proposed Easement 7 crossing would still impact one or more census block groups characterized as having greater than 50% minority populations and/or have greater than 20% impoverished populations.

BBP has stated that the pipeline would be designed to meet or exceed all applicable federal and state requirements, and the likelihood of a release would be minimal as discussed further in Section 4.1.15. However, in the event of a release at the Easement 7 crossing, BBP has stated that they would implement measures outlined in their FRP and site-specific GRP to minimize and reduce impacts on all affected communities.

Because of the reasons above, it was determined that an inadvertent release at the Easement 7 crossing would not have a disproportionate impact on the human health and environment within the identified minority or impoverished communities.

In summary, in the event of a worst-case scenario release during operations, an additional 13 census block groups could be affected beyond those impacted by construction (discussed above). Within the 13 additional block groups, two additional EJ communities were identified (15%, 2 of 13).

The addition of 13 new block groups results in a total of 25 census block groups along and downgradient of the 22 federal project crossings and easements that are potentially impacted by the construction and operation of the requester's preferred alternative. Seven of the 25 block groups (28%) are minority or low income communities. Conversely, 18 of the 25 total block groups are not minority or low income. This represents 72% of the total number of block groups that could be impacted by a release at the federal project and Easement crossings. For the reasons stated in the above EJ analysis, there are no disproportionate impacts on minority and/or impoverished communities from construction or operation of the pipeline.

Conclusion

Overall, construction and operation of the requester's preferred alternative would not have a disproportionate impact on minority and/or impoverished communities.

4.1.11 Socioeconomics

Future Conditions with No Action

Under the “no action” alternative, BBP would not construct the proposed Bayou Bridge Pipeline Project, and no impacts to socioeconomics would occur.

Future Conditions with the Requester’s Preferred Alternative

According to a study conducted by the Louisiana State University Center for Energy Studies at the request of Energy Transfer (the overall Bayou Bridge Pipeline Project developer) (Attachment E), the proposed Bayou Bridge Pipeline Project is estimated to generate an economic benefit of over \$829 million in economic output for the state, represented by the direct, indirect, and induced impacts from construction spending in Louisiana. Further, the proposed Bayou Bridge Pipeline Project could create over 1,500 temporary construction jobs. These temporary construction jobs could create considerable labor income and state income tax revenue during approximately 8 months of construction. Operation of the proposed Bayou Bridge Pipeline Project is estimated to generate a total of \$9.5 million in economic output for the state during the first 5 years of operation. During the same 5 years, operation of the proposed Bayou Bridge Pipeline Project is estimated to generate \$7 million in total wages for permanent employees and over \$200,000 in state / local tax revenue. Finally, indirect and induced economic growth associated with the construction and operation of the overall project could result in the creation of over 2,500 additional jobs, which would generally be temporary and of variable duration.

The requester’s preferred alternative is assumed to have a short construction window with a small number of construction workers dedicated to each of the federal project and Easement crossings. Parishes in which the requester’s preferred alternatives are located (i.e., Calcasieu, Jefferson Davis, Acadia, Vermilion, Lafayette, St. Martin, Iberville, and Assumption) could experience short-term temporary impacts to the local economy through induced spending from construction employees working on the crossings and other areas of the proposed Bayou Bridge Pipeline Project. No residential homes or farms would be relocated as a result of the requester’s preferred alternative. Additionally, no demographic changes are anticipated in the Census tracts affected as no permanent employment would be created as a result of the requester’s preferred alternative.

The only activities that would be negatively impacted during construction of the requester’s preferred alternative would be the hunting and fishing activities, and these impacts

would be limited to the Easement crossings in which the pipeline would be installed via the open cut method as these areas would be temporarily precluded from being utilized for hunting and fishing activities during construction within the proposed project footprint only. The requester's preferred alternative would not impact hunting and fishing activities where the federal projects and Easements 700-E-1 and 7 are located as the pipeline would be installed via HDD and there would be no surface disturbances that would preclude these activities. The impacts to hunting and fishing activities would be negligible as all areas outside of the proposed project footprint would be available for hunting and fishing during construction. Also, all areas disturbed by the requester's preferred alternative would be returned to pre-construction contours and allowed to revegetate. There would be no permanent loss of habitat that could be utilized for hunting and fishing, and game species would return to the proposed project area following the completion of construction. Further, all of the Easement crossings are co-located with other existing utilities which minimizes impacts to habitat utilized for hunting and fishing.

Hunting and fishing activities in the vicinity of the requester's preferred action could be at risk if there was a release of crude oil during operation of the Bayou Bridge Pipeline. Game species most susceptible to the effects of an oil spill are typically aquatic species (fish, crawfish, etc.), birds, and shoreline mammals that would come into physical contact with spilt oil. A detailed discussion of the potential impacts on fishery resources and wildlife is provided in Sections 4.1.4 and 4.1.5, respectively. Depending on the extent of the release, population declines of the impacted game species could lead to an overall decline in hunting and fishing activities until the populations reestablish in the affected area. While hunting and fishing activities would be temporarily precluded from the affected area during the cleanup procedures and remediation activities, the percent of the area restricted from hunting and fishing is a fraction of a percent of the overall usable area at any given location as described in Sections 4.1.2 through 4.1.5 above. Thus, the overall impact to fishing and hunting activities is minor.

BBP has detailed provisions for protecting and mitigating potential impacts associated with a spill during operations in Section 4.1.15. Additionally, impacts on hunting and fishing resources would be further mitigated by following the cleanup procedures and remediation activities described in the FRP. BBP is developing the FRP in compliance with the applicable requirements of the OPA 90 for submittal to PHMSA that incorporates the actual installed system. The primary goal of OPA 90 is to make the environment and public whole for injuries to natural resources and services from an incident involving an oil discharge. OPA regulation defines "natural resources" as "land, fish, wildlife, biota, air ground water, drinking water

supplies, and other such resources belonging to, managed by, held in trust by, appertaining to, or otherwise controlled by the U.S., any state or local government or Indian tribe”. “Natural resource services” are defined as “functions performed by a natural resources for the benefit of another resource and/or the public.” Under OPA, the pipeline operator is liable for the removal costs and for damages for injury to, destruction of, loss, or loss of use of, natural resources, including the reasonable cost of assessing the damage. Thus, in the event of a crude oil release that resulted in damages to game species or hunting/fishing activities, the operator would be held responsible to restore, replace, or acquire the equivalent natural resources in accordance with OPA regulations.

With the exception of temporary impacts on hunting and fishing activities, a majority of the impacts on socioeconomics due to construction of the requester’s preferred alternative would be positive. Impacts on hunting and fishing activities during construction would be negligible as these activities would be allowed to resume upon completion of construction and there would be no permanent impacts. Operation of the requester’s preferred alternative could impact hunting and fishing activities should a release of crude oil occur. However, these impacts would be minor as BBP would work to contain and remediate the spill. Furthermore, hunting and fishing activities could continue in all unaffected areas during the cleanup activities, and it is anticipated that the affected area could be utilized for hunting and fishing following the successful remediation of the spill. Any loss of game species would be mitigated for by BBP in accordance with OPA 90.

4.1.12 Noise

Future Conditions with No Action

Under the “no action” alternative, BBP would not construct the proposed Bayou Bridge Pipeline Project, and no impacts on noise resources would occur.

Future Conditions with the Requester’s Preferred Alternative

The pipeline would be installed via HDD under the federal project areas and Easements 700-E-1 and 7. With the exception of Easement 7, all of these crossings are uninhabited and therefore, would have no audible impact to persons or residents.

Easement 7 contains residents on the west side and is adjacent to residents on the east side along state roads 1 and 308, respectively. The closest HDD workspaces associated with the Easement 7 crossing are approximately 400 feet from the residences and 200 feet from the Easement. Noise generated from the HDD during construction would be audible to area

residents; however, construction activities are anticipated to occur during normal business hours and night-time activities are not expected thus minimizing audible impacts. In the event night-time activities are required, BBP has stated that they would notify landowners where noise is expected above 55 dBA at night and offer compensation or temporary accommodations (e.g. hotel stay and meals) to mitigate for the nuisance. Referencing the table from 3.2.11, 55 dBA is the noise level at which greater noise would result in interference and annoyance (The Engineering ToolBox, 2017).

Construction activity at the other 12 Easements would result in short-term increases in noise due to the operation of heavy equipment and other machinery. Direct impacts would be largely confined to those areas where heavy equipment is operated during the active construction period. All motorized equipment would be operated with a muffler to reduce ambient noise levels. Nighttime noise due to construction would be limited because construction generally occurs during daylight hours, Monday through Saturday. Because of the temporary nature of construction activities, significant noise impacts would not be anticipated as a result of the requester's preferred alternative. Furthermore, construction activities at these 12 Easements would be located within and adjacent to uninhabited areas and is therefore expected to have no audible impacts to persons or residences.

Normal operation of the requester's preferred alternative would not impact noise at the federal project and easement crossings as the pipeline would be buried a minimum of 5 feet below the surface. In the event of a release, noise impacts would be associated with the equipment and machinery utilized by BBP to contain and remediate a release. The noise related impacts would be temporary and similar to those described above for construction activities. BBP has stated that they would implement measures, such as mufflers on motorized equipment, to minimize the noise related impacts during the cleanup efforts. Therefore, there would be no long-term noise impacts as a result of a crude oil release.

In summary, construction related noise impacts would be temporary and limited to periods of active construction. During operations of the pipeline, noise impacts would not be anticipated unless a release were to occur, and in these instances, noise impacts would be temporary and limited to the duration of the containment and remediation activities. There would be no long-term impacts on noise as a result of the requester's preferred alternative.

4.1.13 Air Quality

Future Conditions with No Action

Under the “no action” alternative, BBP would not construct the proposed Bayou Bridge Pipeline Project and no impacts on air quality would occur.

Future Conditions with the Requester’s Preferred Alternative

With the requester’s preferred alternative, no long-term direct or indirect impacts to air quality would occur as the proposed buried pipeline would not emit any criteria air pollutants. During construction, emissions from fuel-burning internal combustion engines (e.g., transportation barges, heavy equipment, drill rigs, etc.) would temporarily increase the levels of some pollutants, including greenhouse gases (GHGs), NO_x, CO, VOCs, SO₂, respirable PM (i.e., PM sized 10 microns and smaller [PM₁₀]), and small amounts of hazardous air pollutants (HAPs) such as formaldehyde in the immediate area of the respective activities. Construction of each of the HDDs is likely to take approximately 5 to 8 weeks to complete, while trench installation would take approximately 1 to 2 weeks to complete in each area. To reduce the emission of the pollutants, fuel-burning equipment running times would be kept to a minimum and engines would be properly maintained. The temporary increase in emissions is not expected to impact air quality long-term in the immediate area or region as impacts would be limited to active construction.

