

EXECUTIVE SUMMARY

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EXECUTIVE SUMMARY

ES. 1 Introduction and Authority

The Coastal Protection and Restoration Authority of Louisiana (CPRA or Applicant) submitted a Joint Permit Application on June 23, 2016 (revised March 16, 2018) to the U.S. Army Corps of Engineers (USACE), New Orleans District (CEMVN) for a Department of the Army (DA) permit under Section 10 of the Rivers and Harbors Act of 1899 (33 United States Code [USC] 403) and Section 404 of the Clean Water Act (CWA) (33 USC 1344) (collectively referred to as “Section 10/404”) and submitted a Section 408 Permission Request Letter (33 USC 408) to CEMVN on January 13, 2017 for activities related to the construction, operation, and maintenance of the proposed Mid-Barataria Sediment Diversion Project (proposed MBSD Project or Project) (see Appendix A). The proposed Project consists of a multi-component river diversion system intended to convey sediment, fresh water, and nutrients from the Mississippi River to the mid-Barataria Basin through an intake structure and conveyance channel complex. Activities subject to USACE jurisdiction would include discharges of dredged or fill material in jurisdictional waters, construction performed in the Mississippi River, and alteration of USACE civil works projects.

A Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) for the proposed MBSD Project was initially published by CEMVN in the *Federal Register* (FR) on October 4, 2013 (78 FR 61843). Following receipt of a modified DA permit application by CEMVN from CPRA, a supplemental NOI was published by the USACE in the *Federal Register* and provided notice to the public on April 27, 2017 (see Appendix C). On July 5, 2017, the USACE provided official public notice of upcoming scoping meetings and announced the 60-day formal scoping comment period (see Appendix B). In 2018, CPRA submitted a revised permit application with a revised Purpose and Need (see Appendix A). The MBSD Project has since been added to the inventory of “covered projects” that are pending environmental review or authorization pursuant to Title 41 of Fixing America’s Surface Transportation Act (FAST-41) (42 USC 4370m, et seq.).

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended (42 USC 4321 *et seq.* [1969]), USACE serves as the Lead Agency for the preparation of this EIS. The U.S. Environmental Protection Agency (USEPA), National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Service (USFWS), U.S. Department of the Interior (USDOI), and U.S. Department of Agriculture (USDA) are cooperating agencies.

The EIS has been prepared to analyze the potential impacts of the proposed Project and a range of reasonable alternatives, including No Action, on the natural and human environment. The EIS is intended to be sufficient in scope to provide the environmental review necessary to address federal, state, and local requirements with respect to permits, approvals, and authorizations for the proposed Project. In addition to informing the USACE decisions, the EIS will be used to inform decisions that the *Deepwater Horizon* (DWH) Natural Resource Damage Assessment (NRDA) Louisiana

Trustee Implementation Group (LA TIG) may make regarding restoration planning in the Barataria Basin under the Oil Pollution Act (OPA) and the *Deepwater Horizon Oil Spill Final Programmatic Damage Assessment and Restoration Plan and Final Programmatic EIS* (PDARP/PEIS) and associated Record of Decision (ROD). The LA TIG, which includes USEPA, NOAA, USDOJ, USDA, and five Louisiana state agencies, including CPRA, is evaluating this Project for implementation. The LA TIG is relying on this EIS to satisfy its obligations pursuant to NEPA related to restoration planning and this Project.

ES. 2 Purpose and Need

The purpose and need for the Project was developed taking into consideration the Applicant's stated purpose and need and input from the cooperating agencies (identified in Chapter 1, Section 1.8). The underlying purpose and need for the proposed Project (hereinafter called the "Project purpose and need") is to restore for injuries caused by the DWH oil spill by implementing a large-scale sediment diversion in the Barataria Basin that will reconnect and re-establish sustainable deltaic processes between the Mississippi River and the Barataria Basin through the delivery of sediment, fresh water, and nutrients to support the long-term viability of existing and planned coastal restoration efforts. The proposed Project is needed to help restore habitat and ecosystem services injured in the northern Gulf of Mexico as a result of the DWH oil spill.

ES. 3 Description of Proposed Project

The proposed Project evaluated in this EIS is a controlled sediment and freshwater intake diversion structure in Plaquemines Parish on the right descending bank of the Mississippi River at river mile (RM) 60.7, with a conveyance system that would discharge sediment, fresh water, and nutrients from the Mississippi River into an outfall area within the mid-Barataria Basin in Plaquemines and Jefferson Parishes (see Figure ES-1).

