Executive Summary

The *Deepwater Horizon* (DWH) oil spill resulted in the oiling of more than 1,100 kilometers of wetlands, nearly all of which were located in coastal Louisiana (DWH NRDA Trustees, 2016). The heaviest oiling occurred in the Barataria Basin, resulting in substantial injuries to natural resources in the basin (DWH NRDA Trustees, 2016). The impact of those injuries was intensified by the fragile nature of the basin. Already suffering from significant coastal erosion, marshes in the Barataria Basin that experienced heavy oiling subsequently experienced double or triple the rate of marsh loss. Recognizing that the resulting loss of marsh productivity affected resources throughout the northern Gulf of Mexico ecosystem, the State of Louisiana and the federal Trustees that negotiated the DWH Natural Resource Damages settlement allocated $4 billion, almost half of the total settlement amount, to restoring Louisiana's wetland, coastal, and nearshore habitats.

The DWH Natural Resource Damage Assessment Trustees began analyzing strategies for restoring these coastal losses as part of the settlement process. In the *Deepwater Horizon Oil Spill: Final Programmatic Damage Assessment and Restoration Plan and Final Programmatic Environmental Impact Statement* (Final PDARP/PEIS), the Trustees noted that, "[c]onsidering the scale of impacts from the oil spill, the Trustees also understand the importance of increasing the resiliency and sustainability of this highly productive Gulf ecosystem through restoration" (DWH NRDA Trustees, 2016, page 5-25). To address these large-scale impacts, they agreed that "[d]iversions of Mississippi River water into adjacent wetlands have a high probability of providing these types of large-scale benefits for the long-term sustainability of deltaic wetlands" (DWH NRDA Trustees, 2016, page 5-25). In deciding that sediment diversions were a wetland restoration technique worth exploring, the Trustees also identified multiple potential benefits from such projects. These benefits included helping "maintain the Louisiana coastal landscape and its ability to overcome other environmental stressors by stabilizing wetland substrates; reducing coastal wetland loss rates; increasing habitat for freshwater fish, birds, and benthic communities; and reducing storm risks, thus providing protection to nearby infrastructure" (DWH NRDA Trustees, 2016, page 5-25).

Building on the Final PDARP/PEIS, the federal and state trustees responsible for the restoration of resources in the State of Louisiana (the Louisiana Trustee Implementation Group, or LA TIG) began evaluating restoration strategies that could restore for injuries to natural resources in the Barataria Basin, which resulted in the *Strategic Restoration Plan and Environmental Assessment #3: Restoration of Wetlands, Coastal, and Nearshore Habitats in the Barataria Basin, Louisiana* (SRP/EA #3). In that document, the LA TIG ultimately determined that a combination of "marsh creation and ridge restoration plus a large-scale sediment diversion would provide the greatest level of benefits to injured Wetlands, Coastal, and Nearshore Habitats and to the large suite of injured resources that depend in their life cycle on productive and sustainable wetland habitats" (LA TIG, 2018, page 3-32) in the basin and in the broader northern Gulf of Mexico. The wetlands and marsh habitats that were significantly affected by heavy oiling throughout Barataria Basin were already under stress due to the historic loss of its deltaic connection with the Mississippi River. Implementing a restoration technique here that not only builds wetlands and marsh complexes but does so by re-establishing the deltaic processes that originally built the marsh is especially appropriate (LA TIG, 2018, pages 1-13, 2-6, 2-19, 3-7, and 3-8). Thus, re-establishing deltaic processes to Barataria Basin with a

large-scale sediment diversion would provide system-wide benefits to that ecosystem that would not be realized with any other restoration technique (LA TIG, 2018, pages 2-19 and 3-8).

Since finalizing the SRP/EA #3, the LA TIG has evaluated a variety of potential alternatives for a large-scale sediment diversion in the Barataria Basin. This Final Restoration Plan (Final RP), along with the Final Environmental Impact Statement (Final EIS) being simultaneously released, encapsulate that evaluation. This RP takes advantage of decades of analysis of sediment diversion strategies that have been undertaken by the State of Louisiana, as well as extensive modeling and scientific analysis of potential diversion alternatives. The Trustees believe that the detailed scientific review of potential benefits and impacts from the Project that are evaluated here and in the EIS present a robust statement of the science behind the Trustees' recommended path forward.

Ultimately, the Trustees' analysis has determined that, as with many environmental restoration projects, there would be ecological tradeoffs associated with any of the large-scale sediment diversion alternatives. The benefits would be significant and would primarily derive from the creation of thousands of acres of marsh that, with a steady supply of Mississippi River sediment, would be sustained over decades even in the face of rising sea levels and coastal erosion. After 50 years of operation of a diversion with a capacity of 75,000 cubic feet per second (cfs) (the Proposed MBSD Project, or Alternative 1 in this RP), over 20% of the marsh in the Barataria Basin is projected to have been created or sustained by the diversion. The Trustees believe that a sediment diversion is the only way to achieve a self-sustaining marsh ecosystem in the Barataria Basin.