In accordance with Section 176(c) of the CAA, a conformity analysis was conducted for the requester’s preferred alternative located within Iberville Parish, which is designated as a non-attainment (marginal) area for 2008 8-hour O₃. All emissions generated by the requester’s preferred alternative within Iberville Parish would be generated from construction activities that take place within Easement 700-E-2 such as: clearing and grading for the equipment landing for offloading of equipment and materials, installation of pipe utilizing both open cut and HDD methods, and restoration activities that would take place upon completion of construction. An additional source of construction-related emissions would be the vessels utilized to move barges carrying equipment, materials, and construction personnel along the GIWW and Easement 700-E-1 to the equipment landing. There would be no emissions associated with the East Atchafalaya Levee crossing.

Exhaust emissions of the pollutants generated by construction equipment and other vehicles that are powered by diesel or gasoline engines have been estimated based on the anticipated types of equipment and the levels of use (Table 4-19). Conservative assumptions

were used to estimate the anticipated construction emissions associated with the requester's preferred alternative in Iberville Parish. For example, it was assumed that it would take approximately 50 days to complete all activities associated with the requester's preferred alternative in Iberville Parish and that all equipment would be utilized continuously during a 10 hour workday.

Source	NO _x (tons)	CO (tons)	SO ₂ (tons)	PM ₁₀ (tons)	VOC (tons)	GHG (CO ₂ e) (tons)	Formaldehyde (tons)	Total HAP (tons)
Tug Boats	3.143	1.702	0.003	0.098	0.314	340.189	0.002	0.008
Excavators	0.579	0.502	0.001	0.029	0.058	100.224	0.001	0.002
60-Ton Cranes	0.289	0.251	0.000	0.014	0.029	50.112	0.000	0.001
Dozer	0.217	0.188	0.000	0.011	0.022	37.570	0.000	0.001
Sideboom	0.002	0.000	0.000	0.000	0.000	30.239	0.000	0.001
Welding Rigs	0.326	0.239	0.000	0.026	0.033	30.239	0.000	0.001
Generator	0.099	0.122	0.000	0.007	0.010	17.181	0.000	0.000
Outboard Boats	1.296	1.123	0.002	0.065	0.130	224.502	0.002	0.005
Drilling Mud Pumps	1.488	1.290	0.002	0.074	0.149	257.719	0.002	0.006
Totals (tons)	7.439	5.417	0.010	0.325	0.744	1,087.973	0.008	0.025

The estimated construction emissions were aggregated to compare against the General Conformity *de minimis* emission thresholds, which as stated in Section 3.2.12 is 100 tpy for both NO_x and VOCs (O₃ precursors). As shown in Table 4-20 below, the requester's preferred alternative in Iberville Parish is not anticipated to result in emissions of O₃ precursors (NO_x and VOC) during construction that would exceed General Conformity applicability thresholds or cause a new NAAQS violation or significantly contribute to a NAAQS violation.

Air Pollutant	NO _x	VOC
Iberville Parish O₃ Nonattainment (Marginal) Area		
Construction Emissions	7.44	0.74
General Conformity Threshold ^a	100	100
<i>De Minimis</i>	Yes	Yes

^a General Conformity threshold is based on the severity of the nonattainment area.

Operational impacts on air quality would be negligible during normal operations of the pipeline. However, air quality would be impacted both directly and indirectly as a result of a release of oil. Direct impacts would be associated with the evaporation of hydrocarbons from the surface of the affected land and/or surface waters. The extent of the direct impacts on air

quality is variable and would be linked to the volume of the spill, the area affected by the spill, the duration of BBP's containment and remediation activities, and the prevailing atmospheric conditions during and immediately following the release.

Indirect impacts on air quality as a result of a release would be associated with the emissions of the equipment and machinery utilized during the response efforts and would be temporary. It is anticipated that emissions from these equipment would be similar or less than that of the construction equipment described in Table 4-19; and therefore, the indirect impacts on air quality as a result of the response efforts would not exceed General Conformity applicability thresholds or cause a new NAAQS violation or significantly contribute to a NAAQS violation.

Overall, impacts on air quality as a result of construction would be temporary and would not exceed *de minimis* emission thresholds. Similarly, it is anticipated that direct and indirect air quality impacts during operations would have no long-term impacts.

4.1.14 Hazardous, Toxic, and Radioactive Waste (HTRW)

The EPA (2017c) defines hazardous waste as waste that is dangerous or potentially harmful to human health or the environment, occurring as liquids, solids, gases, or sludges. They can be generated through the disposal of commercial products, such as cleaning fluids or pesticides, or manufacturing processes. Improper management and disposal of hazardous substances can lead to pollution of groundwater or other drinking water supplies and the contamination of surface water and soil. The primary federal regulations for the management and disposal of hazardous substances are the Comprehensive Environmental Response, Compensation, and Liability Act and the Resource Conservation and Recovery Act (RCRA).

A review of hazardous or suspected hazardous wastes along the requester's preferred alternative corridor was conducted by searching government and commercial environmental databases. Presently, there are no recognized Radiation Information Database sites within one mile of the requester's preferred alternative area. However, one Superfund site listed on the National Priorities List is located approximately 0.50 mile north of the requester's preferred alternative area at the Mermentau River federal project crossing in Jefferson Davis Parish. This site (SBA Shipyard) was used for the construction, repair, retrofitting, and cleaning of barges until 1999. The soil, sediment, and groundwater are contaminated with waste from barge cleaning activities including diesel, coal tar, creosote, crude oil, petroleum products, and asphalt. Soil, sediment, and groundwater at the site contains numerous polycyclic aromatic hydrocarbons, volatile organic compounds, and metals. Contamination has migrated from the

facility to underlying groundwater, adjacent wetlands, and nearby surface waters. Interim removal activities were conducted by SBA from March 2001 to January 2005 under an EPA December 2002 RCRA Order and Agreement. The site was referred to the EPA by the LDEQ in September 2012 due to active releases of hazardous materials from an abandoned barge into the Mermentau River, to which the Coast Guard responded. The EPA is currently conducting an interim removal action to prevent active releases from an on-site buried barge (EPA, 2017d). There are no other Superfund sites located within one mile of the requester's preferred alternative.

One Brownfield Property is located approximately 0.62 mile north of the requester's preferred alternative crossing of Easement 7 in Assumption Parish, Louisiana. The property, Belle Rose Library, was formerly used as a gas station, auto body/paint shop, and later by a roofing company and was identified by the EPA as a candidate for cleanup under the Brownfield Grant Program, because it poses a risk to human health and/or the environment. An environmental assessment of the property was completed in October of 2014, but the cleanup activities have not begun. Planned reuse of the property is a parish branch library (EPA, 2017d). No other Brownfield properties are located within 1 mile of the requester's preferred alternative.

Although there is one regulated Superfund site listed on the National Priorities List within 0.50 mile of the requester's preferred alternative at the Mermentau River crossing, no direct or indirect impacts to the public or construction workers safety are expected because the HDD installation technique would be utilized. The trenchless installation method would allow the segment of pipeline to be installed 35 feet below the River bottom without impacting the Superfund site. Similarly, construction activities at the crossing of Easement 7 are not anticipated to be impacted by the Belle Rose Library Brownfield Property, because the requester's preferred alternative is 0.62 mile from the site and would be installed utilizing the HDD method at a minimum depth of 48 feet under the Easement. In the event contamination is encountered during construction, the UDP (Appendix B) would be implemented to protect people and the environment by avoiding or minimizing any effects.

BBP has stated that the storage, use, handling, and disposal of all regulated materials and other materials with the potential for impacts to public safety would be managed in accordance with applicable regulations and industry standards to avoid or minimize any impacts. Any hazardous materials discovered, generated, or used during construction would be managed and disposed of in accordance with applicable local, state, and federal regulations.

Should emergency response be required during construction, the contractor would have some of their own trained or contracted responders, and local response teams would be expected to assist.

The requester would comply with any laws, regulations, or conditions issued by any Federal, state, or local governmental agency having jurisdiction to abate or prevent pollution, such as the RCRA, and State hazardous waste management rules.

In addition to the sites identified above, a search of the U.S. Coast Guard National Response Center's (NRC) yearly reports from 2007 to 2017 indicates that there are previous spills or other releases that have occurred within the vicinity of the requester's preferred action and areas potentially impacted by a release during operations, including in the Atchafalaya Basin (NRC, 2017). The NRC is a database that documents reported oil spills, chemical releases, or maritime security incidents. Due to the variable nature of the information provided by the public for each spill, it is difficult to determine the accuracy of the reports relative to the spill location, extent of impacts, volumes, and remedial activities. However, it is anticipated that any spills verified by federal, state, and/or local agencies have been successfully contained and remediated in accordance with all applicable regulations. Furthermore, there are no ongoing remediation activities that would be further impacted by a release during operations of the requester's preferred alternative (EPA, 2017e).

If, during construction, BBP's contractor identifies evidence of contamination as a result of a previous spill, they would employ measures outlined in the UDP to protect people and the environment. It is anticipated that all past spills identified within the NRC database, including those in the Atchafalaya Basin, have been successfully contained and remediated by the party responsible for the spill. Furthermore, BBP has stated that the measures outlined in Section 4.1.15 would be implemented in the event of a spill to minimize and mitigate potential impacts on the environment.

4.1.15 Reliability and Safety

PHMSA, a federal agency within the USDOT, is the primary federal regulatory agency responsible for ensuring the safety of America's energy pipelines, including crude oil pipeline systems. As a part of that responsibility, PHMSA established regulatory requirements for the construction, operation, maintenance, monitoring, inspection, and repair of liquid pipeline systems.

Risk Assessment

While an oil spill at any one of the proposed federal projects and Easement crossings is considered a low probability, it is still considered a low risk/high consequence event. In order to determine the likelihood of a release during operations, an analysis of incident frequencies from publicly available historical data (PHMSA, 2017) was performed. The calculated incident frequency for “onshore pipeline, including valve sites” is 0.00079 incident/mile-year based on an analysis of the active 2004 to 2016 database maintained by PHMSA¹.

While future events cannot be known with absolute certainty, incident frequencies can be used to estimate the number of events that might occur over a period of time.

Examination of the PHMSA annual report for hazardous liquids dataset (PHMSA, 2017) indicates that the majority of actual pipeline spills are relatively small. Fifty percent of the spills consist of 4 bbls or less. In 84 % of the cases, the spill volume was 100 bbls or less. In 95 % of the incidents, spill volumes were less than 1,000 bbls. Oil spills of 10,000 bbls or larger occurred in 0.5 % of cases. These data demonstrate that most pipeline spills are small and that releases of 10,000 bbls or more are uncommon.