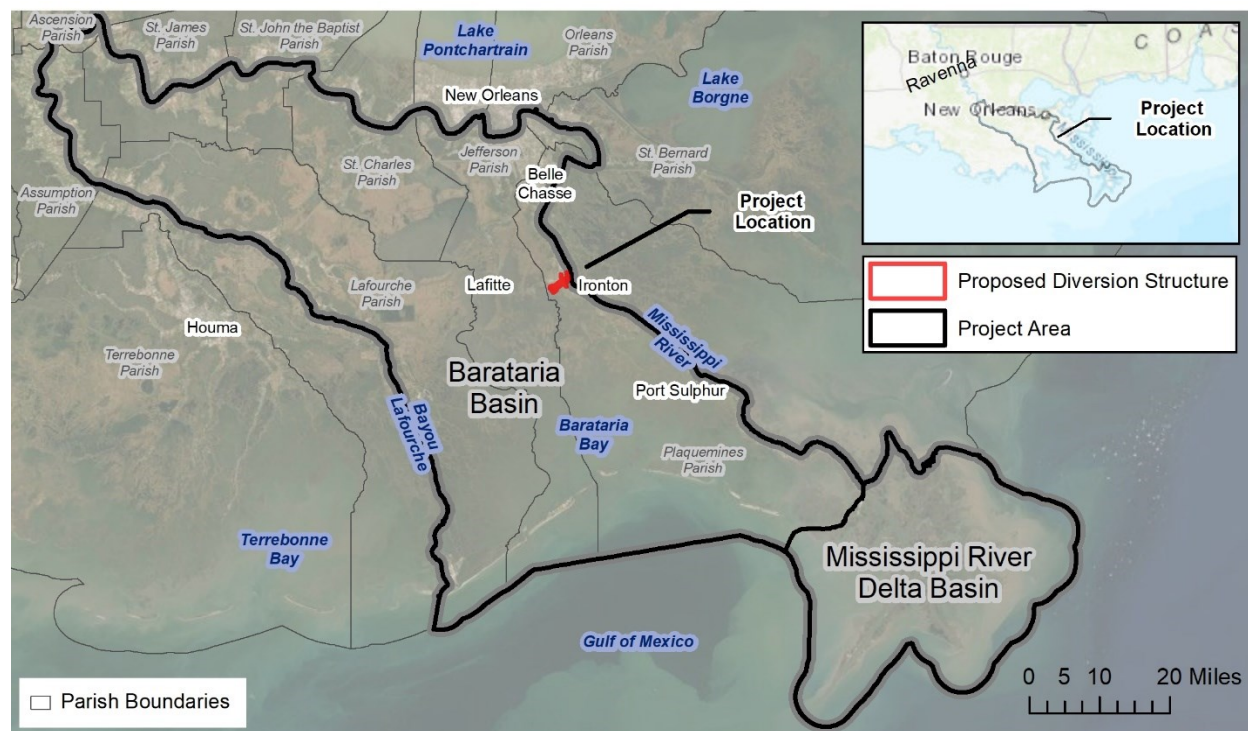


Figure ES-1. Project Area (Barataria Basin and Western Portion of the Lower Mississippi River Delta Basin).

When operational, the proposed Project could discharge up to 75,000 cubic feet per second (cfs) of fresh water, sediment and nutrients into the mid-Barataria Basin during periods when Mississippi River flows are 450,000 or greater at Belle Chasse, Plaquemines Parish, Louisiana. The proposed structure is designed to discharge a maximum of 75,000 cfs when the Mississippi River flow reaches 1,000,000 cfs. When Mississippi River flows are below 450,000 cfs at Belle Chasse, the proposed MBSD Project would operate to maintain a background (base) flow of up to 5,000 cfs to protect, sustain, and maintain newly vegetated or recently converted fresh, intermediate, and brackish marshes near the diversion outflow.

Design elements of the proposed Project's include the following main features (see Chapter 2, Figure 2.8-1):

- **Diversion complex:** consists of features that form the basic structural elements for water intake and conveyance from the Mississippi River to the Barataria Basin outfall area including intake structure (headworks), gated control structure, conveyance channel, guide levees, and stability berms. These features would be designed to convey fresh water, sediment, and nutrients from the Mississippi River to the Barataria Basin by way of a control structure confined by guide levees.
- **Basin outfall area:** the area in the Barataria Basin where sediment, fresh water, and nutrients from the Mississippi River would be dispersed via the conveyance channel during operations. A delta is anticipated to form within

the outfall area. Sand and coarse-grained sediments would be deposited within the outfall area in an initial delta formation area, with finer-grained sediment being deposited farther from the outfall area throughout the Project area. An outfall transition feature will be included that is designed to expedite development of the initial delta formation area and increase the efficiency of water and sediment accumulation. The immediate outfall area is defined as the area of the Barataria Basin that encompasses the outfall transition feature, barge access channel for delivery of construction materials, beneficial use placement areas, and marsh terrace outfall features.

- **Auxiliary structures:** Project elements that accommodate existing or future services and infrastructure, including road, rail, utilities, and drainage systems.

The proposed Project construction footprint would encompass approximately 949.1 acres. During operations, approximately 848.7 acres of the construction footprint would be permanently occupied by the proposed diversion complex; the remaining acreage would not be required or maintained during Project operations. Additionally, up to approximately 500 acres of open water and eroding marsh would be restored to wetlands in two beneficial use placement areas in the immediate outfall area, depending on the availability of suitable material generated from dredging operations during construction. The proposed Project would require up to 5 years of construction, depending on the extent of needed ground modifications and soil stabilization measures and would likely occur in several phases. Construction of the major Project features includes clearing and grubbing, stockpiling and placement of material, excavating and constructing haul roads (including drainage channels, cross drain structures, and access fencing), hauling material, grading and paving, dredging, pumping of dredged material to prepared disposal site(s), installation of sediment and erosion control measures and slope protection, permanent and final stabilization, and extension of utilities to serve the proposed Project. Many of these features would be temporary and would be removed after construction is complete.

ES. 4 Potential Environmental Impacts

The EIS addresses the potential impacts from construction and operation of the proposed MBSD Project on the environment and those resources identified during the public scoping period, taking into consideration proposed Best Management Practices (BMPs), Environmental Protection Measures (EPMs) and other mitigation measures. The process of identifying and selecting the action alternatives, including the proposed MBSD Project, for detailed review in this EIS is set forth in Chapter 2 Alternatives. As a result of the alternatives development and screening seven alternatives were carried forward for evaluation in the EIS:

- **No Action Alternative:** None of the action alternatives evaluated in this EIS would be permitted or built.
- **Alternative 1:** variable flow up to 75,000 cfs maximum sediment diversion

(Applicant's Preferred Alternative).

- Alternative 2: variable flow up to 75,000 cfs maximum sediment diversion including marsh terracing outfall feature.
- Alternative 3: variable flow up to 50,000 cfs maximum sediment diversion.
- Alternative 4: variable flow up to 50,000 cfs maximum sediment diversion including marsh terracing outfall feature.
- Alternative 5: variable flow up to 150,000 cfs maximum sediment diversion.
- Alternative 6: variable flow up to 150,000 cfs maximum sediment diversion including marsh terracing outfall feature.

Each of the alternatives are large-scale sediment diversion projects as described in Chapter 2 of the EIS. These alternatives were carried forward for further analysis under the Section 10/404 permit review and under OPA by the USACE and the Louisiana Trustees who are also cooperating agencies for the EIS. Results of the impact analyses showed mainly negligible to minor differences in impacts when terrace features were compared to the alternatives without terrace features. Therefore, the impacts of all the terrace alternatives are described under the "Terrace Alternatives" heading within each resource section in Chapter 4 of the EIS. In the instances that the terrace impacts with more than minor differences are notably different from the other alternatives, those differences are explicitly stated within the Chapter 4 resource sections.

Cumulative impacts of this Project with other past, present, and reasonably foreseeable actions in the Project area were also assessed (see Chapter 4, Section 4.25). Chapter 4, Section 4.27 contains a compilation of the proposed and recommended mitigation measures.

All areas of the human and natural environment that may be impacted by the proposed Project were considered, including geology and soils; groundwater resources; surface water and coastal processes; surface water and sediment quality; wetland resources and waters of the U.S.; air quality; noise; terrestrial wildlife and habitat; aquatic resources; marine mammals; threatened and endangered (T&E) species; socioeconomics; environmental justice; commercial fisheries; cultural resources; land use and land cover; recreation and tourism; public lands; aesthetic and visual resources; public health and safety, including flood risk reduction and shoreline protection; navigation; land-based transportation; and hazardous, toxic, and radioactive waste.

