RFF REPORT

Speeding the Pace: Decisionmaking for Diversion Project Implementation in Louisiana

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Executive Summary

To protect and restore coastal wetlands and ecosystems, the State of Louisiana has proposed construction of Mississippi River diversion projects. At certain river flows the projects would be operated to redirect some of the sediment-laden water out of the Mississippi channel into areas that are now open water. As the sediments settle they create conditions favorable to the creation of new wetlands and the protection of existing wetlands. Diversions are projected to increase—or at least slow the loss of—wetland acreage on the Louisiana coast.

Analysis of diversion engineering and operations, costs, land building potential, and broader economic and ecosystem effects has been underway for more than a decade. While diversions have critics, Louisiana state agencies, in particular the Coastal Protection and Restoration Authority, and many environmental NGOs are strong advocates for these projects. That support, combined with significant funding available from the *Deepwater Horizon* litigation settlement, have moved two specific diversion projects—known as Mid-Breton (MBRE) and Mid-Barataria Sediment Diversion (MBSD)—closer to implementation.

However, to be implemented—constructed and operated—diversions must secure local, state, and federal approvals and withstand possible legal challenges brought by opponents. Reviews and approval are required because diversions will alter environmental and social conditions across a large geographic area. This report details the approval process, highlights issues that might slow decisions, and suggests ways to accelerate the pace of decisionmaking.

We provide a brief institutional history of diversion reviews and then describe alternative paths forward as of September 2016. A key procedural distinction is between federal projects that receive congressional approval for Corps of Engineers funding and non-federal projects that, although they do not received federal appropriations, nevertheless require permits and permissions for the Corps of Engineers to allow construction. The review and approval process under both paths is detailed.

Diversion decisions will rely on inherently uncertain model predictions. Uncertainties relate to the future conditions without the projects (baseline assumptions), the amount and location of created wetland, impacts on commercially and recreationally valuable species, impacts on protected species, and effects on the local economy.

We discuss the opportunity and challenges for making adaptive management a strategy for moving forward in the presence of unavoidable uncertainty. We also describe key trade-offs and conflicts arising from the social and ecological effects of diversions and how they might be resolved.

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1. Introduction

To protect and restore coastal wetlands and ecosystems, the state of Louisiana has proposed constructing Mississippi River diversions. These large projects would divert water from the Mississippi channel in order to deposit river sediment where there is now open water. Diversions are projected to increase, or at least slow the loss of, wetland acreage along the Louisiana coast.

Increasingly rigorous analyses of diversion engineering, operations, costs, land-building results, and broader economic and ecosystem effects have been underway for more than a decade. Although diversions have critics, Louisiana state agencies, in particular the Coastal Protection and Restoration Authority, and many environmental NGOs are strong advocates for these projects. That support, combined with significant funding available from the *Deepwater Horizon* litigation settlement, have moved two specific proposals—the Mid-Breton (MBRE) and Mid-Barataria sediment diversion (MBSD)—closer to implementation.

However, any diversion project must first secure local, state, and federal approvals and withstand possible legal challenges brought by opponents. These reviews are required because diversions are expected to alter existing and future environmental and social conditions across a large geographic area.

This report details the approval process, highlights issues that might slow decisions, and offers the authors' reflections on ways to accelerate the pace of decisionmaking. We review federal- and state-led project delivery processes and identify laws, regulations, and processes that might slow the pace of decisionmaking leading to restoration project implementation in Louisiana. As a caution, the report is not written for the interested general reader. Rather, it is geared toward audiences with background knowledge of federal and state planning and analysis and regulatory approval (review and decision) processes and the two diversion projects.

To prepare this report, we conducted interviews with more than 40 individuals from federal and state agencies, NGOs, and the private sector. Persons interviewed were assured that there would be no direct attribution of their comments. The interviews were supplemented by our own documentary research (published reports, memoranda, peer-reviewed literature) and by attending or reviewing public presentations made by the Louisiana Coastal Protection and Restoration Authority (CPRA) and US Army Corps of Engineers (Corps) staff.

The resulting report is organized into four sections.

1. To provide the background for the project-specific discussion of MBSD and MBRE, the first section presents the administrative context for decisionmaking. At present, MBRE is moving forward as a federal project and MBSD as a nonfederal project. A *federal project* receives congressional authorization for Corps funding to complete construction with, in this case, the state of Louisiana as a cost-share partner. In addition to construction costs, the planning and design costs for a federal project are also cost-shared. A *nonfederal project* receives no federal appropriations through the Corps budget for its planning, design, or construction. As a nonfederal project, MBSD will need to obtain permits and permissions for the Corps to allow its construction to move forward.
2. The second section describes decisions affecting the two diversion projects beginning in 2007, leading up to September 2016, when this report was completed.
3. The third section is specific to the path ahead for MBRE implementation as a

federal project and MBSD as a nonfederal project.