This sustained marsh is expected to benefit many fish and wildlife species in the basin, including red drum, largemouth bass, blue crab, white shrimp, Gulf menhaden, and migratory waterfowl. These benefits to fish and wildlife species would translate to benefits to recreational users who watch, fish, or hunt those species. In addition, these benefits would not only accrue in the Barataria Basin but, through the transport of marsh productivity, also in the offshore ecosystems of the northern Gulf of Mexico. Figure ES-1 provides a conceptual representation of these benefits, highlighting how key ecological dynamics in the Proposed MBSD Project area would improve, particularly when compared to a future without this project.

The Trustees recognize that any of the large-scale sediment diversion alternatives considered would also result in collateral injuries to some natural resources. Reconnecting the river to the basin to restore an estuary that has been degrading and becoming more saline for almost a century would produce significant changes to current conditions in the Barataria Basin, which will negatively affect some of the species that currently reside in the basin. The primary driver of this change would be a reduction in salinity; any of the large-scale sediment diversion alternatives considered would result in a substantial reduction in salinity in portions of the basin. That reduction in salinity would negatively impact fish and wildlife species that rely on higher saline waters and have moved further into the estuary as salinities have increased due to the severed connection between the river and the basin. Key species that would be adversely affected include dolphins, brown shrimp, and oysters.