The major issues identified during the evaluation of resource impacts from implementation of the proposed Project are summarized below and include: surface water and coastal processes; surface water and sediment quality; wetland resources and waters of the U.S.; noise; aquatic resources; marine mammals; T&E species;

socioeconomics, environmental justice; commercial fisheries; recreation and tourism; public health and safety, including flood risk reduction and shoreline protection; navigation; and land-based transportation. A more detailed discussion of the affected environment is provided in Chapter 3. A more detailed discussion of the potential impacts from Project implementation in comparison to the other action alternatives and the No Action Alternative is provided in Chapter 4. A summary of the potential impacts for each alternative can also be found in Chapter 2.

The Delft3D Basinwide Model, which is a two-dimensional model used to simulate changes in hydrodynamics, sediment transport, water quality, and vegetation within the Mississippi River Delta and its estuaries, was used to assess impacts of the Project alternatives in the Barataria Basin and the birdfoot delta from implementation of the Project alternatives, as well as the impacts of the No Action Alternative. The Delft3D Basinwide Model was run for a modeling timeframe of five decades (2020 to 2070), which approximates the 50-year analysis period of the proposed Project alternatives. Observed large-scale processes, including subsidence and sea-level rise, were included in the model setup along with smaller-scale processes, such as tidal fluctuations, atmospheric and wind forcing, and rainfall. The model setup also incorporates the hydrologic, bathymetric, topographic, water quality, and vegetation impacts from completed and ongoing restoration projects, dredging operations, rivers, and natural and man-made Mississippi River diversions, such as the Bonnet Carré Spillway, Davis Pond Freshwater Diversion, Caernarvon Diversion, Mardi Gras Pass, West Pointe A La Hache, Bohemia Spillway, Naomi Siphon, Violet Siphon, and various passes in the birdfoot delta (see Appendix E for further details about the Delft3D Basinwide Model).

The proposed Project would result in impacts on the general character of the Barataria Basin, including, but not limited to, salinity, temperature, land accretion, and water quality. These impacts would generally be either adverse or beneficial depending on habitat tolerances of area plants, animals, and people, with moderate to major adverse impacts anticipated to occur only on those plants and animals that are unable to tolerate the modified habitat, and subsequently to the people that rely on the area plants and animals for economic, recreational, or other purposes. In many cases, impacts in the Barataria Basin resources would be higher near the diversion outfall, where land building/sedimentation, salinity, and water level impacts would be greatest, and would decrease with distance from the outfall. A general summary of proposed Project impacts is provided here. See Chapter 4 for a more detailed discussion of Project impacts.

Geology and Soils

Substantial excavation and dredging (approximately 6 to 8 million cubic yards [mcy]) during construction of the proposed Project are expected to cause permanent, moderate, adverse impacts on the existing geology, complex geomorphology, and topography that characterize much of the construction footprint between the New Orleans to Venice, Louisiana Non-Federal (NOV-NFL) and Mississippi River and Tributaries (MR&T) Levees, including point bar deposits, natural levees, abandoned

distributary channels, and marsh deposits. Native soils, some of which are designated prime farmland soils, would be completely removed by excavation within the footprint causing permanent, minor to moderate, adverse impacts. Dredged material placed in proposed beneficial use sites in the immediate outfall area would revegetate and provide wetland habitat, representing a permanent, moderate, beneficial impact on existing shallow-bay bottom soils because emergent wetlands would provide higher ecological productivity.

Operation of the proposed Project is projected to directly impact the geology, topography, and geomorphology of the Barataria Basin via the introduction of approximately 5 to 7 million tons of sediment transported through the diversion and deposited in the Barataria Basin annually, which would have permanent, major, beneficial impacts on land building, with a maximum of about 17,300 acres (27.0 square miles) of land built in the mid-Barataria Basin by 2050. However, this sediment deposition and land building would occur against a backdrop of significant land loss in the basin and across the region due to subsidence and sea-level rise, so that even as diversion operations are increasing sediment deposition and land creation, some of this acreage would be lost over time due to these ongoing processes. By 2070, land created by the Project in the basin is projected to be approximately 13,400 acres (20.9 square miles). It should be noted however that while the absolute difference in land area in the Barataria Basin between the Applicant's Preferred Alternative and the No Action Alternative peaks in 2050, the proportion of the projected area remaining as a result of the proposed Project would steadily increase in time. As land loss accelerates due to sea-level rise and subsidence, more of the remaining wetland area would be attributed to diversion operations.

By contrast, in the birdfoot delta, operation of the MBSD Project is estimated to induce approximately 3,000 acres of land loss by 2070 (a 45 percent reduction as compared to the No Action Alternative), representing permanent, moderate, adverse impacts. These impacts in the birdfoot delta may be partially abated by improving the capture of sediment that is lost to the Gulf through other targeted restoration projects.

Surface Water and Coastal Processes

The Delft3D Basinwide Model was used to project impacts of the proposed Project on bed elevations, water levels, and tidal values in the Barataria Basin taking into account the ongoing operations of the Davis Pond Freshwater Diversion Project, the Caernarvon Freshwater Diversion Project, and other natural and human-made existing Mississippi River diversions and hydrologic influences.

Bed Elevations

The MBSD Project would have permanent, major, beneficial impacts on bed elevations in the Barataria Basin from the influx of sediments (approximately 310 million tons over 50 years). This in turn would have permanent, major to minor, beneficial impacts on land building and marsh creation in the Barataria Basin, with impacts decreasing with distance from the immediate outfall area. Although ongoing trends of

subsidence and local erosion would continue to impact the basin, sediments introduced through the proposed diversion would help to offset land loss and sustain or increase bed elevations, primarily within roughly 100-square-miles of the diversion. The most substantial impacts on bed elevations would occur within approximately 10 miles of the diversion structure with a maximum increase of 3.7 feet by 2070 within the immediate outfall area of the diversion, and moderate and minor impacts extending farther, primarily southward. Negligible impacts on bed elevations would occur near the northern, western, and southern ends of the basin. The MBSD Project would have permanent, moderate, adverse impacts on bed elevations in the birdfoot delta due to the reduced sediment load reaching the delta.