4. In the final section we describe actions that can expedite MBRE and MBSD project planning, design, review, and final decisionmaking. Because project implementation will require funding, we also comment on funding for implementation, assuming that all necessary approvals for project implementation are secured.

The reader of this report should take note of three important caveats.

First, this report describes the situation as of September 2016. Since the first draft of this report was completed, the decision landscape has continued to change, and we recognize that it will change in the future because of external forces (e.g., changes in federal administration) and purposeful action by stakeholders (e.g., the adoption of the 2017 Louisiana coastal master plan). Between September 2016 and the time of this draft, the federal executive branch and congressional leadership changed, the Louisiana Trustee Implementation Group (TIG) was being formed, the 2017 Louisiana draft coastal master plan was published, MBSD was placed on the Federal Permitting Dashboard in the last days of the Obama administration, and a contractor was selected to complete the required environmental impact statement (EIS) for MBSD.

Second, this report is not written from the perspective of either advocates or opponents of diversion projects. Also, it does not assume that diversions ultimately will or will not be built. Rather, the report describes points in the decision process that may cause delays in diversion project decisionmaking for either a federal project (MBRE) or a nonfederal project (MBSD).

Third, we assume that the readers of this report have extensive background knowledge about the projects and their history and have a working understanding of the pertinent laws, regulations, and funding alternatives. Specifically, discussions of Section 408 permissions, federal budget justification criteria, National Environmental Policy Act (NEPA) EIS, and Section 404/10 permitting is limited to only those points that bear directly on the authors' reflections. The text is not a primer on Section 408 permission, federal project budget justification, the NEPA-EIS process, or Section 404/10 permitting.

2. Context for Diversion Decisionmaking

2.1. Conflicting Visions

At the risk of oversimplifying, we have identified the premises that motivate both diversion advocates and skeptics or opponents. Permission and permitting processes are designed to illuminate and ultimately resolve conflicts arising from a project proposal. The conflicting visions described below depict the broad outlines of those conflicts.

Proponents make four assertions:[1]

1. The state and nation face a slow-motion land loss disaster that is accelerating because of sea-level rise,[2]

[1] The direct quotes in 1, 3, and 4 are from http://www.mvn.usace.army.mil/Portals/56/docs/PD/PeerReview/ApprovedLCADeltaManagment.pdf. However, there are reasons to believe that these sentiments were insisted upon by the state as cost-share sponsor but were not wholly embraced by the Corps.

[2] http://thelensnola.org/2015/09/15/coastal-planners-talk-now-about-drastic-changes-or-deal-with-crisis-later/

and "There will be a total collapse of coastal ecosystems and habitats over time if we do nothing." The implication is that this is an emergency demanding national attention and calling for "moonshot" thinking.[3]

2. The geologic record of delta formation and loss provides compelling evidence that diversions will "work" to build and then maintain land over time, and that (nondiversion) marsh creation projects are an option only if diversions are deemed infeasible.[4]
3. "There will be changes to the ecosystems and habitats over time if no action is taken. Maintaining the status quo is not possible (or even always desirable)." The implication is that current environmental conditions are not the correct baseline for considering diversions' social and ecological effects.
4. Any diversion project "…will operate under high levels of ecological and engineering uncertainty." The implication is that enough study has been completed, and in consideration of premise 1, it is time to implement diversions and then trust in adaptive management (AM) to fine-tune each project.

Diversion skeptics and opponents begin with three different premises:

1. The river and the coastal system are so highly altered that diversions may build far less land than hoped for. A corollary to this premise is that alternative land-building actions—generally referred to as "marsh creation" (e.g., "dredge, pump, and deposit")—may be a better use of funds.
2. 2. Significant reduction in ecological and engineering uncertainty can be secured with additional study and modeling (and a corresponding delay in implementation), with adaptive management experiments on smaller pilot projects, or with more analysis of restoration projects complementary to diversions (e.g., constructed ridges, polders) that could accelerate land building or minimize harm to habitats and species.
3. 3. The physical and biological changes in areas adjacent to diversions will be significant and have immediate adverse effects on current populations of fish and marine mammals—and in turn, on the communities that rely on these resources. The implication, as a potential matter of both law and fairness, is that such effects should be avoided, minimized, and mitigated.

Given that these broad fundamental differences exist, the decision process going forward is likely to reflect and will need to resolve the conflicting visions.

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http://www.washingtonpost.com/sf/national/2015/08/21/the-next-big-one/?tid=HP_more.