Actual frequency may differ from the predicted values of this analysis. Due to the improvements in design, construction, operation, and inspection of pipelines in order to prevent inadvertent releases, the actual number of incidents would likely be substantially lower than estimated based on this analysis as it includes releases from older pipelines. PHMSA, in its role of regulating oil and hazardous liquids pipelines, is actively working with pipeline operators to decrease the risk of releases.

Although PHMSA utilizes 10,000 bbls as its “large spill” category, according to BBP, it is unlikely that the Bayou Bridge Pipeline would experience a release of this magnitude at any federal project or Easement crossing. As noted in Section 3.1, BBP has conducted spill modeling to determine hypothetical worst case scenarios for the purposes of analysis during the operational phase of the project to aid in the placement of block valves and spill response planning. The estimated volumes were conservatively calculated assuming a complete severing of the pipeline (guillotine break) and a complete separation of the pipeline resulting in a complete opening equal to the pipeline diameter.

¹ Note: In 2002, PHMSA instituted a 5-gallon spill reporting limit. Prior to this change, only spills over 2,100 gallons or 50 bbls were reported. The annual report data for hazardous liquids maintained by PHMSA is for 2004 through 2016.

In the first phase of the calculation, liquid flows from the break in the pipeline at the operating flow rate until the pumps are shut down. In the second phase of the calculation, the pumps have been shut down and the product is draining from the break under the force of gravity. The theoretical maximum volume available for gravity flow is rarely all available as drained liquid as the volume is restricted to the liquid contained in the pipeline segment between the two closed valves, the elevation differences and hydraulics between the two closed valves, and the elevation of the break. Siphoning effects were conservatively not considered in the non-pressurized flow calculation. Therefore, the total spill volume is the sum of pressurized flow volume (phase 1) plus the gravity drain down volume (phase 2).

None of the hypothetical worst case scenarios for the crossings of federal projects and Easements and associated waterways equaled or exceeded 10,000 bbls. In fact, it is anticipated that an actual spill would be much less given that the worst case spill model included conservative assumptions presented in Section 3.1. A risk analysis conducted by BBP addressed nine industry-recognized pipeline integrity threat categories in combination with public and environmental impact that could occur in the event of a release into the federal projects and Easements. These threat categories include the following: 1) third-party damage, 2) external corrosion, 3) internal corrosion, 4) pipe manufacturing defects, 5) construction related defects 6) incorrect operations, 7) equipment failure, 8) stress corrosion cracking and 9) natural forces. BBP derived the risk analysis in accordance with 49 CFR 195.452 "Hazardous Liquid Pipelines in High Consequence Area."

The calculated incident rate probability information provided by the requester was reviewed and it was determined that risk of a spill resulting in significant adverse environmental impacts to any particular resource or community was determined to be minimal. Although the consequences of a large spill may be high, the probability of a spill to any particular resource or community is low. Additionally, as noted below (Spill Prevention, Leak Detection, and Spill Response Measures) the requester has safeguards in place to mitigate the likelihood and severity of a spill.

Third Party Damage

Pipeline failure due to third party damage is ranked low for all of the federal projects crossings and most of the Easements as they would be installed utilizing HDDs. The only third party damage that would threaten the HDD portions of the pipeline would be another HDD in the same location of the requester's proposed pipeline; the HDDs are installed at depths to preclude interference from any federal project dredging activities. Due to tracking technological

advances such as sub-meter accuracy, a permanent and accurate record of the proposed pipeline would be documented to preclude another pipeline being placed via HDD in the same location.

The Easements crossed solely or in part utilizing the open cut method have a higher probability of third party damage due to being installed shallower, approximately 5 feet below natural grade. However, this risk is still ranked as low/moderate due to the remote location of the crossings, the line of sight marking of the pipeline in the field, the authorization requirements from the USACE to construct in these locations, the aerial patrol frequency being an average of bi-weekly, and the requirement for persons carrying out excavation activities to utilize “call before you dig” services such as 811 for utility locates prior to construction.

External Corrosion

Pipeline failure for the portion of the requester’s preferred alternative is classified as low. The conventionally installed segments have a low risk ranking due to the high fusion bonded epoxy coating that is used and the deep well cathodic protection. The potential in the HDD segments is ranked low due to the high performance external coating system that is being used (heavy epoxy-concrete abrasion resistant overcoat [ARO] fusion bonded epoxy [FBE]), deep well cathodic protection, and installation of a thicker wall pipe compared to non-HDD segments. A conservative corrosion growth rate was determined to take 70 years before a through-wall metal loss could occur without cathodic protection or maintenance. Because in-line inspection metal loss detection tools run every five years, external corrosion activity would be detected and mitigated prior to it becoming an integrity threat.

Internal Corrosion

Pipeline failure due to the internal corrosion threat for the portion of the requester’s preferred alternative is ranked low. Causes of internal corrosion would be due to accumulation of water and solids in low spots of the pipeline. However, BBP’s internal corrosion mitigation program for the entire pipeline includes chemical analysis of the crude product stream, pipeline operations (maintenance of minimum flow rates that keep entrained water and solids moving through the system), a maintenance pigging program, wall pipe design, and in-line inspection performed every five years. The potential for internal corrosion does exist, but successful implementation and continual monitoring of the effectiveness of the above programs would mitigate the risk. As with the external corrosion threat, the internal corrosion would be detected and mitigated prior to it becoming an integrity threat.

Pipe Manufacturing Defects

Pipeline failure due to manufacturing defects is considered low as the applicant has a robust quality assurance quality control program for all procured materials, inspection upon delivery and inspection through installation. Prior to the installation of an HDD, the pre-strung segment would be hydrostatically strength-tested for four hours at 1.25 times the maximum operating pressure (MOP). Additionally, upon completion of construction and prior to the commissioning of the pipeline in its entirety, it would be hydrostatically strength-tested for eight hours at 1.25 times the MOP. The pipeline would only go into service subsequent to these tests being successful.

Construction Related Defects

Pipeline failure for the segment that crosses the federal projects and Easements due to construction related defects is categorized as low. All pipe joints would be welded by qualified welders and 100% girth weld radiography would provide a two-dimensional grayscale image of every weld. Inspection staff would oversee every stage of construction to document compliance with regulations and all applicant imposed design and construction measures that go above and beyond the regulations. After construction and prior to commissioning of the pipeline, the hydrostatic testing would be performed. Prior to the line being put into service, an in-line inspection tool would be ran to identify any injurious mechanical damage that may have gone undetected during construction. Any identified areas that pose a threat would be remediated prior to going in-service.

Incorrect Operations

Pipeline failure due to incorrect operations (e.g. overpressure event caused by human error) is ranked low. The system is controlled and monitored 24 hours a day, 365 days a year by experienced controllers in the control center in Sugarland, Texas. The system is designed with instruments and pressure relief systems to minimize the opportunity for overpressure. Additional information is provided in the sections below.

Equipment Failure

Pipeline failure due to equipment failure for the section of the pipeline that crosses the federal projects and Easements are categorized as low. These segments are buried; shut-off valves are placed periodically along the pipeline, generally on either side of the major waterway. These valves are remotely operated and are secured by elevated platforms and perimeter fencing. The pipeline monitoring is performed via supervisory control and data acquisition

(SCADA), which has redundant communications via satellite and cellular phone service to ensure fulltime communications to the control center. In addition, all of the remote operated equipment has battery back-up in the event of an electrical power failure, further all valves can be manually operated as needed.

Stress Corrosion Cracking

Stress corrosion cracking is a concern primarily in HDD segments due to the curvature of the pipe and potential stress from pulling the segment through during construction. The potential for pipeline failure due to stress corrosion cracking at the applicant's HDDs is ranked as low due to the grade of pipe being installed (X70 and tested at a minimum of 70,000 psi tensile strength). The HDD segments would be installed and operated well below this tensile strength level; less than 25% of it. Again, the entire pipeline is externally coated with a fusion bond epoxy coating.

Natural Forces

The potential for pipeline failure due to natural forces is ranked low for the segment of the pipeline that crosses the federal projects and Easements. According to USGS (2015, 2017b), National Weather Service (Roth, 2010), and FEMA (2017b), this geographic location is ranked as follows for natural hazards: Earthquake-Low; Landslide-Low; Hurricane-High; and Flood-High. Impacts to the requester's preferred alternative as a result of a hurricane are not anticipated as there are no aboveground features that could be impacted by high winds. Erosion of cover/exposure of the pipeline to debris during flood conditions is also unlikely due to the fact that the pipeline is buried a minimum of five feet below the ground surface. Furthermore, the pipeline would be weighted so as to prevent buoyancy as soils become saturated.

Consequences

Although a release of crude oil is considered a low probability at any one of the federal project and easement crossings, a release would be considered a high consequence event. The consequences associated with each of the federal project and Easement crossings were evaluated utilizing a relative index methodology that is based on a calculated risk ranking scale, which takes into account three sets of data: release volume, HCA interaction, and affected water crossings. After the risk ranks were assigned for the crossings, a final risk score was calculated, and this score was utilized to assist in response planning. A detailed analysis of the risk scores is presented in the PHMSA spill model, which has been provided to the USACE.

The following section provides a summary of the spill prevention and response measures that would be implemented for the Bayou Bridge Pipeline Project based in part on information provided by the PHMSA spill model.

Spill Prevention, Leak Detection, and Spill Response Measures

To prevent pipeline failures resulting in inadvertent releases, BBP has stated that they would construct and maintain the pipeline to meet or exceed industry and governmental requirements and standards. Specifically, the steel pipe would meet PHMSA specifications under 49 CFR 195, follow standards issued by the American Society of Mechanical Engineers, National Association for Corrosion Engineers and American Petroleum Industry (API). Once installed, the pipeline would be subjected to testing to verify its integrity and compliance with specifications, including hydrostatic pressure testing at the crossings, checking coating integrity, and X-ray inspection of the welds. The pipeline would be placed into service only after inspection to verify compliance with all construction standards and requirements. BBP has stated that they would maintain and inspect the pipeline in accordance with PHMSA regulations, industry codes, and prudent pipeline operating protocols and techniques.

BBP has stated that they would prepare a FRP which details the procedures to be implemented in the event of an inadvertent pipeline release and would be submitted and approved by PHMSA prior to commencing transportation of crude oil. The FRP would comply with the applicable requirements of OPA 90, and would be prepared in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), the Region 6 Contingency Plan, the Southeast Texas and Southwest Louisiana Area Contingency Plan, and the Southeast Louisiana Area Contingency Plan. Specifically, this Plan is intended to satisfy the applicable requirements of:

- Pipeline and Hazardous Materials Safety Administration, USDOT requirements for an OPA 90 plan (49 CFR 194) and
- American Petroleum Industry RP 1174 - Recommended Practice for Pipeline Emergency Preparedness and Response.