In the Mississippi River, the Project would have permanent, moderate, and adverse impacts, with general trends of increased erosion immediately upstream of the diversion and increased deposition immediately downstream of the diversion. The driving force for these impacts would be the reduced flow and consequently slower water velocity downstream of the diversion from the rerouting of river water through the diversion.

Water Levels

Operational impacts on water levels in the Barataria Basin from the Project would be permanent, adverse, and range from major to minor, depending on the location in the basin, with maximum increases of 1.1 foot in the immediate outfall area. Higher water levels would primarily occur when the diversion is flowing above base flow (greater than 25,000 cfs and up to 75,000 cfs depending on flows in the river). Impacts on water levels in the basin would decrease with increasing distance from the diversion structure, with negligible impacts on water levels occurring near the northern, western, and southern ends of the basin. Minor impacts on water levels in the basin near the birdfoot delta are projected.

The proposed Project is projected to have intermittent, minor, beneficial impacts on water levels in the Mississippi River during Project operations. Water levels are projected to decrease upriver and downriver of the diversion structure due to diverting water from the river into the basin, with a maximum modeled change of 1.0 foot in the river.

Tides, Currents, and Flow

Operational impacts of the MBSD Project on currents and flow in the Barataria Basin would be permanent and minor to major (depending on distance from the immediate outfall area) due to widespread and readily apparent impacts on water flow velocity and direction when the proposed Project is operating above base flow (greater than 25,000 cfs and up to 75,000 cfs depending on flows in the river). These current and flow impacts would be beneficial for reestablishing deltaic processes in the basin and adverse on the larval transport and juvenile recruitment of some aquatic species. Tides would not be impacted, other than from overall impacts of higher water levels.

The fresh water flowing out of the diversion structure would create a general north to south flow in the basin as the fresh water moves towards the Gulf.

In the Mississippi River, Project impacts on the existing flow of the river would be permanent and moderate because the rerouting of river water from the Mississippi River into the proposed diversion intake channel may create cross-currents (perpendicular to the existing general downstream flow) near the proposed diversion site. This impact would be adverse due to impacts on shallow-draft vessels transiting past the site on the west side of the river and on the pallid sturgeon.

Surface Water and Sediment Quality

Monthly average concentrations of water quality parameters were modeled to determine the projected impacts due to operations of the Project. Permanent, minor to moderate reductions in salinity in the Barataria Basin and permanent, minor increases in salinity in the birdfoot delta would be expected to occur during Project operations. These salinity impacts would be beneficial for some wetland types and aquatic species and adverse for others. The introduction of Mississippi River water containing elevated fecal coliform concentrations into oyster propagation areas could cause permanent, major, direct, adverse impacts on water quality by occasionally elevating fecal coliform concentrations in oyster propagation areas during Project operations. There would be intermittent, permanent, minor decreases in water temperatures, and permanent, minor to moderate impacts on average nitrogen concentrations, average phosphorus concentrations, average dissolved oxygen (DO) concentrations, average total suspended solids concentrations, and average sulfate concentrations in the Barataria Basin. Movement of sediment from the Mississippi River to the basin is not expected to result in measurable impacts on sediment quality in the basin.

Wetland Resources and Waters of the U.S.

The Project would divert fresh water, sediments, and nutrients into the Barataria Basin in order to build, sustain, and maintain wetlands in an area that has been largely isolated from natural flooding inputs from the Mississippi River. Sediment accretion would raise the land elevation in submerged areas to allow wetland vegetation to establish and grow; nutrients transported as part of the proposed Project could contribute to increased primary production (above and below ground plant biomass); and changes in average annual salinity would allow for freshwater and intermediate wetland species to establish, survive, and potentially expand in areas that have been adversely impacted by saltwater intrusion. Because of these changes, the MBSD Project would have major, permanent, beneficial impacts on wetlands in the Barataria Basin where wetlands would be sustained and created by the diversion of sediment and fresh water. While the Project would sustain and create wetlands in the Project area, substantial wetland loss across the region due to subsidence and sea-level rise would be ongoing, resulting in a net loss of wetland acreage over the 50-year analysis period. With Project operations, by year 2070, total wetland acres in the Barataria Basin would be 85,500 and wetland losses would be 17.4 percent less than the No Action Alternative, which is projected to have 72,800 acres in the Barataria Basin by 2070.

The Project is expected to cause moderate, permanent, adverse impacts on wetlands in the birdfoot delta where wetlands would be lost due to reduced sediment and freshwater inputs. By year 2070, total wetland acres in the birdfoot delta would be reduced to 3,510 acres with the proposed Project while the No Action Alternative is projected to have 6,410 acres in the birdfoot delta by 2070. Decreases in sedimentation in the birdfoot delta would result in decreased land building and an increased rate and extent of wetland loss over time, which would affect various species populations that utilize marsh habitat. Due to the loss of wetlands in the birdfoot delta, moderate adverse impacts on the Delta National Wildlife Refuge (NWR) and Pass A Loutre Wildlife Management Area (WMA) would also occur.

As projected by the Delft3D Basinwide Model, the proposed Project would reduce salinities in the basin, which would reduce the number of days the Davis Pond Freshwater Diversion operates over the 50-year analysis period. However, the acreage of freshwater wetlands benefited by the Davis Pond Freshwater Diversion (located in the northern portion of the Barataria Basin) is not projected to be affected.

The Project is projected to cause minor to moderate, permanent, adverse impacts from the spread of invasive species in the Barataria Basin, since operation of the Project could result in the introduction or spread of invasive wetland plant species in created wetland areas. Invasive plant species are already present in the Barataria Basin under current conditions; however, the water and sediment transported from the Mississippi River into the Barataria Basin would provide a vector for the spread and establishment of invasive plants. Freshwater and brackish wetland invasive plants could also expand as a result of reduced salinity and increased nutrients. In the birdfoot delta, the Project is expected to cause negligible to minor, permanent, beneficial impacts on the spread of invasive species in the birdfoot delta since the range of certain species may be restricted by saltwater intrusion and wetland loss.

Air Quality

Temporary, direct minor to moderate, adverse impacts on air quality would occur during construction of the Project. Potential impacts on air quality during construction of the Project would be associated with criteria pollutant emissions from operation of combustion-powered equipment, barges delivering construction materials and equipment, and trucks, equipment, and workers travelling to the Project construction area. Fugitive dust emissions would also be generated by off-road vehicle use, earthwork (such as land clearing and ground excavation), aggregate and material handling (including concrete batching), and wind erosion of exposed piles of dredged and excavated material. Construction pollutant emissions associated with the MBSD Project would be temporary and spread out over 5 years. During operations, intermittent but permanent, direct adverse impacts on air quality due to operations and maintenance would occur over the 50-year analysis period; however, these emissions would be negligible, only occurring during active maintenance activities.