[3] "A moonshot, in a technology context, is an ambitious, exploratory and ground-breaking project undertaken without any expectation of near-term profitability or benefit and also, perhaps, without a full investigation of potential risks and benefits." http://whatis.techtarget.com/definition/moonshot.

[4] This perspective is reflected, as just one example, in the statement on page 16 of http://www.mississippiriverdelta.org/files/2014/12/Restoring-the-Mississippi-River-Delta-for-People-and-Wildlife.pdf. Several technical reviews of this statement made at the request of the authors elicited critical comments on the technical validity of the marsh creation text.

2.2. All Paths to Implementation Go through the Corps

As of September 2016, the MBRE diversion would be constructed as a *federal project*, and MBSD is a *nonfederal project*, even though planning for MBSD began as if it would be a federal project.

Whether a diversion is a federal or nonfederal project, the paths to implementation pass through the Corps, where the interaction of planning rules and practices, permitting and permissions, and funding flows affect the pace of implementation. However, Corps budget justification for a federal project and Corps reviews of applications for regulatory permits and permissions for a nonfederal project are grounded in different authorities and are led by different staff.

These institutional differences can affect the way the Corps approaches the permit and permission issue. The federal project path has an inherent (pro) bias, in the sense that the Corps planning office will seek a preferred alternative it can justify as a federal project and, once justified, becomes an *advocate* for that alternative. In contrast, a nonfederal path applicant files a request for a permit to construct the applicant's preferred alternative with the Corps regulatory office. This leads to a different dynamic because that office is expected to *judge* whether the preferred alternative is in the public interest. In determining whether the applicant's preferred alternative is in the public interest, the Corps will use different criteria than for projects it advocates.

2.3. Justification as a Federal Project: The Feasibility Report

The Corps needs to demonstrate in a series of reports that any project is in what the Corps calls the "federal interest." Only then will the administration support authorization and construction funding through the Corps budget. The Corps follows a 21-step process to get to construction and in that process must conduct certain prescribed analyses to show that the project is in the federal interest. Specifically, analyses of MBRE (and MBSD, when it was being considered as a federal project) applied National Ecosystem Restoration (NER) analytical protocols, used for justifying projects that are part of the Corps' aquatic ecosystem restoration (AER) mission area.

NER analyses support a cost-effectiveness decision criterion and not a benefit-cost criterion. The outcomes (benefits) of an AER project are expressed as habitat units created. In the case of the diversions, the habitat units are defined as predicted acres of created wetland, weighted by their contribution to increases in specific fish and wildlife habitats. Created habitat units must support fish and wildlife resources of "national significance." Then, the alternative recommended in a feasibility report has to be the most cost-effective, measured in dollars of cost per habitat unit created. If the project is to receive administration support, the cost-effectiveness of diversion habitat units could be compared with that of "nationally significant" AER projects in other parts of the nation when the Corps budget is allocated. In addition, any alternative recommended for budgeting must have a commitment from a nonfederal entity to pay 35 percent of the total project construction cost and all long-term operations and maintenance (O&M) costs.

Any proposed alternative has to comply with all applicable laws and derivative regulations. A "Chief's Report" includes both an EIS and a feasibility report. Together they make the case for budgeting as a federal project. The EIS, required by NEPA, provides the structure for recordkeeping that is used to report the analysis that will be used to confirm compliance with relevant laws and regulations. The feasibility report issued in 2010 for MBRE included this EIS. No equivalent report or EIS has been issued for MBSD, as noted below.

2.4. The Scope for the EIS

One Corps document states: "There are literally over a hundred other environmental laws that we have to comply with during feasibility studies."[5] This same potential scope of environmental considerations applies if the alternative is being proposed as a nonfederal project seeking a 404/10 permit (as discussed in the next section). However, what the Corps determines is within the project area (scope) of the EIS differs between the Corps planning process and its regulatory offices, which have differing authorities and applicable regulations. This means that the shift of MBSD from a federal to a nonfederal project may affect the matters reviewed and how they are considered in decisionmaking.

The first step in preparing an EIS is to develop a scope of work that identifies the laws most relevant to the decision at hand and, for a given analytical budget, the extent of the analysis expected to be conducted as part of the EIS. The required "adequacy" of the analysis increases as the "significance" of a project's "adverse" "impacts" on the concerns reflected in a specific law increase. For an adequate EIS to be prepared, such that a 408 Permission can be granted and a 404/10 permit issued, the project needs to be near a final design and operations plan.[6]

For diversions, EIS analyses will most likely need to have an adequate analysis of their effects on marine mammals under the Marine Mammal Protection Act (MMPA), threatened and endangered (T&E) species under the Endangered Species Act (ESA), and essential fish habitat under the Magnuson-Stevens Act.