The FRP and GRPs identify Oil Spill Response Organizations (OSRO) that have the capability to mobilize to support cleanup and remediation efforts in the event of a pipeline release. Each listed OSRO would be contractually secured to provide trained personnel and equipment necessary to respond to a pipeline release or a substantial threat of such release.

The operator requires an annual certification from each OSRO to assure compliance with the National PREP guidelines.

BBP has also developed site-specific GRPs for the federal project and Easement crossings. These security sensitive documents, submitted to the USACE as Privileged and Confidential, identify site-specific resources and response measures for an immediate, safe, and effective response to a release of crude oil from the Bayou Bridge Pipeline.

Following completion of construction and throughout operation of the Bayou Bridge Pipeline Project facilities, the Operator and qualified contractors would maintain emergency response equipment and personnel at strategic points along the pipeline route. These personnel would be trained to respond to pipeline emergencies as well as in the National Incident Management System (NIMS) Incident Command System (ICS). The Operator would also coordinate with local emergency responders in preventing and responding to any pipeline related problems. These activities would include conducting and hosting, over a period of time, emergency response drills with both BBP employees and local emergency responders along the pipeline route. BBP would conduct emergency response drills/exercises in accordance with National PREP guidelines, which is recognized, and approved, by the EPA, US Coast Guard, and PHMSA.

In addition to the testing and inspection measures described above, BBP would utilize a SCADA system to provide constant remote oversight of the pipeline facilities. Power for the SCADA system would be provided from the power grid. In the event of a power outage, a 500 watt Uninterruptable Power Supply would supply low voltage power to the Programmable Logic Controller and communication equipment. Communication with the SCADA system would be accomplished via satellite (Hughes Global Network) and telephone (4G cellular [ATT] or landline depending on availability/coverage). Both forms of communication are continually engaged to poll information from these sites for 100% reliable remote monitoring / operation of these sites through the SCADA system to the Operations Control Center (OCC) in Sugarland, Texas (a backup control room is located in Bryan, Texas), and are proven to have the least potential for interruption during pipeline operations.

If an alarm criteria threshold is met during operations of the pipeline, the SCADA system would alert BBP's OCC Operators, located in Sugarland and Bryan, Texas, of rapid drops in pressure, who would then activate the controls as necessary and initiate procedures for an appropriate response. The OCC prioritizes and responds to all alarms in accordance with the control room management regulations referenced in 49 CFR 195.446 (e). This regulation

requires that the OCC Operator have a SCADA system alarm management plan; in general, the plan must include review of the SCADA alarm operations to ensure alarms support safe pipeline operations, identify any required maintenance that may affect safety at least once every calendar month, verify correct safety-related alarm values and descriptions at least once every calendar year when associated field equipment are changed or calibrated, determine effectiveness of the alarm management plan through a yearly review, and monitor content and volume of activity at least once a calendar year to assure controllers have adequate time to review incoming alarms. Leak Warn, a leading software program for monitoring pipelines, would be tailored to the pipeline facilities, in accordance with PHMSA requirements. The Operator would utilize a Computational Pipeline Monitoring System (CPM) to monitor the pipeline for leaks. The CPM is a state-of-the-art pipeline monitoring tool and features a real-time transient model that is based on pipeline pressure, flow, and temperature data, which is polled from various field instruments every 6 seconds and updates the model calculations to detect pipeline system variations every 30 seconds. After the system is tuned, this state-of-the-art CPM system is capable of detecting leaks down to 1 % or better of the pipeline flow rate within a time span of approximately 1 hour or less and capable of providing rupture detection within 1 to 3 minutes. State-of-the-art leak detection equipment and software utilized during operations or the pipeline would be updated per federal standards in accordance with PHMSA requirements. In the event that a leak is confirmed through verification, pump station shutdown would be initiated within a predetermined amount of time to effectuate. Next, the remotely controlled isolation valves (mainline valve sites would be installed on both sides of large waterbody crossings for isolation in the event of an emergency shutdown), which are operable from the OCC, would be closed. These valves have a closure time of no greater than three minutes. Monitoring of the pipeline segments installed via HDD would be accomplished in the same manner as those segments installed by conventional methods (i.e., SCADA, internal inspection devices, and aerial patrols). Typically, repairs are not made on any section of pipe greater than 10 to 20 feet below the ground surface depending on the repair needed. If a material impact was on the pipeline below the 10-foot depth, operation of the system would be modified accordingly (e.g., reduce operating pressure) or the line would be re-drilled. If inspections identify an anomaly, requirements would be followed to comply with USDOT requirements.

In the event of a leak during operations of the pipeline, the Operator would implement the response measures described in the FRP. Below is a list of typical response activities.

However, each spill mitigation situation is unique and would be treated according to the actual spill circumstances present at the time of release.

Notification: The Operator would conduct notifications in accordance with federal and state guidelines. These guidelines, along with additional notification forms/procedures would be presented in the FRP. Local government response agencies would be notified first followed by federal and state agencies as well as surrounding communities, and governments in accordance with the relevant provisions of the FRP and relevant law. Response notification to such entities as the National Response Center, PHMSA, EPA, USACE, and affected state regulatory entities would be made in accordance with the requirements dictated by the incident type. A complete list of required notifications would be included in the FRP. In accordance with PHMSA policy, the FRP would be updated every five years or sooner if there are material changes to the Plan.

Mobilize Response Equipment: Emergency equipment would be available to allow personnel to respond safely and quickly to emergency situations. Company-owned equipment would be inspected and exercised in accordance with PREP guidelines and would be mobilized and deployed by the Operator from strategic staging locations along the pipeline. Additionally, the operator's contractually secured OSRO would provide trained personnel and equipment necessary to respond, to the maximum extent practicable, to a worst case discharge or substantial threat of such discharge. At a minimum, each OSRO would have containment booms, absorbents, boats, and vacuum trucks available. A complete list of equipment and list of trained personnel necessary to continue operations of the equipment and staff the oil spill removal organization for each of the OSRO contractors would be included in the FRP.

Response Activities: Following incident command protocols, the Operator would work in unison to cooperate with and assist fire, police and other first responders when implementing actions to protect personnel, public safety and the environment. The FRP would include a spill response checklist which lists activities that could be conducted during a spill which would be modified to best address the specific circumstances of a spill event. Incident response activities may include: initiating spill assessment procedures including surveillance operations, trajectory calculations, and spill volume estimating; berming or deployment of containment and/or sorbent booms; lining shorelines with sorbent or diversion booms to reduce impacts; and recovering contained product as soon as possible to prevent the spread of contamination using appropriate hoses, skimmers, pumps, and storage containers or vacuum trucks at collection areas. The response activities would continue until an appropriate level of cleanup is obtained as provided

by the responsible federal, state or other governmental authorities. The nature and location of the incident would affect the regulatory and notification requirements, for which more detail would be provided in the FRP. Incidents involving discharges to navigable waters are governed the OPA 90.

4.1.16 Cumulative Impacts

The CEQ regulations define cumulative impacts as “the impact on the environment which results from the incremental impact of the action when added to other past, present, or reasonably foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such other actions. Cumulative Effects can result from individually minor but collectively significant actions taking place over a period of time” (40 CFR 1508.7). No surface level impacts associated with HDD activities would occur in the respective requester’s preferred alternative areas and these activities would not contribute to a cumulative effect on resources evaluated.

The cumulative effect areas were determined using the 10-digit HUC for areas of ground disturbance, which includes the Atchafalaya Basin Main Channel (0808010104) and the GIWW (0808010103) HUCs. Due to the interconnected nature of several resources including vegetation, wildlife, surface water resources, fisheries, and wetlands, cumulative impacts were evaluated within the watersheds to adequately identify past, present, and reasonably foreseeable projects with the potential to contribute to cumulative impacts. The effects of the requester’s preferred alternative on other resources, including air quality and noise during construction, land use, and aesthetics, would be limited to an area smaller than the watershed; thus, cumulative impacts can be fully evaluated for all resources through identification of projects within the watershed. Resources that would not be affected by the requester’s preferred alternative (as discussed throughout Section 4.0) would not contribute to cumulative impacts; therefore, those resources, such as groundwater, fisheries, threatened and endangered species, cultural resources, and EJ communities, are not discussed further in this section.

Major projects within the two HUC-10 watersheds were identified through review of publicly available information including web searches, USACE Public Notices, and other agency websites as well as contacting local planning and development agencies (USACE, 2017b; Freeman, 2017; Babineaux, 2017). The availability of information regarding past projects limited the results to those projects that had been proposed/completed between 2012 and 2016. In total, there were four past projects identified within the two HUC-10 watersheds evaluated

(Table 4-21). Although constructed greater than 10 years ago, the pipelines with which the requester's preferred alternative is co-located with across the Easements were also included as one additional line item in the analysis of past projects. Table 4-21 provides a summary of the past projects' scope, estimated construction dates, and relative location to the requester's preferred alternative. Although there is a lack of information regarding the status of the past projects identified, it is assumed that construction of these projects has been completed for the purposes of this cumulative impacts analysis.

Three current or reasonably foreseeable future projects were also identified within the two HUC-10 watersheds evaluated: St. Martin Parish Government's Beau Bayou Swamp Hydrologic Restoration Project, Wax Lake East Drainage District's Drainage Improvements Project, and Enterprise Products Partners, L.P.'s RGP Pipeline and Rail Terminal Expansion Project. Table 4-22 contains a summary of the current or future projects' scope, construction schedule, and relative location to the requester's preferred alternative. Information regarding construction timeframes and project sizes for the St. Martin Parish Government's and the Wax Lake East Drainage District projects are unknown; however, to ensure that all potential cumulative impacts are evaluated, it is assumed that these projects would be constructed concurrently with the requester's preferred alternative. The direct, indirect, and cumulative impacts from the identified projects are discussed in the following sections.