Noise

During construction of the proposed Project there would be temporary, minor to moderate, adverse noise impacts associated with general combustion-powered construction equipment, dredging, and pile driving that would produce sound that would be perceptible in the vicinity of the Project. Impacts would be greatest near the diversion complex and adjacent auxiliary structures, where pile driving is planned. In addition, the Project has the potential to produce underwater sound from construction activities including pile driving, dredging, and the transit of Project-related vessels. Impacts on marine and aquatic species due to underwater noise are addressed further in their specific resource section.

Operation of the Project would create permanent, negligible to minor, and adverse noise impacts from activation of the diversion components, such as opening and closing diversion gates; water flow through the diversion; and intermittent use of a backup generator for electricity. Impacts on marine and aquatic species due to noise from maintenance dredging would be intermittent and limited to maintenance dredging activities and are addressed further in their specific resource section.

Terrestrial Wildlife and Habitat

The MBSD Project would have minor (for agricultural lands) to moderate (for forested lands), permanent, adverse impacts on upland vegetation from conversion to turf grass or developed land during construction, as well as moderate, beneficial, impacts from the protection of upland vegetation as wetlands are created in the outfall during operations.

The MBSD Project is also anticipated to have minor to major, permanent beneficial impacts on wetland-associated wildlife in the Barataria Basin where wetlands are sustained and created by the diversion of sediment and freshwater, and moderate, permanent, adverse impacts on wetlands in the birdfoot delta where wetlands are lost due to reduced sediment and freshwater inputs. Minor to major, adverse and beneficial impacts on wildlife would also occur as the salinity regime in the Barataria Basin changes, both over the short-term (from initial operations) and permanently (during the change in salinity in the basin over time). There would be minor to moderate, permanent, beneficial impacts on green-winged teal, mottled duck, and alligators from increased habitat suitability near the immediate outfall area; negligible impacts on the gadwall due to overall low habitat suitability in the Project area.

Aquatic Resources

Impacts on aquatic fauna are generally influenced, either positively or negatively, by changes in available habitat. Aquatic fauna are benefited from the presence of vegetation coverage and habitat structure (wetlands, submerged aquatic vegetation [SAV], and hard bottoms), favorable salinities and temperatures (which vary by species), and suitable nutrient and DO levels. Adverse impacts occur with increased turbidity and sedimentation, when water flow and tidal transport mechanisms change to

the extent that larval recruitment is affected, and/or when other favorable habitat characteristics (such as habitat structure and water quality) are lost or altered to the extent where they become detrimental. The MBSD Project would have impacts on habitat that would translate to varying beneficial or adverse impacts on aquatic fauna; however, the impacts are predominantly related to increases in marsh habitat in the Barataria Basin and moderate decreases in salinity.

Individual aquatic species may experience moderate or major, adverse impacts where altered salinities and temperatures are outside of a species' optimal range, especially in areas closer to the diversion outfall where these impacts are typically more pronounced. Similarly, increased turbidity in the outfall may result in up to moderate adverse impacts for species that are less tolerant of turbidity. The proposed Project would likely initially result in major adverse impacts on SAV in the basin from a relatively quick decrease in salinity, which may result in die-offs of species intolerant of the new salinity regime early in the Project analysis period; however, these impacts would be offset by the major benefits to SAV that are anticipated once the salinity regimes stabilize and new freshwater or intermediate communities become established.

Minor to major adverse impacts may occur on faunal recruitment, where high diversion flows overlap with peak larval transport periods for individual species. The proposed Project would likely have major, adverse impacts on the Barataria Basin population of eastern oysters (predominantly from salinity changes, increases in fecal coliform concentrations, and sedimentation) and brown shrimp (predominantly from changes in salinity and precluded larval recruitment). Other species with projected adverse impacts include spotted seatrout (minor) and southern flounder (negligible to minor). Beneficial impacts would be expected for white shrimp (negligible to minor), blue crab (negligible to minor), bay anchovy (minor), Gulf menhaden (moderate), red drum (moderate), largemouth bass (moderate), and freshwater fishes (moderate). Negligible impacts are expected for Atlantic croaker.

Marine Mammals

The only marine mammal stock likely to be impacted by the MBSD Project is the Barataria Bay Estuarine System (BBES) stock of bottlenose dolphins. Impacts on BBES dolphins include immediate and permanent, major, adverse impacts on survival largely due to prolonged exposure to low salinities throughout the BBES stock area. BBES dolphins north of the Barrier Islands would be especially adversely impacted, while Barrier Island-associated dolphins would be less-adversely impacted. The proposed Project would also cause adverse impacts on health and reproduction from multiple stressors including low salinity exposure, wetland loss in the BBES stock area, lower temperatures, an increased risk of harmful algal blooms (HABs), and the residual effects from the DWH oil spill. These impacts would result in decreased survival rates, which would be anticipated to cause a substantial reduction in population numbers of BBES stock dolphins.

Threatened and Endangered Species

Federally listed species with the potential to be impacted by the MBSD Project include the West Indian manatee, five species of sea turtles in their aquatic habitat (as well as the loggerhead sea turtle on nesting beaches), the pallid sturgeon, two shorebirds (piping plover and red knot), and the black rail. Other species of concern considered include the saltmarsh topminnow and bald eagle.

Pallid sturgeon may become entrained in the flow and diverted into Barataria Basin, where it is presumed they would be unable to access the Mississippi River and would become functionally segregated from the listed population. Because of this entrainment potential, the MBSD Project is likely to have moderate, adverse impacts on the pallid sturgeon. The Project is likely to have minor to moderate and adverse impacts on the Kemp's ridley, green, and loggerhead sea turtles based on the potential increase in commercial shrimping interactions (each species) and presence of core use habitat in the Barataria Basin (Kemp's ridley). Negligible to minor, adverse impacts on the piping plover (or its critical habitat), red knot, and black rail are anticipated. Negligible to moderate, permanent, indirect, and adverse impacts on the bald eagle are anticipated from potential contaminant uptake. Operational impacts of the MBSD Project on West Indian manatees, and on hawksbill and leatherback green sea turtles in marine environments, are expected to be negligible to minor and adverse. Impacts on loggerhead sea turtles on nesting beaches are expected to be negligible and no impacts would occur on the four other sea turtle species on nesting beaches, or on loggerhead critical habitat. Minor to moderate, permanent, beneficial impacts are expected on the saltmarsh topminnow.