Another suite of laws receiving attention in EIS analyses in recent years relates to historic and cultural protection and preservation. These laws have often elevated tribal nations' concerns in EIS preparation.[7] More generally, attention to how the project affects an area's cultural heritage (local communities) must be a consideration in an EIS analysis.

2.5. 404/10 Decision Criteria for a Nonfederal Project

Regarding 404/10, the implementing regulations and case law (not the organic law itself) establish criteria for evaluating and then issuing or denying a Section 404 permit to place fill material in waters of the United States. Specifically, the 404(b)(1) guidelines require that the alternative proposed is the "least environmentally damaging practicable alternative" (LEDPA). The LEDPA is identified by EIS and other analyses conducted during the permit evaluation.

The LEDPA analysis requires evidence that a comprehensive range of practicable alternatives was evaluated with an eye toward any environmental damage caused. The "over 100 laws" noted earlier are all possible ways that environmental damage may be defined. However, the 404(b)(1) guidelines, and more particularly the LEDPA analysis itself, focus on the aquatic ecosystem as defined at 40 CFR 230.3(c). The basis for considering and measuring the extent of environmental damage to the aquatic ecosystem for almost all permits associated with any proposal is the current environmental condition. The permitted project must first avoid and then

[5] http://planning.usace.army.mil/toolbox/process/chart-regs.pdf. NOAA lists fewer laws and regulations. http://www.habitat.noaa.gov/restoration/techniques/regulationspermits.html.

[6] Those interviewed suggested that design had to be at the 90 percent level of completion, although it is not clear how the percentage of completion is measured.

[7] . http://www.knowla.org/entry/752/

minimize damage against that aquatic resource baseline while still meeting purpose and need. If any alternative, including the LEPDA, still causes environmental damage that cannot be avoided or minimized, then compensatory mitigation is required to offset the harms to the aquatic ecosystem and approximate returning the aquatic environment to its current (pre-project) condition.[8]

2.6. 408 Review and Permission

Both diversions will alter the design of existing Corps-built projects (e.g., the Mississippi levee system) and have the potential to affect the benefits realized from other projects that were built in whole or in part with Corps funds. Therefore, the Corps planning office must, under the Rivers and Harbors Act of 1899, Section 408, review the proposed alternative to ensure that implementation of the proposed project will be "consistent with (Corps-funded) authorized project purposes." This can be interpreted to mean that the proposed alternative will not adversely affect existing projects' ability to meet their authorized purposes. Specifically, any construction for the diversions cannot reduce the structural integrity of a levee, any shoaling that reduces current or future navigation capacity must be removed by dredging (a cost that may be assigned to the diversion project), and adverse effects on other projects must be considered and perhaps avoided (e.g., sediment starvation of a downstream Coastal Wetlands Protection and Restoration Act (CWPRA) project if river sediment is diverted upstream of that project).[9]

If the alternative is a federal project, then assurance of Section 408 compliance is embedded in the plan formulation and justification process. If the alternative is a nonfederal project, then the Corps will grant Section 408 permission (not a permit) for the nonfederal project to proceed.

2.7. The Record of Decision

The 404/10 regulatory review is administered by the Corps. The Environmental Protection Agency (EPA) has oversight responsibility for how the 404 portion of the Corps' regulatory program is implemented and cannot issue permits itself (as it can under other sections of the Clean Water Act, CWA). For a project that requires an EIS to move forward, a record of decision (ROD) must be issued by the Corps' District Engineer, defining the allowed project and specifying any bounds or constraints on operations.[10] The ROD also describes the rationale for issuing (or denying) the permit.

If the ROD is for a federal project, such as MBRE, then the Corps will affirm that the federal planning process and the proposed federal project have fully recognized and

[8] The possibility for compensatory mitigation cannot be a consideration in defining the LEDPA. However, trade-offs in types and amounts of resource functions are allowable when a compensatory mitigation plan is proposed and approved.

[9] The 408 permission process is supposed to consider system-wide effects on Corps-built infrastructure. However, the Corps has the authority to decide when trade-offs are acceptable. It may decide that diverting sediment to one place while starving a project in another area is acceptable. It may decide that navigation channel shoaling can be mitigated with additional channel dredging.

[10] The ROD may require the applicant to report on operations (perhaps annually) to show compliance of operations with terms of the permit or authorization.

considered the environmental impacts and have complied with all applicable laws and regulations. In effect, the ROD affirms that the project recommended for budgeting (formulated and then evaluated by the Corps planning office) is the LEDPA.[11] If the ROD permits a nonfederal project, such as MBSD, the Corps *regulatory office* must explain the basis for the permit decision, describe any conditions that constrain project construction activities or operations, and specify any compensatory mitigation requirements.