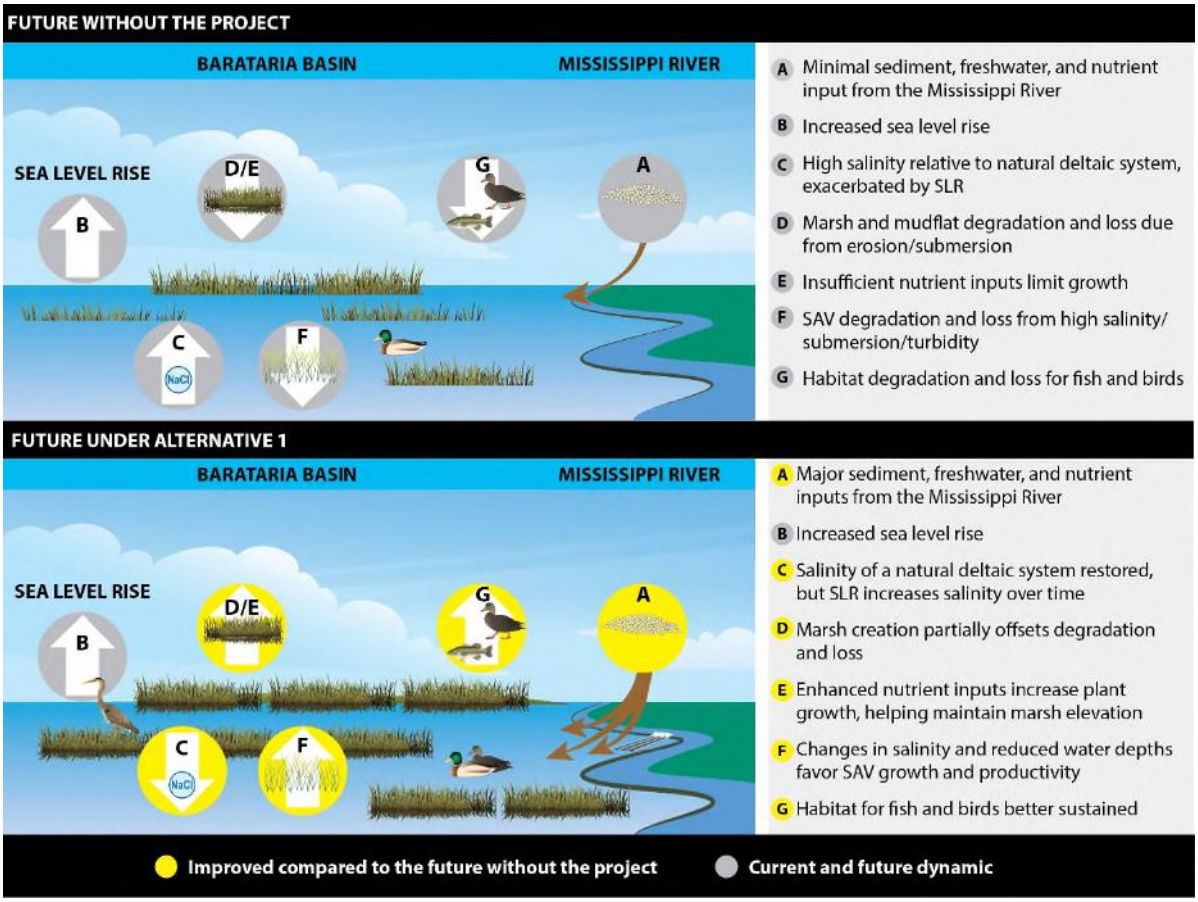

Figure ES-1. Conceptual Representation of the Benefits of the Proposed MBSD Project. Under future conditions, a lack of connectivity to the Mississippi River, in combination with sea level rise, leads to the degradation and loss of wetland habitat and submerged aquatic vegetation. Alternative 1 delivers sediment, freshwater, and nutrients to the basin, helping restore and sustain mudflats, aquatic vegetation, and wetlands, which benefits fish and bird species that rely on these habitats. Some symbols adapted and used in this figure are through the courtesy of the Integration and Application Network (https://ian.umces.edu/symbols/).

The large-scale sediment diversion alternatives considered would also affect storm hazards and tidal flooding in the vicinity of the diversion. The diversion would restore and expand marshes and thereby reduce storm surge and flooding in the communities north of the diversion. At the same time, flows through the diversion and the additional marsh created or sustained by the diversion are expected to somewhat accelerate tidal flooding in communities south of the diversion that remain outside of levee protection (from Myrtle Grove south to Grand Bayou). During the first several decades of operation of the diversion, these communities could experience increases in the intensity and duration of flooding impacts; however, within 50 years, sea level rise and subsidence would overtake the effects of the diversion and return as the primary forces driving flooding in these communities. Also, the additional marsh created or sustained by the diversion is expected to somewhat increase storm surge in communities south of the diversion. As part of evaluating the public health and safety impacts of the Project, the LA TIG considered impacts to communities with Environmental Justice concerns, including Ironton, the community closest to the diversion structure.

The different large-scale diversion alternatives evaluated in this Final RP result in different levels of impacts and benefits. After considering these impacts and benefits, the Trustees have selected as their preferred alternative a diversion with a maximum capacity of 75,000 cfs (with the actual flow through the diversion dependent on the flow of the Mississippi River). The Trustees fully evaluated a smaller-capacity diversion with a maximum capacity of 50,000 cfs and found that such a diversion would provide substantially less benefit in marsh preservation and restoration and correspondingly less associated benefits to nearshore marine ecosystems, water column resources (including fish and shellfish), birds and terrestrial wildlife, recreational use, and offshore ecosystems. Not only would the smaller 50,000 cfs diversion achieve substantially fewer benefits to the overall coastal ecosystem, it would do so with only a small reduction in collateral injury, impacts on public health and safety, and cost, making it overall a less desirable alternative to the LA TIG. The LA TIG also fully evaluated a larger-capacity diversion with a maximum capacity of 150,000 cfs. While the marsh creation benefits of such a large diversion would be significantly greater than the 75,000 cfs alternative, the projected collateral injuries and impacts to public health and safety would also increase to levels unacceptable to the Trustees. The Trustees also considered three additional alternatives that consisted of diversions with capacities of 75,000 cfs, 50,000 cfs, and 150,000 cfs with marsh terraces in the outfall area to potentially enhance wetland creation. However, marsh terraces are anticipated to provide little additional benefit to injured resources and would result in increased costs, and thus none of these alternatives was preferred by Trustees.

This Final RP incorporates revisions to both the Monitoring and Adaptive Management Plan and the Mitigation and Stewardship Plan, reflecting the Trustees' consideration of public comments received on the Draft Phase II Restoration Plan #3.2: Mid-Barataria Sediment Diversion (Draft RP). The Trustees are committed to these plans as key components of an MBSD Project. These plans include proactive strategies to engage and work with the communities, individuals, and stakeholders that rely on and value the resources that would be impacted.

References

DWH NRDA Trustees. 2016. *Deepwater Horizon* Oil Spill: Final Programmatic Damage Assessment and Restoration Plan and Final Programmatic Environmental Impact Statement. Available: http://www.gulfspillrestoration.noaa.gov/restoration-planning/gulf-plan. Accessed September 29, 2020.

LA TIG. 2018. Strategic Restoration Plan and Environmental Assessment #3: Restoration of Wetlands, Coastal, and Nearshore Habitats in the Barataria Basin, Louisiana. Available: https://www.gulfspillrestoration.noaa.gov/sites/default/files/2018_03_LA_TIG_Final_SRP_EA_508-Compliant.pdf. Accessed September 28, 2020.