Socioeconomics

The proposed Project is expected to cause minor to moderate, permanent, adverse impacts on economy, population, housing and property values, tax revenues, public service, and community cohesion in communities near the immediate outfall area (within 10 miles north and 20 miles south) outside of flood protection due to increased tidal flooding and outmigration. In the New Orleans area north of the diversion, the Project would be expected to have minor, permanent, beneficial impacts on economy, population, housing and property values, public service and tax revenues as the land gained as a result of the Project would decrease the risks of storm hazards. Moderate to major, temporary, beneficial impacts from job creation and increased economic activity in the Project area are also anticipated.

Environmental Justice

The construction of the proposed Project could have minor to moderate, temporary, adverse impacts on low-income and minority populations within 0.5-mile of the construction footprint. Construction impacts on minority and low-income populations could be disproportionately high and adverse for the population of Ironton.

The operation of the proposed Project could lead to long-term, minor to major, adverse impacts on communities not protected by federal levees from acceleration of increases in tidal flooding and, storm hazards, and major, permanent, adverse impacts on commercial fisheries, and subsistence fisheries. These impacts could be disproportionately high and adverse on some low-income and minority populations in the Project area as compared to the No Action Alternative. These impacts would result from acceleration of changes in the frequency of tidal flooding and the severity of storm hazards relative to the No Action Alternative, particularly in the 2020s and 2030s. Disproportionately high and adverse impacts could occur on low-income and minority populations within the communities of Myrtle Grove, Hermitage, Grand Bayou, and Happy Jack, to the extent that affected populations lack resources to avoid or otherwise respond to the impacts. To a lesser extent, tidal flooding could increase in the Lafitte area, which includes multiple communities with varying levels of existing non-federal flood protection. In addition, disproportionately high and adverse impacts on low-income and minority populations could occur in some communities where reductions in abundance of oysters, brown shrimp, and certain finfish species are anticipated as a result of the Project. These impacts could occur to the extent that affected populations engage in or are heavily reliant on commercial and subsistence fishing for these species. Impacts would vary according to levels of engagement and dependence.

For low-income or minority populations located in areas inside the federal levee system or farther than about 10 miles north or 20 miles south of the immediate outfall area, impacts from increased tidal flooding and storm surge caused by operation of the Project are expected to be negligible. For low-income or minority populations located in areas north of the diversion and inside of federal flood protection, the Project is expected to have some beneficial impacts related to additional protection from storm hazards due to reduced storm surge and wave heights as a result of land building.

Consistent with the Council on Environmental Quality's guidance regarding outreach and engagement to low-income and minority populations, CPRA engaged in additional outreach to the low-income and minority populations potentially impacted by increases in tidal flooding and storm hazards due to the proposed Project, as well as those low-income and minority populations reliant on commercial or subsistence fishing, prior to issuance of the Draft Environmental Impact Statement (DEIS) to seek their input on additional or alternative mitigation measures. CPRA is continuing to evaluate additional mitigation measures including the feedback received through that outreach. For instance, CPRA is evaluating mitigation measures related to the potential acquisition of easements on properties within approximately 20 miles to the south of the diversion in areas outside of levee protection due to the identified potential for disproportionately high and adverse impacts from tidal flooding and storm hazards. CPRA would prefer to acquire easement rather than acquiring full ownership of affected properties. CPRA is also evaluating mitigation measures to address the identified potential for disproportionately high and adverse impacts on commercial oyster and brown shrimp fishing.

CPRA encourages and requests low-income and minority populations that may be adversely impacted by the proposed Project to provide comments on the mitigation

measures identified in the Mitigation Plan, and to identify alternative or additional mitigation measures to CPRA through their comments on the DEIS. CPRA will thereafter consider those measures and review and revise the Mitigation Plan as appropriate.

Commercial Fisheries

Construction of the Project would likely have temporary, minor, adverse impacts on commercial fishing activities. Southbound roadway capacity on LA 23, the main thoroughfare along the west bank of the Mississippi River, would be reduced at times, which could impact access for those engaged in commercial fishing activities.

The operation of the MBSD Project is expected to have both beneficial and adverse direct and indirect impacts on fish abundance in the Project area, which would have beneficial impacts on the commercial catch of some targeted species, and adverse impacts on the commercial catch of other targeted species. Due to the anticipated decrease in abundance of eastern oysters and brown shrimp during Project operations, the MBSD Project is expected to cause adverse impacts on oyster and shrimp fisheries (and fishers) within the Barataria Basin.

Overall, moderate to major, adverse, permanent direct and indirect impacts are anticipated on shrimp fisheries in the Project area due to expected negligible to minor, permanent, beneficial impacts on white shrimp, and major, permanent, adverse impacts on brown shrimp abundance. While some substitution of targeted species may be possible, such substitution would require additional investment by individual fishers, which may or may not be financially feasible. Declines in shrimp abundance may also exacerbate trends in the aging workforce to leave the industry. Adverse impacts on brown shrimp abundance and subsequent adverse impacts on the overall shrimp fisheries would begin at the onset of operations and last permanently throughout the 50-year analysis period. Any benefits on shrimp abundance in the Project area associated with increased marsh habitat later in the analysis period would not substantially alter the stated impacts on the shrimping industry in the Project area.

Overall, the eastern oyster fishery in the Project area is expected to experience major, permanent, adverse impacts under the proposed Project, although it is possible that areas near the barrier islands could be used as seed grounds and growing areas for adults when salinities are too low throughout the rest of the Barataria Basin. This determination considers expected impacts on oyster abundance as well as the anticipated response from commercial fishers.

Negligible to minor, permanent beneficial impacts are expected on blue crab fisheries due to changes in species abundance. Communities reliant on employment and expenditures associated with this industry may also benefit, as expenditures associated with employment and support industries may be increased under this alternative.

Impacts ranging from minor, adverse to moderate, beneficial are anticipated for finfish fisheries. This determination considers potential impacts on finfish abundance as well as the anticipated response from the commercial fishing industry. The abundance of these species directly impacts commercial fishing for these species. Reductions in catch would discourage entrants into the fishery and encourage exits. For species where increases in abundance and catch would be anticipated, the converse would be true. Alternatively, adaptation may be more feasible for new entrants. Overall impacts of the Project on the saltwater finfish commercial fishery would range from moderate, permanent, beneficial (Gulf menhaden), to minor, permanent, beneficial (bay anchovy) to negligible (Atlantic croaker), to negligible to minor, permanent, adverse (southern flounder), to minor, permanent adverse (spotted seatrout).