The Corps typically has some discretion in identifying and certifying the LEDPA. For example, many aspects of the LEDPA determination require judgments, especially if there are trade-offs among aquatic resource damage and improvements. Although planning guidelines note that there are "over 100 laws" to "consider" when making decisions, the LEDPA requirement of the 404(b)(1) guidelines is to address just those guidelines—not all 100 laws. However, other laws may be cited in comments and may be used to challenge a decision if the permit is for an alternative adversely affects a specific resource (e.g., one that leads to substantial "take" of species under the MMPA or ESA).

As an example of how the Corps' discretion might play out, consider a recent letter to the Corps from NOAA stating, "The challenge is to find a restoration strategy that minimizes adverse impacts to fisheries but also maximizes land building and wetland health." This language suggests that some trade-offs may be acceptable to resource agencies in defining the LEDPA.

3. The Path to September 2016

The 2007 Water Resources Development Act (WRDA) provided congressional and Bush administration support for federal projects that included "diversion projects at Whites Ditch and Myrtle Grove; now generally known (and referred to by us) as Mid Breton (MBRE) and Mid Barataria (MBSD), respectively.[12] However, executive branch support and authorization was contingent on whether additional studies affirmed the national interest (i.e., the Corps' budgetary interest) in these projects. This legislation also defined the maximum authorized cost for the projects.[13]

The planning effort for federal diversion projects transitioned to the cost-shared Louisiana Coastal Area Mississippi River Hydrodynamic and Delta Management (LCA MRHDM) restoration study[14] on March 23, 2012. Several excerpts from a fact sheet[15] are worth noting:

- The planning objective was single-purpose "ecosystem restoration" (in Corps terminology).
- The analysis was to provide a decisionmaking framework (e.g., models) and criteria for making decisions about managing sediment and water for restoration.
- The decision document was to be an integrated feasibility report–EIS that would document NEPA compliance.

[11] Recall, however, that the Corps planning office uses "differing methods/processes" to satisfy this requirement than does the regulatory office. This has been a longstanding point of disagreement within the Corps if a federal project at some point needs a permit.

[12] This high-level description of key events begins with WRDA, understanding that there were several significant events leading up to that 2007 act.

[13] https://www.gpo.gov/fdsys/pkg/PLAW-110publ114/pdf/PLAW-110publ114.pdf

[14] *Federal Register* 77, no. 57, 17037.

[15] http://www.mvn.usace.army.mil/Portals/56/docs/environmental/LCA/MRHDMFactSheetMarch2013PAO.pdf.

- The Chief of Engineers would approve the report, leading to any necessary congressional authorization for implementation as a federal project.

3.1. Mid-Breton

A Chief's report (integrated feasibility and EIS) was completed for MBRE in 2010. The report cautioned,

"The recommendations contained herein reflect the information available at this time … They do not reflect program and budgeting priorities inherent in the formulation of a national civil works construction program, nor the perspective of higher levels of review within the Executive Branch. Consequently, the recommendations may be modified before they are transmitted to the Congress as proposals for authorization and/or implementation funding."

Also, the project's cost exceeded the cost allowed in WRDA 2007. Therefore the proposed MBRE project—as envisioned in 2010—was to be submitted by the administration for a new authorization. The Chief's report continued,

"The fully funded cost for the project is $387,620,000 … The project is funded 65% by the Federal Government and 35% by the non-Federal sponsor … The operations and maintenance of this project may be assumed by the State of Louisiana as the non-Federal sponsor."

Nonetheless, even without a new authorization, the Corps and the local sponsor continued to do additional engineering and design[16] for MBRE.[17] That project engineering and design (PED) work was completed in 2014. Because the PED work focused on final design, the text below from the 2010 Chief's report remains relevant because it indicates something about the Corps' sense of analytical needs and objectives going forward, even under a revised authorization request.

"Fishery modeling and habitat change modeling will be performed during the PED phase. The cost and schedule for this will be incorporated into the PMP being developed by the USACE for the PED Phase.

The intent of these models is to support adaptive management of this project.

The project is also subject to an EIS and Section 408 Permit, as well as Section 10 and Section 404 permits."

In effect, the last requirement appears to be saying the Corps needs to affirm that as a federal project, MBRE (1) would pass a Section 404 review[18] and be permitted *as if* it were a nonfederal project, and (2) that 408

[16] Typically, once a project is authorized, the next step is to wait for the administration to propose appropriations for further planning, engineering, and design (PED) and a design agreement with the local sponsor that agrees to cost-share responsibilities. However, for MBRE there was a move to PED (Steps 15 and 16 jumping ahead of Steps 13 and 14; see Figure 1), since the project in concept was already authorized in WRDA 2007.