**Table 4-21
Past Projects Considered in the Cumulative Impact Analysis for the Requester's Preferred Alternative**

Project and Company Name	Project Description	Estimated Construction Completion Date	Project Size	Approximate Distance from the Requester's Preferred Alternative	Areas Evaluated	Resources Potentially Affected
Louisiana Department of Natural Resources, Atchafalaya Basin Program	Water Quality Enhancement Activities within Grand Lake and Little Bayou Pigeon	Unknown	Unknown	7 miles south of Federal Easement 301E-3	A-182E-4, A-163E-1, A-182E-2, A-111E-4, A-163E-4, A-111E-5, 301E-3, 700-E-2, 700-E-1, 145 E-1, 145 E-2, 145 E-3	Wetlands, wildlife, surface water resources, socioeconomics
Hilcorp Energy Company	Maintenance dredging, well re-entry, and marsh creation	Unknown	Unknown	20 miles south of Federal Easement 700-E-2	A-182E-4, A-163E-1, A-182E-2, A-111E-4, A-163E-4, A-111E-5, 301E-3, 700-E-2, 700-E-1, 145 E-1, 145 E-2, 145 E-3	Wetlands, wildlife, surface water resources, socioeconomics
McMoRan Oil & Gas, L.L.C.	Dredging operations to construct a 2,221-foot long access channel and slip. Construction of platforms, boat dock, and walkway for barges needed to drill well	Unknown	Unknown	9 miles south of Federal Easement 700-E-2	A-182E-4, A-163E-1, A-182E-2, A-111E-4, A-163E-4, A-111E-5, 301E-3, 700-E-2, 700-E-1, 145 E-1, 145 E-2, 145 E-3	Wetlands, wildlife, surface water resources, socioeconomics
Interstate Exploration, LLC	Prop-washing approximately 11,250 feet of an existing oilfield canal for access	Unknown	Unknown	6 miles northeast of Federal Easement 301E-3	A-182E-4, A-163E-1, A-182E-2, A-111E-4, A-163E-4, A-111E-5, 301E-3, 700-E-2, 700-E-1, 145 E-1, 145 E-2, 145 E-3	Wetlands, wildlife, surface water resources, socioeconomics
Various	Installation of pipelines	Between 16 and 57 years ago	Approximately 1.9 miles of co-located pipelines	Immediately adjacent to requester's preferred alternative	A-182E-4, A-163E-1, A-182E-2, A-111E-4, A-163E-4, A-111E-5, 301E-3, 700-E-2, 700-E-1, 145 E-1, 145 E-2, 145 E-3	Wetlands, wildlife, surface water resources, air quality, noise, land use, socioeconomics, aesthetics

**Table 4-22
Present and Reasonably Foreseeable Projects Considered in the Cumulative Impact Analysis for the Requester's Preferred Alternative**

Project and Company Name	Project Description	Estimated Construction Timeframe	Project Size	Approximate Distance from the Requester's Preferred Alternative	Areas Evaluated	Resources Potentially Affected
Beau Bayou Swamp Hydrologic Restoration St. Martin Parish Government	Water Quality Enhancement within the Beau Bayou Water Management Unit.	Unknown	Unknown	3 northwest of Federal Easement 145 E-1.	A-182E-4, A-163E-1, A-182E-2, A-111E-4, A-163E-4, A-111E-5, 301E-3, 700-E-2, 700-E-1, 145 E-1, 145 E-2, 145 E-3	Wetlands, wildlife, surface water resources, socioeconomics
Drainage Improvements for Wax Lake East Drainage District	Install a pumping station along a borrow pit canal and extend discharge pipes over an existing levee of the East Calumet flood gate for discharge west of the levee and gate. The Project would improve the drainage district's ability to control the water level within the borrow canal and prevent backwater flooding of the Patterson area during storm events.	Unknown	Unknown	28 miles southeast of Federal Easement A-163E-1.	A-182E-4, A-163E-1, A-182E-2, A-111E-4, A-163E-4, A-111E-5, 301E-3, 700-E-2, 700-E-1, 145 E-1, 145 E-2, 145 E-3	Wetlands, wildlife, surface water resources, socioeconomics
RGP Pipeline and Rail Terminal Expansion Enterprise Products Partners L.P.	Construction of a new 65-mile, 10-inch diameter pipeline, which will transport refinery grade propylene between Sorrento and Breaux Bridge, Louisiana.	Construction: 2016 Operation: Early 2017	65-miles	7 miles north of Federal Easement A-182E-2.	A-182E-4, A-163E-1, A-182E-2, A-111E-4, A-163E-4, A-111E-5, 301E-3, 700-E-2, 700-E-1, 145 E-1, 145 E-2, 145 E-3	Wetlands, wildlife, surface water resources, socioeconomics

Surface Water Resources

As stated previously, it is assumed that all construction associated with the past projects identified in Table 4-21 has been completed, and the temporarily disturbed areas have returned to pre-construction conditions. All temporary increases in turbidity and sedimentation as a result of the past projects have settled or dispersed well in advance of the requester's preferred alternative. Permanent impacts to water quality and surface flow within the watersheds as a result of the construction of berms along the pipelines with which the requester's preferred alternative is co-located has been documented by the LDNR Atchafalaya Basin Program (LDNR, 1998). However, the requester's preferred alternative would not result in the construction of additional berms or increases in the size of the existing berms as all disturbed areas would be returned to pre-construction contours upon completion of the requester's preferred alternative. Furthermore, BBP would install the pipeline to a sufficient depth so as to not limit any future hydrologic restoration activities in the area aimed at removing portions of the berms to improve water quality. Therefore, construction of the requester's preferred alternative would not contribute to a cumulative impact on surface water resources when considering past projects.

Construction of the requester's preferred alternative and the projects identified in Table 4-22 would result in cumulative impacts on surface water resources. For example, ground disturbance and in-water work associated with these projects and the requester's preferred alternative would result in temporary increases in turbidity and sedimentation that would impact water quality. However, due to the distance of the projects in Table 4-22 from the requester's preferred alternative and each other along with the relatively minor and localized extent of anticipated impacts, increases in sedimentation would likely settle prior to reaching the other project areas. Furthermore, any increases in turbidity as a result of the construction of the projects and the requester's preferred alternative would be negligible as the baseline turbidity levels within the river systems impacted are already high. In addition, the majority of these projects would not be constructed concurrently.

BBP has stated that it would implement best management practices in accordance with all federal and state permits, laws, and regulations to minimize impacts on surface waters. BBP and the other projects identified in Table 4-22 would implement BMPs to minimize impacts on surface water resources resulting from stormwater run-off and/or in-water work. Therefore, cumulative impacts on surface water resources would be short-term and negligible, with the

requester's preferred alternative areas quickly returning to pre-construction conditions following construction.

Normal operation of the requester's preferred alternative would not result in a cumulative impact on surface water sources. In the event of an inadvertent release during operations, BBP has stated that they would implement measures outlined in their FRP and GRP to minimize and mitigate any potential impacts on surface water resources. Therefore, the cumulative impacts on surface water resources as a result of a release would be short-term and minimal. Details regarding the potential impacts on surface water resources as a result of a release and the proposed response measures are provided in Sections 4.1.3 and 4.1.15.

Wetlands

The requester's preferred alternative would not result in the permanent loss (i.e., fill) of wetlands; however, some forested wetlands would be permanently converted to herbaceous and scrub-shrub wetlands within the maintained easement. It is anticipated that the other projects identified in Table 4-21 and Table 4-22 would also result in the temporary or permanent conversion of forested wetlands.

Construction and operation of historic pipeline installations that pre-date the CWA resulted in the loss of wetlands, as mitigation was not required for the conversion of forested wetlands within the pipeline ROW. With the exception of the pipelines installed prior to the CWA, the requester's preferred alternative and other identified projects are subject to regulation by the USACE under the CWA and all would require authorization from the USACE prior to the start of construction of each project. Various regulations and permit conditions (federal, state, and local) for all of the projects would require the use of BMPs to ensure the avoidance and minimization of cumulative impacts on wetlands and waterbodies. Furthermore, the identified projects would be required to mitigate for impacts on waters of the U.S., including permanent and temporary conversion of forested wetlands, through the purchase of mitigation credits or the establishment of a permittee-responsible mitigation solution within the same river basin that the impacts occur. Required mitigation for total wetland conversion impacts across the Project (including those areas identified in this EA) is being evaluated by the Regulatory Functions Branch during its evaluation of the Section 10/404 permit application. Finally, the overall impacts to wetlands within the watershed as a result of the projects and the requester's preferred alternative would be negligible as these projects would not be constructed concurrently and they represent a small percentage of the approximately 400,000 acres of wetlands located within the cumulative impact areas.

Due to the mitigation requirement, the abundance of wetland habitat within the cumulative impact area (the HUCs), and the lack of any proposed fill by the requester's preferred alternative, cumulative impacts on wetlands in the requester's preferred alternative area would be negligible.

Normal operation of the requester's preferred alternative would not result in a cumulative impact on wetland resources as impacts associated with the maintenance of the requester's permanent easement would be mitigated in accordance with all applicable federal regulations as described in Section 6.0. In the event of an inadvertent release during operations, BBP has stated that they would implement measures outlined in their FRP and GRP to minimize and mitigate any potential impacts on wetland resources. Therefore, the cumulative impacts on wetland resources as a result of a release would be short-term and minimal. Details regarding potential impacts on wetlands resources as a result of a release and the proposed response measures are provided in Sections 4.1.2 and 4.1.15.

Wildlife

The potential for cumulative impacts to occur on wildlife as a result of the requester's preferred alternative when combined with the other projects identified in Table 4-21 and Table 4-22 is primarily a result of habitat disturbance. As discussed in Section 4.1.5, the only wildlife habitat that would be directly impacted by the requester's preferred alternative is forested wetlands on 12 of the 14 Easements. The other projects considered in this cumulative impacts analysis would also impact forested wetlands. Since most of the projects vary in distance from one another by approximately three to 32 miles it is not likely that even concurrent construction would have a cumulative impact on wildlife. Furthermore, the impacts on wildlife habitat within the watershed as a result of the projects and the requester's preferred alternative would be negligible as they represent a small percentage of the approximately 504,500 acres of similar habitat within the cumulative impact area. The majority of disturbance for any one or combination of the projects would occur during the construction phase; however, the requester's preferred alternative and the other projects identified would have permanent and long-term impacts on forested wetland habitat due to the time it would take for forests to reestablish in temporarily impacted areas and/or for areas to remain non-forested. As discussed above, all of the projects that impact forested wetlands would be required to mitigate for those impacts in accordance with Section 404 of the CWA with the exception of the pipelines with which the proposed Bayou Bridge Pipeline Project is co-located that pre-date the CWA. This mitigation, in

addition to the abundance of available forested wetland habitat in the cumulative impact areas (HUC 10) would minimize potential cumulative impacts on wildlife.

Due to the timespan that has passed since the installation of the pipelines, the wetland habitat and wildlife impacted within the temporary construction areas of the historic pipelines within the requester's preferred alternative area have naturalized and largely returned to pre-construction conditions. Operation of the existing pipelines has resulted in impacts on wildlife as a result of the loss of wetland habitat and the creation of a pipeline canal. However, there is an abundance of available forested wetland habitat in the adjacent areas, and these pipeline canals provide habitat to a variety of wildlife that rely on open water habitat rather than forested wetlands. The requester's preferred alternative would not result in additional loss of forested wetland habitat or the creation of a pipeline canal; therefore, the overall cumulative impacts on wildlife as a result of the requester's preferred alternative would be negligible.