The Project is also expected to result in minor, permanent, beneficial, direct and indirect impacts on alligator populations in the Project area due to the retention of suitable habitat near the outfall and negligible impacts on the aquaculture industry.

There could also be impacts on commercial fishing related to changes in access that could result from the Project. Minor, permanent, adverse impacts on commercial fishing would occur as a result of increased tidal flooding of launch sites, sediment accretion in the Myrtle Grove area, or the expansion of thick mats of aquatic invasive plant species. This could impact commercial fishing by increasing travel distances to, or closure of, certain water access points. These accessibility impacts would be less adverse for smaller vessels, such as those used for recreational boating. Project-induced sedimentation affecting some Barataria Basin navigation channels and marine infrastructure would result in permanent, moderate, adverse impacts on commercial fishing vessels using the affected channels and marinas if no mitigation efforts are taken to maintain channel depths. However, larger ports, including Port Sulphur, Venice, and Buras, would not be affected by increased tidal flooding or by sediment accretion related to the Project.

Recreation and Tourism

The proposed Project would have long-term, minor to moderate, adverse impacts on site accessibility, recreational boating, and boat-based recreational fishing due to increased tidal flooding at access points in Lafitte, Myrtle Grove, and Grand Bayou and permanent, moderate, adverse impacts due to sedimentation in some of the Project-area navigation channels used to access recreation sites. In addition, there could be moderate, permanent, adverse impacts on recreational boating and boat-based recreational fishing due to increase in the introduction and expansion of invasive plant species in the basin, which would clog canals and impede boating.

Minor, permanent, adverse impacts would be expected on recreational fishing for spotted seatrout, as well as moderate, permanent, beneficial impacts on recreational fishing for red drum. Beneficial impacts would be expected on hunting and wildlife watching due to an increase in wetland habitat in some areas of the Barataria Basin; adverse impacts would be expected due to wetland loss in other areas such as in the

birdfoot delta. Overall benefit to these activities is anticipated to be minor to moderate and permanent.

Minor, permanent, adverse or beneficial impacts on the regional economy associated with recreational expenditures in the region. Adverse impacts would be associated with localized site accessibility impacts and potential decrease in abundance of spotted seatrout while beneficial impacts would be associated with potential increase in abundance of red drum.

Public Lands

Public lands in the Project area include state and federal parks, wildlife refuges, a scenic river, and WMAs. Project operational impacts on public lands are associated with impacts on wetlands because they provide critical ecosystem services for wildlife and aquatic species. Impacts on wetlands directly correlate with the ability of state and federal agencies to meet conservation objectives on public lands. The Project would not impact wetlands in the Jean Lafitte National Historical Park and Preserve-Barataria Preserve, Timkin WMA, Bayou des Allemands Natural and Scenic River, Elmer's Island Wildlife Refuge, E.A. Maier Family Donation, and Grand Isle State Park. However, the Project would cause 35 acres of wetland loss in the Salvadore WMA, representing minor, permanent, adverse wetland impacts.

The Project is anticipated to have minor to moderate, adverse, permanent impacts on the two state and federal public lands located in the birdfoot delta due to projected decreases in wetlands. The Project would result in a net loss of 926 acres and 37 acres, respectively, in the Delta NWR and the Pass A Loutre WMA due to the reduced sediment that would be delivered to the birdfoot delta via the Mississippi River over the 50-year analysis period.

Land Use and Land Cover

Vegetation clearing, ground disturbance, and fill placement during construction of the proposed Project are expected to cause a mix of temporary and short-term, moderate, adverse impacts on the existing landscape in the immediate vicinity (generally within 0.5 mile) of the Project's upland and water-based construction footprints. By contrast, dredged material may be placed in the basin near the immediate outfall area in designated beneficial use areas, resulting in beneficial impacts on wetland resources.

The proposed Project would be constructed on 949.2 acres of lands comprised of uplands, wetlands, and open water resulting in moderate, permanent, adverse impacts on existing land use. Changes in land use and land cover (specifically wetlands and open water) within the Barataria Basin and the birdfoot delta, as well as changes in use (for example, fishing, recreation, and tourism) would result in permanent, moderate, impacts on land use; however, whether these changes in land use types are adverse or beneficial depends on the particular use or user in question. For example, the creation of wetlands within the Barataria Basin may be beneficial for certain uses such as

hunting of waterfowl, while these same impacts may be considered adverse for other water-based users where open water is more desirable.

During the 50-year analysis period, the total acres created by the Project in the Barataria Basin is greatest in 2050; however, at that time the difference in land area relative to the No Action Alternative is only about 9 percent. Alternatively, by 2070 the Preferred Alternative is outperforming the No Action Alternative, generating 26 percent more land area in the basin as compared to the No Action Alternative.

Aesthetics

The viewshed of the proposed Project includes predominately open lands with scrub vegetation, agricultural crops, sporadic homes, and industry. No institutional or publicly significant visual features in or around the location proposed for the Project diversion structure such as federal or state lands, or national or state designated wild or scenic rivers. Permanent changes to the visual character of the area would result from operation of the aboveground structures, most notably the diversion complex, which would modify the viewshed; however, the structure's low-profile would limit the distance from which it would be visible.

During operations, wetland creation and restoration would occur in the Barataria Basin, while gradual land loss would occur in the birdfoot delta. These permanent, minor impacts on the existing viewsheds would occur in areas where visual receptors are present only intermittently (for example, fishermen, boaters, hunters); as such, impacts on the viewshed for these visual receptors would be minor. Whether these impacts on the viewsheds are beneficial or adverse would depend on the perspective of the individual receptor; for example, the increase in wetlands may be perceived as beneficial for those individuals participating in wildlife viewing, where water-based users may find the loss of open water to be adverse. The restored wetlands are expected to provide additional habitat for wildlife and plant species, which would result in long-term enhancement of the natural character of the viewshed.