[17] "The Preconstruction Engineering and Design (PED) Project Management Plan was approved by CPRA in August 2011, which outlines additional modeling and evaluation activities to determine the best location for the diversion structure on the Mississippi River. Once a final location is selected (expected in August 2013), additional PED activities such as detailed plans and specifications can begin." http://www.mvn.usace.army.mil/Portals/56/docs/environmental/LCA/Near-Term%20Projects/MDWDFactSheetJuly2013PAO.pdf.

[18] The 404 permit also addresses requirements of the Rivers and Harbors Act of 1899 Sec. 10 and is often referred to as 404/10 permitting.

permission would be given *as if* it were a nonfederal project.

As of September 2016, no new EIS analyses for MBRE had been initiated. The Corps website describes work specific to MBRE as "suspended." Additional discussion of MBRE as a federal project is included later in this report.

3.2. Mid-Barataria

Since 2007 the same federal-state project planning processes that led to a Chief's report for MBRE were also being conducted for MBSD. In fact, until summer 2016, MBSD was on track to be implemented as a federal project. The expectation was that in May 2016 the Corps and state would propose a tentatively selected plan (TSP). With a TSP, the planning partners could receive public and agency comment, agree to further analyses, and prepare the Chief's report (integrated feasibility and EIS) for authorization of MBSD as a federal project.

In December 2015 the CPRA board had already instructed staff to advance to engineering and design for the MBSD project after securing funds provided under the RESTORE Act.[19] That instruction in effect jumped past several steps in the Corps' federal project implementation process, signaling the willingness of the state to design and then implement MBSD as a nonfederal project.

As of summer 2016, the state had moved forward outside the federal project planning process when it filed an application for a Section 404/10 permit and for Section 408 permission. Previously, the state and Corps had signed an MOU agreeing to transfer funds to the Corps to expedite the review processes for MBSD as a nonfederal project to be located on the west bank of the Mississippi River at river mile 61 above Head of Passes.

The status of the project design and cost estimate at the time of the permit application was described by CPRA. "The CPRA has received a Basis of Design Report along with other supporting documentation for a 30% level design for the project elements listed above." Recall that for an adequate EIS to be prepared, for a 408 permission to be granted, and for a 404/10 permit to be issued, the design needs to be near final. Thus, a wide range of analyses (e.g., relating to land-building effectiveness and environmental effects) will be required and produced as the project moves toward this near final design.

The state's decision to proceed with MBSD as a nonfederal project has at least two possible explanations. First, the significant state- and Corps-led analysis and public engagement that took place between 2010 and 2016 raised questions (for some) about diversions' costs, effectiveness, environmental effects, and effects on local communities. For example, expert panels (e.g., the state's own Panel on Diversion Planning and Implementation) and federal agencies (e.g., NOAA) identified knowledge gaps and model discrepancies that they viewed as pertinent to project analysis and review. There is also clear evidence of at least some public opposition to diversions. These gaps, uncertainties, and disputes implied (to some) a natural and (to others) a frustrating "slowing down" of the federal plan development process as the Corps attended to likely technical and regulatory disputes (as required by law, executive guidelines, and regulation). In response, the state has chosen the nonfederal project pathway as a way—it hopes—to move forward more quickly.

[19] Formally, the Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States Act.

Second, the *Deepwater Horizon* spill and subsequent damage awards may have motivated the decision to proceed as a nonfederal project because they reduced the need for federal funding. The *Deepwater Horizon* settlement has been cited by the state as a source of sufficient funds even if no federal project funding (through the Corps budget) is available.

The situation as of September 2016 is that MBRE continues as a possible federal project and MBSD as a nonfederal project. Note that MBSD must now obtain a Section 404/10 permit and Section 408 permission from the same Corps district that had previously been a study cost-share partner. In addition, the LCA MRHDM still exists as a cost-shared study, and the work completed under that study remains, including rationales and model results that supported the Chief's MBRE report and the (not issued) MBSD TSP. If the cost-shared study is suspended, the Corps may choose to publish the results as a project completion report. Also, it is not yet clear whether the LCA MRHDM analyses will be used in the 408 and 404/10 reviews. What is clear is that the MRHDM work may be requested or made available through discovery and relied upon as part of any future legal challenges to a ROD approving MBRE or MBSD. Any discrepancies between the Corps' LCA MRHDM analyses and those conducted by others as part of the EIS analysis are a likely point of challenge by diversion opponents.