Normal operation of the requester's preferred alternative would not result in a cumulative impact on wildlife resources as all disturbed areas would be returned to pre-construction contours and allowed to revegetate upon completion of construction. In the event of an inadvertent release during operations, BBP has stated that they would implement measures outlined in their FRP and GRP to minimize and mitigate any potential impacts on wildlife. Therefore, the cumulative impacts on wildlife as a result of a release would be short-term and minimal. Details regarding potential impacts on wetlands resources as a result of a release and the proposed response measures are provided in Sections 4.1.5 and 4.1.15.

Socioeconomics

Each of the projects identified in Table 4-21 and Table 4-22 have or could result in direct, indirect, and induced beneficial socioeconomic impacts commensurate with the size and scope of the individual project; therefore, there is potential for beneficial cumulative impacts on socioeconomics as a result of the construction and operation of the requester's preferred alternative when combined with the other projects.

Other Resources

While the requester's preferred alternative would result in impacts on other resources including air quality, noise, land use, and aesthetics, these impacts would be minor, localized and would not be anticipated to overlap with the impacts of the other projects identified in Table 4-21 and Table 4-22 with the exception of the pipelines with which the requester's preferred alternative is co-located that pre-date the CWA. Due to the timespan that has passed since the

installation of the pipelines, cumulative impacts on air quality, noise, and land use as a result of the requester's preferred alternative would not be anticipated. Cumulative impacts on aesthetics would be negligible as the requester's preferred alternative is co-located with the existing pipelines and would not result in the creation of a new pipeline corridor through the area.

In the event of an inadvertent release during operations, BBP has stated that they would implement measures outlined in their FRP and GRP to minimize and mitigate any potential impacts. Therefore, the cumulative impacts on other resources as a result of a release would be short-term and minimal. Details regarding potential impacts on the respective resources as a result of a release are provided in Sections 4.1.7, 4.1.9, 4.1.12, and 4.1.13. Additional details regarding the proposed response measures are provided in Section 4.1.15.

Conclusion

Overall, the requester's preferred alternative, when combined with past, present, and reasonably foreseeable future actions, would have either negligible or minor cumulative impacts on water and aquatic resources, wetlands, and wildlife. No significant environmental impacts were identified with the requester's preferred alternative on water and aquatic resources, and wildlife resources. The requester's preferred alternative's cumulative impacts would not be expected to result in long-term adverse impacts.

5.0 COORDINATION

In accordance with EC 1165-2-216(7)(3)(c)(vi), a Section 408 public notice (16-169) dated February 21, 2017 was posted on the USACE, New Orleans District's Section 408 webpage for a 15-day public review and comment period. All factors considered to be relevant to the proposal were identified, including the potential cumulative effects associated with the requester's preferred alternative. The Atchafalaya Basinkeeper responded to the Section 408 Public Notice by letter dated March 9, 2017 with several comments. Comments were considered in development of this EA, as appropriate.

Details regarding the coordination that has taken place with the USFWS, the Louisiana SHPO, and the federally recognized tribes with historic ties to the areas to be impacted by the requester's preferred alternative are provided in Section 7.0.

6.0 MITIGATION

The requester's preferred alternative would not result in impacts on "waters of the U.S." at the eight federal project crossings and two of the Easement crossings (7 and 700-E-1);

therefore, mitigation is not required for these crossings. However, the requester’s preferred alternative would result in unavoidable impacts to “waters of the U.S.” at each of the remaining 12 Easement crossings. In accordance with 33 CFR 332.3(b) and the USACE MVN Compensatory Mitigation Standard Operating Procedure, the requester proposes to utilize mitigation bank credits as compensatory mitigation for the unavoidable impacts to “waters of the U.S.”

In total, the requester’s preferred alternative at the 12 Easement crossings would temporarily impact 15.21 acres of forested wetlands, 5.77 acres of cypress/cypress-tupelo dominated forested wetlands, 0.09 acre of streams, and 0.06 acre of open waters. These 12 Easement crossings would also result in the permanent conversion of 2.99 acres of forested wetlands and 2.60 acres of cypress/cypress-tupelo dominated forested wetlands to emergent and scrub shrub wetlands. The requester would mitigate for all temporary and permanent impacts to forested wetlands that would result from the requester’s preferred alternative. Compensatory mitigation is not required for temporary impacts to streams and open waters as these features would be returned to pre-construction conditions upon completion of construction. A summary of the impacts and required mitigation credit types by Easement crossing is presented in Table 6-1.

River Basin	Federal Easement ID	Credit Type	Impacts (acres)
Atchafalaya River Basin	145-E-1	BLH	0.80
	144-E-1	BLH	0.03
	145-E-2	BLH	0.32
	144-E-3	BLH	2.12
		Bald Cypress/Tupelo Swamp	0.47
	A-182E-4	Bald Cypress/Tupelo Swamp	1.40
	A-163E-1	BLH	4.32
		Bald Cypress/Tupelo Swamp	2.24
	A-182E-2	BLH	0.83
	A-111E-4	BLH	1.75
	A-163E-4	BLH	1.02
	A-111E-5	BLH	5.06
	301E-3	BLH	0.13
700E-2	BLH	1.82	
	Bald Cypress/Tupelo Swamp	4.26	
Totals			26.57
BLH: Bottomland Hardwood			

The USACE-MVN interim Louisiana Wetland Rapid Assessment Method (LRAM) was used to determine the total appropriate mitigation requirements for the requester’s preferred

alternative. Upon approval by the USACE-MVN Regulatory Functions Branch, the appropriate amount of credits would be purchased from USACE-MVN approved mitigation banks. The USACE-MVN Regulatory Functions Branch would make the final determination on mitigation requirements to ensure that mitigation would be adequately addressed.

7.0 COMPLIANCE WITH ENVIRONMENTAL LAWS AND REGULATIONS

7.1.1 Clean Water Act Section 404(b)(1) Guidelines

The USACE-MVN Regulatory Functions Branch is evaluating the requester's preferred alternative under an Individual Permit for compliance with Section 10 of the RHA (33 CFR 322) and Section 404 of the CWA (33 CFR 320-332). The requester submitted an initial permit application on February 19, 2016, and supplemental information was submitted on April 6, 2016, July 29, 2016, and January 13, 2017. The requester must obtain certification of coverage prior to any respective construction activities.

7.1.2 Section 401 Water Quality Certification

Section 401 Water Quality Certification (WQC-160921-03) was requested from the Louisiana Department of Environmental Quality concurrently with the CWA Section 404/Section 10 application. The requester must obtain certification prior to any construction activities.

7.1.3 Endangered Species Act

On February 19, 2016, the requester submitted a Threatened and Endangered Species and Sensitive Resource Report to the USFWS Louisiana Ecological Field Office to initiate informal consultation. On March 14, 2016, the USFWS Louisiana Ecological Field Office issued a letter indicating concurrence with the finding of "no effect" and "not likely to adversely affect" (Appendix D). The USFWS also indicated that no further consultation with the USFWS under Section 7 of the Endangered Species Act would be required unless there are significant changes in the scope or location of the proposed project, or if it has not been initiated within one year of the date of the letter. Due to the expiration of one year, the requester submitted a supplemental request for concurrence on February 1, 2017. The USFWS Louisiana Ecological Field Office reissued a concurrence letter for the project on February 28, 2017 (Appendix D). On May 10, 2017, the USFWS Louisiana Ecological Field Office issued a letter concurring with the determination that the proposed water withdraws from the Atchafalaya River and the GIWW are not likely to adversely affect pallid sturgeon (Appendix D).

7.1.4 Consultation and Coordination with Indian Tribal Governments, and Section 106 of the National Historic Preservation Act

The U.S. Department of Defense recognizes its trust responsibilities to Federally recognized Indian Tribes and has established an American Indian and Native Alaskan Trust policy that directs its agencies, including USACE, to work with Tribes in a manner that incorporates tribal needs, traditional resources, stewardship practices, and the development of viable working relationships. In addition, EO 13175, *Consultation and Coordination with Indian Tribal Governments*, outlines policy and criteria regarding the establishment of “regular and meaningful consultation and collaboration with tribal officials in the development of Federal policies that have tribal implications, and are responsible for strengthening the government-to-government relationship between the U.S. and Indian tribes.” These concepts, in conjunction with the USACE Tribal Policy Principles implemented by the USACE Tribal Nations Program, inform and are reflected in CEMVN’s consultation process.

In partial fulfillment of responsibilities under Executive Order 13175, the National Environmental Policy Act, and Section 106 of the National Historic Preservation Act, CEMVN initiated consultation pursuant to 36 CFR § 800.3(c) with Federally recognized Indian Tribes with a known interest in CEMVN boundaries in letters dated March 1, 2017 regarding the proposed undertaking. In that letter, CEMVN provided a description of the proposed undertaking and project area and enclosed project shapefiles, reports of the cultural resources investigations completed to date, and copies of correspondence between the SHPO and the requester regarding the undertaking and its potential effects on historic properties. In addition, CEMVN requested information concerning the proposed undertaking and its potential to significantly affect cultural resources, protected tribal resources, tribal rights, Traditional Cultural Properties, or Indian lands.

In response to CEMVN’s March 1, 2017 letter initiating consultation, the Coushatta Tribe of Louisiana requested a face-to-face meeting under Executive Order 13175 directly related to the Bayou Bridge Pipeline and its potential effects on lands for which the Coushatta Tribe has a traditional cultural affiliation. A consultation meeting was convened on April 28, 2017 in which the Coushatta Tribe requested that a Tribal monitoring program be implemented as a permit condition to alleviate concerns expressed by the Tribe regarding potential issues with the Phase I survey results, especially as they relate to the accuracy of the Culture History components of the survey reports. On May 5, 2017, a document prepared by the Coushatta Heritage Department and Tribal Energy Resource, LLC titled “Recommended Permit Conditions” was hand delivered to CEMVN.

In response to CEMVN's March 1, 2017 letter initiating consultation, the Seminole Nation of Oklahoma stated in an email dated March 9, 2017 that they wish to defer to the Chitimacha Tribe of Louisiana for final comment and that they request a listing of flora in the project area. In an email dated April 25, 2017, CEMVN provided the Seminole Nation of Oklahoma a list of flora encountered during the pipeline survey. In an email dated April 26, 2017, the Seminole Nation of Oklahoma requested that if populations of Giant Cane, Yaupon Holly, and Coastal Plain Willow are disturbed during the project that they be replanted. In an email dated August 21, 2017, CEMVN provided a detailed description of the potential effects to these plant species, concluding that the project will have no impact to Giant Cane and that both Yaupon Holly and Coastal Plain Willow will reestablish naturally via natural succession from adjacent, non-disturbed populations. In addition, non-inundated disturbed areas will be reseeded with a native seed mix to complement natural succession. No additional comment was received on this issue.