Public Health and Safety, Including Flood Risk Reduction and Shoreline Protection

Water levels and land change projected in the Barataria Basin and birdfoot delta through Delft3D Basinwide Modeling were used in conjunction with topography analysis to quantify existing tidal flood risk within the Project area, and to project potential impacts on such risk associated with the proposed Project. In addition, the coupled ADvanced CIRCulation (ADCIRC) and Simulating WAVes Nearshore (SWAN) high fidelity models (referred to as ADCIRC in this EIS) were used to quantify existing coastal storm hazards (surge and wave height magnitude) in the Project area, and to project potential impacts on storm surge and wave height magnitude associated with the Project.

Floodplains and Tidal Flooding

The MBSD Project would increase water levels during operation, which would have long-term, minor to major impacts (depending on location) on public health and safety by increasing the frequency of tidal flooding in the Barataria Basin communities located outside levee protection specifically within areas approximately 10 miles to the north and 20 miles to the south of the immediate outfall area. These communities could experience an increased percentage of days of inundation due to tidal flooding as compared to the No Action Alternative, with the greatest impacts, in general, in communities closest to the diversion outfall, and potential impacts decreasing with distance from the immediate outfall area. Impacts on public health and safety in Project-area communities within federal levee systems would be negligible, as still water levels are not expected to exceed authorized levee heights for federal levee systems within the Project area during periods when the diversion is operating above base flow.

Storm Hazards

Operation of the MBSD Project would have permanent, minor to moderate, beneficial impacts on communities outside of federal levee systems north of the diversion (Lafitte and Des Allemands), and permanent, minor to moderate, adverse impacts on public health and safety risks associated with storm hazards in communities outside of federal levee systems south of the diversion (including Myrtle Grove and Grand Bayou). The MBSD Project is projected to cause a maximum decrease in storm-surge elevations of 1.0 foot at the West Bank and Vicinity Levees near New Orleans during a 1 percent AEP (100-year) storm. At the same time, operation of the MBSD Project is anticipated to cause increases in storm surge of up to 1.7 feet near Myrtle Grove in 2070. The greatest impacts on surge elevation and wave heights are projected to occur within the vicinity of the MBSD Project immediate outfall area and would be reduced to negligible in areas farther from the outfall.

Risk Reduction Levees

The MBSD Project would have a permanent, negligible to minor, beneficial impact on public health and safety in northern reaches within the NOV-NFL Levee system, and a small portion of communities within the West Bank and Vicinity (WBV) system, by reducing surge elevation and wave height. However, the decrease in surge elevation and wave height north of the diversion (for a representative 1 percent AEP [100-year] storm) is not projected to be substantial enough to prevent overtopping of the NOV-NFL Levee as it was designed and built to reduce the risk of hurricane and storm damage up to either a 2 percent AEP (50-year) storm (from Oakville to La Reussite), or a 4 percent AEP (25-year) storm (from La Reussite to St. Jude). Conversely, the MBSD Project would have permanent, minor, adverse impacts in some communities within the NOV-NFL and NOV systems south of the outfall area by increasing storm surge, causing maximum water levels to overtop some NOV-NFL levee reaches, which would not otherwise be overtopped without the MBSD Project. The impact of the MBSD Project on storm surge is not anticipated to have more than a negligible to minor

(localized) impact on public health and safety within other levee systems within the basin.

Navigation

In the Barataria Basin, the Project would cause moderate increases in dredging in the Barataria Bay Waterway due to increased sedimentation in the basin. Bayou Lafourche and the Gulf Intracoastal Waterway would experience minor to negligible increases in dredging, respectively. Project impacts on navigation traffic in the basin during construction and operations would be negligible to minor.

During construction, the Project would have moderate, temporary, adverse impacts on the safety and efficiency of shallow-draft vessels transiting past the proposed Project site in the Mississippi River due to waterway obstructions associated with the proposed cofferdam of the river intake system. During operations, the Project would have moderate, intermittent but permanent, adverse impacts on marine traffic efficiency and safety for shallow-draft vessels in the Mississippi River due to cross-currents extending into the channel from the proposed intake of water into the diversion. Some congestion may be unavoidable and could cause transit delays. The Project would also cause minor to moderate, permanent, adverse increases in dredging requirements in some portions of the Mississippi River navigation channel downriver of the proposed Project site and in the birdfoot delta due to Project-induced changes to typical shoaling patterns and locations.

Land-Based Transportation

The Project would cause temporary, moderate, adverse impacts on roadway transportation during construction due to traffic delays and congestion from increased construction traffic. LA 23 would provide the primary vehicular access for transporting equipment, materials, and personnel to and from the construction site during the 5-year construction period.

Construction of the proposed diversion complex would require that a portion of the New Orleans Gulf Coast Railway be permanently raised and relocated over the intake channel with a maximum grade of 1.5 percent. To avoid disruptions to railroad operations and maintain rail service during the construction period, CPRA would construct a temporary railroad spur extending from the existing railroad along the north side of the proposed conveyance channel prior to construction.

Hazardous, Toxic, and Radioactive Waste

Temporary, minor to moderate, adverse impacts due to potential unexpected discovery of and exposure to existing contaminated sites and inadvertent releases of contaminants from construction activities and equipment during construction could occur. Similar to impacts during construction, operation of the proposed Project could result in short- to long-term, minor, adverse impacts resulting from the transport and use of potentially harmful chemicals and fuels needed for general equipment maintenance and operation. During operation, liquid materials and chemicals may be stored or

transported onsite for the operation and maintenance of combustion engines used for backup storm generators. Multiple camp structures, submerged oil well pipes; capsized boats; oil field facilities; well platforms; pipelines and associated debris were observed in the outfall area. Although no evidence of leaks, spills, stains, stressed vegetation, hydrocarbon sheen, or odors were observed at these sites, increased water flow and sedimentation due to operation of the proposed Project could potentially create exposure to existing contaminated sites and inadvertent releases of contaminants resulting in minor to major, short to long-term, adverse impacts over time.

Cultural Resources

The proposed Project is not expected to cause any impacts on cultural resources within the Construction Impacts Area of Potential Effect (APE). However, within the Operations Impacts APE, CEMVN has determined the Project will have an adverse effect on four historic properties eligible for the National Register of Historic Places (NRHP) and one historic property of undetermined NRHP eligibility. Therefore, CEMVN developed a draft Programmatic Agreement (PA) for the MBSD Project in consultation with the Advisory Council on Historic Preservation (ACHP), the State Historic Preservation Office (SHPO), and Federally-recognized Tribal Nations. The PA includes an alternative mitigation plan agreed to by the Applicant. The draft PA is subject to change before finalizing for the final EIS. If the permit is issued, compliance with the PA will be a condition of the permit.

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