4. The Path Forward: MBRE as a Federal Project

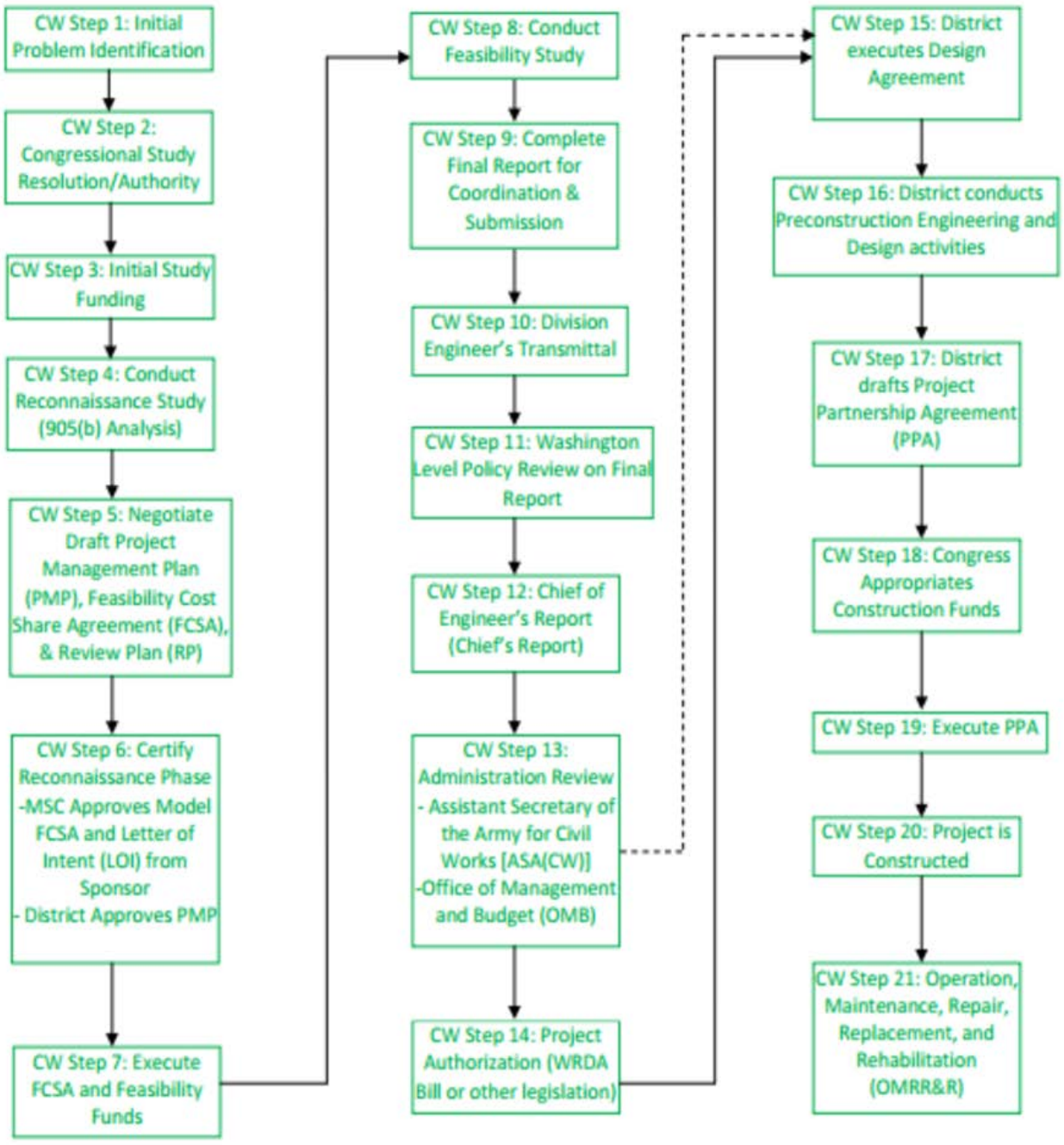
This section tracks the steps that would be followed if MBRE were implemented as a federal project,[20] with the Corps as project advocate, beginning from the current state of the planning process as defined in the 21 steps (Figure 1). As described above, a Chief's report (Step 12) was sent in 2010. Additional PED work (Steps 15 and 16), skipping Steps 13 and 14, was completed by 2014, but more PED work remains. In effect, by September 2016 the process was at Step 13.

It appears that the Chief's report does not yet have review or approval from the Assistant Secretary of the Army for Civil Works (ASA/CW) Office of Management and Budget (OMB) for the renewed or revised authorization. However, the current design is not the same as proposed in the Chief's report, so the authorization language may need to reflect the design changes made between 2010 and 2013.