In consultation letters to SHPO and Federally recognized Indian Tribes dated June 2, 2017, CEMVN documented the finding of "No Historic Properties Affected" with special conditions for the proposed undertaking. This letter stated that a special condition would be attached to the permit that ensures that BBP allows Tribal monitoring for the presence of previously unidentified or unknown cultural, archaeological, or human remains during construction. The Tribal Monitoring Plan is provided as Appendix F.

An additional special condition would be attached to the permit that specifically addresses unanticipated discovery of human remains within the permit area. This special condition would stipulate a process to be followed by the applicant. The condition would include specific language to provide notification to Federally recognized Indian Tribes and proper treatment of unanticipated human remains. If human remains are encountered, the applicant would be required to immediately cease work in the vicinity of the discovery and contact CEMVN. CEMVN would then contact Federally recognized Indian Tribes, SHPO, and conduct other Federal coordination requirements under 33 CFR 325 (Appendix C) and 36 CFR 800. The USACE, with Federally recognized Indian Tribes and the SHPO, would consult on the treatment and final disposition of the remains.

Concurrence with the CEMVN effect determination was received via emails from SHPO on June 7, 2017, the Coushatta Tribe of Louisiana on June 14, 2017, the Muscogee (Creek) Nation on June 20, 2017, the Jena Band of Choctaw Indians on June 27, 2017, and the Choctaw Nation of Oklahoma on June 30, 2017. No other comments were received.

7.1.5 Coastal Zone Management Act

In accordance with the Louisiana State and Local Coastal Resources Management Act of 1978, the Louisiana Department of Natural Resources (LDNR) Office of Coastal Management (OCM) is responsible for regulating activities and managing resources located within the LCZ. All Section 408 and Easement crossings associated with the proposed Bayou Bridge Pipeline Project are located outside of the LCZ with the exception of Easement 7 in Assumption Parish. BBP submitted an application for a Coastal Use Permit for activities located within the LCZ on February 19, 2016, and supplemental information was submitted on April 6, 2016, July 29, 2016, and January 13, 2017. On April 3, 2017, the LDNR OCM issued a Coastal Use Permit for the portion of the proposed Bayou Bridge Pipeline Project located within the LCZ.

8.0 SECTION 408 STANDARDS AND EVALUATION

Section 408 authorizes the Secretary of the Army to grant permission for the alteration or occupation or use of a USACE project if the Secretary determines that the activity would not be injurious to the public interests and would not impair the usefulness of the civil works projects. Requested alterations are reviewed pursuant to Section 408 and EC 1165-2-216, which provides policy and procedural guidance for processing requests to alter USACE civil works projects.

8.1.1 Potential to be Injurious to the Public Interest Evaluation

As set forth above, CEMVN has assessed the environmental impacts of the requester's preferred alternative. No significant impacts to wetlands, wildlife, threatened and endangered species, cultural resources, socio-economical resources, environmental justice, noise and air quality, water quality and hydrology, aquatic resources and fisheries, essential fish habitat, aesthetics, and HTRW are expected. The requester has avoided and/or minimized environmental impacts to the greatest extent practicable, and has proposed mitigation for those impacts that are unavoidable (i.e., the permanent conversion of forested wetlands to herbaceous habitat). Public interests such as fishing and hunting activities would be temporarily impacted by the requester's preferred alternative; however, these impacts would only be experienced during construction activities and would be limited to the construction footprint. It is anticipated that there would be no long-term, significant impacts on hunting and fishing activities as they would resume in the project area upon completion of construction. Furthermore, there are no foreseen cumulative impacts that would have a negative impact on the human environment.

The requester's preferred alternative is estimated to provide economic benefits to the state of Louisiana as well as the local communities impacted by the requester's preferred alternative. Furthermore, the requester's preferred alternative would provide a safe and reliable means of transporting crude oil from facilities in Lake Charles, Louisiana to facilities located near St. James, Louisiana where it would be refined into gasoline and other petroleum products.

Because the benefits of the requester's preferred alternative outweigh any potential detriments, the requested alternative would not be injurious to the public interest.

8.1.2 Potential to Impair the Usefulness of the Authorized Project Evaluation

In accordance with EC 1165-2-216, the USACE-MVN Engineering Division is reviewing the potential of the requester's preferred alternative to impair the usefulness of the civil works projects. The USACE-MVN Engineering Division will incorporate its determination into the overall summary of findings for the requester's preferred alternative.

9.0 PREPARERS

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10.0 REFERENCES

- Atchafalaya Basinkeeper. 2016. Atchafalaya Basinkeeper. www.basinkeeper.org. Accessed January 2017.
- Babineaux, H.J. 2017. St. Martin Parish Government. Personal Communication with Colleen Moss (Staff Biologist, Perennial Environmental Services, LLC).
- California State Fire Marshal, 1993. Hazardous Liquid Pipeline Risk Assessment. Office of the State Fire Marshall. March 1993. osfm.fire.ca.gov/pipeline/pdf/publication/pipelinerriskassessment.pdf. Accessed July 2017.
- Chichester, Brittany Lynn. 2015. Impact of Exposure to Weathered Crude Oil and Accumulation of PAHs in Crawfish (*Procambarus clarkii*). http://digitalcommons.lsu.edu/cgi/viewcontent.cgi?article=3225&context=gradschool_the_ses. Accessed August 2017.

- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitats of the United States. Department of the Interior, Fish and Wildlife Service, Washington, D.C. 131 pp.
- Daigle, J.J., G.E. Griffith, J.M. Omernik, P.L. Faulkner, R.P. McCulloh, L.R. Handley, L.M. Smith, and S.S. Chapman. 2006. Ecoregions of Louisiana (color poster with map, descriptive text, summary tables, and photographs): Reston, Virginia, U.S. Geological Survey (map scale 1:1,000,000).
- Data Basin, 2014. Louisiana Aquifers. <https://databasin.org/datasets/eb718960e6824769b404ad4b18067910>. Accessed January 2017.
- Department of Transportation and Development. 2004. Thickness of the Chicot Aquifer System Surficial Confining Unit and Location of Shallow Sands, Southwestern Louisiana. <http://la.water.usgs.gov/publications/pdfs/TR73.pdf>. Accessed January 2017.
- Department of Transportation and Development. 2003. Ground-Water Resources along the Lower Mississippi River, Southeastern Louisiana. <https://la.water.usgs.gov/publications/pdfs/TR69.pdf>. Accessed January 2017.
- Federal Emergency Management Agency. 2017a. Flood Zones. <https://www.fema.gov/flood-zones>. Accessed January 2017.
- Louisiana Department of Environmental Quality. 2017. Title 33 Environmental Regulatory Code. <http://www.deq.louisiana.gov/portal/tabid/1674/Default.aspx>. Accessed January 2017.
- Federal Emergency Management Agency. 2017b. FEMA Flood Map Service Center: Search by Address. <https://msc.fema.gov/portal/search?AddressQuery=louisiana#searchresultsanchor>. Accessed January 2017.
- Florip, E. 2014. Proposed Oil Terminal Would Be Biggest In Volume. The Columbian. Available at: <http://www.columbian.com/news/2014/nov/24/proposed-oil-terminal-biggest-volume-vancouver/>.
- Freeman, T. 2017. Iberville Parish Council Office. Personal Communication with Colleen Moss (Perennial Environmental Services, LLC).
- Fritelli, J. 2014. U.S. Rail Transportation of Crude Oil: Background and Issues for Congress. Congressional Research Service. Available at: <http://fas.org/sgp/crs/misc/R43390.pdf>.
- GAO. 2014. Freight Transportation, Developing National Strategy Would Benefit from Added Focus on Community Congestion Impacts, United States Government Accountability Office, GAO-14-740, September 2014. <http://www.gao.gov/assets/670/665972.pdf>. Accessed October 2017.
- Louisiana Department of Environmental Quality. 2017a. List of Public Water Supply Systems with Approved Wellhead Protection Programs. <http://www.deq.louisiana.gov/portal/Portals/0/evaluation/aeps/DWPP/WHPPs%20Approved.pdf>. Accessed January 2017.

- Louisiana Department of Environmental Quality. 2017b. Title 33 Environmental Regulatory Code. <http://www.deq.louisiana.gov/portal/tabid/1674/Default.aspx>. Accessed January 2017.
- Louisiana Department of Environmental Quality. 2017c. Final 2014 Louisiana Water Quality Integrated Report (305(b)/303(d)). <http://www.deq.louisiana.gov/portal/DIVISIONS/WaterPermits/WaterQualityStandardsAssessment/WaterQualityInventorySection305b/2014IntegratedReport.aspx>. Accessed January 2017.
- Louisiana Department of Environmental Quality. 2017d. 2016 Louisiana Water Quality Integrated Report. <http://www.deq.louisiana.gov/portal/DIVISIONS/WaterPermits/WaterQualityStandardsAssessment/WaterQualityInventorySection305b/2016IntegratedReport.aspx>. Accessed January 2017.
- Louisiana Department of Environmental Quality. 2008. Mississippi River Alluvial Aquifer Summary, 2008. Aquifer Sampling and Assessment Program. <http://www.deq.louisiana.gov/portal/Portals/0/evaluation/aeps/08MississippiRiverAlluvialAquiferSummary09.pdf>. Accessed January 2017.
- Louisiana Department of Environmental Quality. 1996. Major Aquifer Systems of Louisiana. <http://www.deq.louisiana.gov/static/305b/1996/305b-f.htm>. Accessed January 2017.
- Louisiana Department of Natural Resources. 1998. Atchafalaya Basin State Master Plan. http://www.dnr.louisiana.gov/assets/docs/Atchafalaya_Basin/StateMasterPlan.pdf. Accessed March 2017.
- Louisiana Department of Wildlife and Fisheries. 2017a. Saltwater. <http://www.wlf.louisiana.gov/category/page-fishing/saltwater>. Accessed January 2017.
- Louisiana Department of Wildlife and Fisheries. 2017b. Louisiana Black Bear Habitat and Range. <http://www.wlf.louisiana.gov/louisiana-black-bear-ecology>. Accessed March 2017.
- Louisiana Department of Wildlife and Fisheries. 2017c. Rare Animals of Louisiana: Gulf Sturgeon. http://www.wlf.louisiana.gov/sites/default/files/pdf/fact_sheet_animal/32188-Acipenser%20oxyrinchus%20desotoi/acipenser_oxyrinchus_desotoi.pdf. Accessed February 2017.
- Louisiana Department of Wildlife and Fisheries. 2005. Wildlife Action Plan Details – Chapter 4 Conservation Habitats and Species Assessment. <http://www.wlf.louisiana.gov/wildlife/wildlife-action-plan-details>. Accessed November 2015.
- Louisiana State University Center for Energy Studies. 2017. Potential Economic Impacts of the Bayou Bridge Pipeline. http://www.enrg.lsu.edu/files/images/publications/online/2017/BAYOU_BRIDGE_REPORT_FINAL_02-07-2017.pdf. Accessed February 2017.
- Muller, H. 1987. Hydrocarbons in the freshwater environment. A Literature Review. Arch. Hydrobiol. Beih. Ergebn. Limnol 24:1-69.

- Multi-Resolution Land Characteristics Consortium. 2011. National Land Cover Database 2011. <https://www.mrlc.gov/nlcd2011.php>. Accessed January 2017.
- National Oceanic and Atmospheric Administration Habitat Conservation. 2017. EFH View Tool. <http://www.habitat.noaa.gov/protection/efh/efhmapper/index.html>. Accessed October 2015.
- National Oceanic and Atmospheric Administration Fisheries Office of Protected Resources. 2016. Gulf Sturgeon. <http://www.fisheries.noaa.gov/pr/species/fish/atlantic-sturgeon.html>. Accessed January 2017.
- National Park Service. 2007. Nationwide Rivers Inventory. <http://www.nps.gov/ncrc/programs/rtca/nri/states/la.html>. Accessed February 2014.
- National Response Center. 2017. <http://www.nrc.uscg.mil/>. Accessed August 2017.
- Natural Resources Conservation Service. 2017. Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. <http://websoilsurvey.nrcs.usda.gov/>. Accessed January 2017.
- National Wild and Scenic Rivers. 2017. <http://www.rivers.gov/louisiana.php>. Accessed February 2014.
- NatureServe. 2015. NatureServe Explorer. <http://www.natureserve.org/explorer/>. Accessed October 2015.
- Oiled Wildlife Care Network. 2017. Rescue and Treatment of Oiled Animals. http://www.vetmed.ucdavis.edu/owcn/oiled_wildlife/rescue_and_treatment.cfm. Accessed August 2017.
- Pipeline and Hazardous Materials Safety Administration (PHMSA). 2017. PHMSA Pipeline Incident Statistics. <http://www.phmsa.dot.gov/pipeline/library/data-stats/pipelineincidenttrends>. Accessed July 2017.
- Roth, David. 2010. Louisiana Hurricane History. National Weather Service. Camp Springs, MD. <http://www.wpc.ncep.noaa.gov/research/lahur.pdf>. Accessed July 2017.
- Strategic Online Natural Resources Information System – LDNR. 2017. SONRIS Interactive Map – Water Wells. <http://sonris.com/>. Accessed January 2017.
- Stubblefield, W. A., G. A. Hancock, W. H. Ford, H. H. Prince, and R. K. Ringer. 1995. Evaluation of toxic properties of naturally weathered Exxon Valdez crude oil to surrogate wildlife species. Pp. 665-692.
- The Engineering ToolBox. 2017. EPA Protective Noise Levels. Available at: http://www.engineeringtoolbox.com/epa-protective-noise-level-d_720.html.
- U.S. Army Corps of Engineers New Orleans District. 2017a. The Atchafalaya Basin: Explore Louisiana's Great River Swamp. <http://www.mvn.usace.army.mil/Portals/56/docs/PAO/Brochures/ABFS-Brochure-27apr07.pdf>. Accessed July 2017.
- U.S. Army Corps of Engineers New Orleans District. 2017b. Public Notices. <http://www.mvn.usace.army.mil/Missions/Regulatory/Public-Notices/>. Accessed January 2017.

- U.S. Army Corps of Engineers. 2015. The Atchafalaya Basin. <http://www.mvn.usace.army.mil/Portals/56/docs/PAO/Brochures/ABFS-Brochure-27apr07.pdf>. Accessed November 2015.
- U.S. Army Corps of Engineers. 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coast Plain Region. http://www.usace.army.mil/Portals/2/docs/civilworks/regulatory/reg_supp/AGCP_regsup V2.pdf. Accessed February 2014.
- U.S. Army Corps of Engineers Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1, U.S. Army Engineers Waterways Experiment Station, Vicksburg, MS. Accessed February 2014.
- U.S. Census Bureau. 2015. American Community Survey. Download Center. <https://factfinder.census.gov/faces/nav/jsf/pages/index.xhtml>. Accessed January 2017.
- U.S. Census Bureau. 2010. 2010 Census Interactive Population Search. <https://www.census.gov/2010census/popmap/>. Accessed September 23, 2017.
- U.S. Climate Data. 2017. Climate Louisiana – Lafayette. <http://www.usclimatedata.com/climate/louisiana/united-states/3188>. Accessed January 2017.
- U.S. Department of Agriculture. 2015. Rail Service Challenges in the Upper Midwest: Implications for Agricultural Sectors – Preliminary Analysis of the 2013 – 2014 Situation. United States Department of Agriculture Office of the Chief Economist and the Agricultural Marketing Service. https://www.usda.gov/oce/economics/papers/Rail_Service_Challenges_in_the_Upper_Midwest.pdf. Accessed October 2017.
- U.S. Department of Agriculture. 1980. Nation Program for Soil and Water Conservation, 1980 Program Report D; Appraisal Review Draft, Pt. 2 B1(v.2); Appraisal Soil and Water Related Resources in the U.S. B2(2v); Summary of Appraisal, Parts I and II, and Program Report Dsum; National Program for soil and Water Conservation, 1981 Program Report, Environmental Impact Statement.
- U.S. Department of Transportation. 2015. Transportation Accidents by Mode. Office of the Assistant Secretary for Research and Technology. Available at: http://www.rita.dot.gov/bts/sites/rita.dot.gov/bts/files/publications/national_transportation_statistics/html/table_02_03.html.
- U.S. Environmental Protection Agency. 2017a. Surf your Watershed: Louisiana. <https://cfpub.epa.gov/surf/state.cfm?statepostal=LA>. Accessed January 2017.
- U.S. Environmental Protection Agency. 2017b. 40 Code of Federal Regulations, Part 93. Subpart B – Section 153 Applicability. http://www.ecfr.gov/cgi-bin/text-idx?SID=3ceeffc54fb01e9a05ad78e152d46b0e&node=se40.20.93_1153&rgn=div8. Accessed March 2017.
- U.S. Environmental Protection Agency. 2017c. Hazardous Waste Website. Available at: <http://www.epa.gov/osw/hazard/index.htm>. Accessed January 2017.

- U.S. Environmental Protection Agency. 2017d. EPA Superfund Program: SPA Shipyard, Jennings, LA. Available at: <https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0607497>. Accessed January 2017.
- U.S. Environmental Protection Agency. 2017d. Brownfields Property Progress Profile. Available at https://obipublic11.epa.gov/analytics/saw.dll?PortalPages&PortalPath=%2Fshared%2FCIMC%2F_portal%2FCIMC&Page=Profile%20Page&Action=RefreshAll&ViewState=jjogqsl0j377biqdg6kn6n4u&StateAction=samePageState. Accessed January 2017.
- U.S. Environmental Protection Agency. 2017e. Enviromapper. <https://ofmpub.epa.gov/enviro/em4ef.home>. Accessed August 2017.
- U.S. Environmental Protection Agency. 2016. Emergency Management: Rescuing Wildlife. <https://archive.epa.gov/emergencies/content/learning/web/html/rescue.html>. Accessed August 2017.
- U.S. Environmental Protection Agency. 2016. FOSC Desk Report for the Enbridge Line 6b Oil Spill Marshall, Michigan. <https://www.epa.gov/sites/production/files/2016-04/documents/enbridge-fosc-report-20160407-241pp.pdf>. Accessed July 2017.
- U.S. Environmental Protection Agency. 2014. Sole Source Aquifer Protection Program. <http://water.epa.gov/infrastructure/drinkingwater/sourcewater/protection/solesourceaquifer.cfm>. Accessed January 2017.
- U.S. Environmental Protection Agency. 1995. Light Nonaqueous Phase Liquids. Ground Water Issue. Document Number EPA 540-S-95-500. Accessed July 2017.
- U.S. Fish and Wildlife Service. 2017a. IPaC. <https://ecos.fws.gov/ipac/>. Accessed January 2017.
- U.S. Fish and Wildlife Service. 2017b. Atchafalaya National Wildlife Refuge. <https://www.fws.gov/uploadedFiles/Atchafalaya.pdf>. Accessed July 2017.
- U.S. Fish and Wildlife Service. 2016a. Louisiana Black Bear. <https://www.fws.gov/southeast/wildlife/mammal/louisiana-black-bear/>. Accessed March 2017.
- U.S. Fish and Wildlife Service. 2013a. Atchafalaya National Wildlife Refuge Bird List. [https://www.fws.gov/uploadedFiles/AtchafalayaBirdList\(1\).pdf](https://www.fws.gov/uploadedFiles/AtchafalayaBirdList(1).pdf). Accessed January 2017.
- U.S. Fish and Wildlife Service. 2013b. 50 CFR Parts 10 and 21 General Provisions; Migratory Birds Revised List and Permits; Final Rule. <https://www.fws.gov/migratorybirds/pdf/policies-and-regulations/MBTAListofBirdsFinalRule.pdf>. Accessed January 2017.
- U.S. Fish and Wildlife Service. 2010. Effects of Oil on Wildlife and Habitat. <https://www.fws.gov/home/dhoilspill/pdfs/dhjcifwsoilimpactswildlifefactsheet.pdf>. Accessed July 2017.
- U.S. Fish and Wildlife Service. 2002. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Gulf Sturgeon. http://ecos.fws.gov/docs/federal_register/fr3879.pdf. Accessed October 2015.

- U.S. Geological Survey. 2017a. Lower Mississippi-Gulf Water Science Center – Louisiana. Louisiana Water Use. https://la.water.usgs.gov/WaterUse/data_table/parishTable.asp. Accessed January 2017.
- U.S. Geological Survey. 2017b. Landslide Hazards Program - Landslide Overview Map of the Conterminous United States. <http://landslides.usgs.gov/hazards/nationalmap/>. Accessed July 2017.
- U.S. Geological Survey. 2015. Seismic-Hazards Maps for the Conterminous United States. <https://pubs.usgs.gov/sim/3325/>. Accessed July 2017.
- U.S. Geological Survey. 2011. Amphibian Monitoring in the Atchafalaya Basin. <https://pubs.usgs.gov/fs/2011/3056/pdf/FS11-3056.pdf>. Accessed January 2017.
- U.S. Geological Survey. 2009. Ground Water Atlas of the United States Arkansas, Louisiana, Mississippi. http://pubs.usgs.gov/ha/ha730/ch_f/F-text3.html. Accessed January 2017.