It is also not clear what would be necessary to secure administration support for a renewed or revised authorization so that funding for cost-shared PED (Step 16), beyond what has been completed, could begin.

[20] CPRA can still choose to submit MBRE as a nonfederal project for 404/10 permitting and 408 permission, mimicking the MBSD application.

FIGURE 1. US ARMY CORPS OF ENGINEERS' FEDERAL PROJECT IMPLEMENTATION PROCESS



Notes: The figure is the most recently published version of this highly structured Corps process, which includes a variety of review and coordination requirements, although the process has been modified, especially for the first 11 steps. Steps 1–12 have been altered by SMART planning; http://planning.usace.army.mil/toolbox/smart.cfm?Section=1&Part=2b.

Step 13. Administration Review

First, consider Step 13. MBRE was a project formulated under the Aquatic Ecosystem Restoration mission and evaluated for justification using National Ecosystem Restoration criteria. Therefore, we can assume that MBRE would be reviewed according to typical administration criteria:

- Are the acres and habitat units created per dollar spent are reasonable?
- Are the habitats created of national significance?
- Is there a partner willing and able to cost-share PED and future implementation, including the postconstruction O&M costs?
- Is the proposed project compliant with all applicable laws and derivative regulations?
- Other issues may be raised as well:
- What is the longevity of the project, given sea-level rise, storms, subsidence, and oil and gas industry activity?
- What is the specific adaptive management plan, given model prediction uncertainty and how will it be funded?

Step 15. PED Funding

Turning to Congress (Step 15), MBRE does not appear to be in the draft of either Senate or House versions of WRDA 2016. Therefore, a WRDA in a future legislative session may be the next opportunity for a traditional approach to congressional authorization. However, the project in some form has already been authorized, so it is not a traditional project, and there are other paths to renewed or revised authorization. MBRE could gain authorization with language inserted in an Energy and Water Appropriations bill, as well as gain funds for PED, but congressional prohibitions on earmarks would require that MBRE be included in the president's budget request. This raises the question of how MBRE would compete for limited funds in the face of congressional budget caps and the ability of the Louisiana delegation to secure funding.[21]

Step 16. Conduct PED

This step would build upon the PED work that followed the Chief's report, if there was a new authorization. The pace depends on flow of federal funds and Louisiana's willingness to cost-share, although the state can pay in advance or offer in-kind services and later seek reimbursement. The completion of PED work would allow for a final EIS and ROD. Legal challenges would need to wait for the final ROD.

The focus of future PED work would be the topics identified as needing further study in the 2010 report (described above). So further PED efforts will need to

- complete an EIS analysis sufficient to support the Corps planner's affirmation of compliance with all relevant laws and regulations[22];
- complete analysis necessary to affirm compliance with 408;
- establish an operations plan and AM strategy; and

[21] MBRE might avoid the need for a renewed or revised authorization for changes if the Corps uses the Chief's discretionary authority. This is unlikely, however, given the current hiatus in cooperation between the Corps and the state over LCA MRHDM study.

[22] For an example of a 404(b)(1) compliance for a controversial project, see http://www.sac.usace.army.mil/Portals/43/docs/civilworks/post45/finalreport/9_Appendix%20M1%20-%20Section%20404b1.pdf; or, more generally, http://www.sac.usace.army.mil/Missions/CivilWorks/CharlestonHarborPost45.aspx.

- prepare final cost estimation, including mitigation costs, for unavoidable harms, to the extent practicable.

Step 17. Draft Project Partnership Agreement Review and Approval

In this step a project partnership agreement (PPA) is drafted and executed with the cost-share partner, demonstrating the commitment to cost-share as required by law (35 percent for MBRE) in project construction and to accept future O&M responsibilities. The PPA may include agreements for advanced funding, in which the state pays its cost-share as well as the federal share so that project construction is fully funded. The state then seeks reimbursement for the federal share that it paid. However, there is no assurance that the federal share would be reimbursed.

In effect, advanced funding allows the cost-share partner to "buy its way" through the rest of the steps toward completion of the project if (1) the partner has available funds for construction and (2) is willing to risk not being reimbursed. If settlement funds are used to pay for the federal share, then condition (1) is met and condition (b) may be less of a concern to the state.

Step 18. Congress Appropriates Construction Funds

The Congress has imposed a no earmarks policy. Therefore, securing at least some modest funding through the Corps budget requires administration support for a new start and Congressional appropriation of initial funding.

Step 19. Execute PPA for Construction

With initial federal funds committed, the PPA needs to be formally executed. Even if the flow of future federal funds is slow and intermittent, settlement funds might be used as advanced funding to move the federal project to construction.[23]

Step 20. Project Construction

Construction, including any required compensatory mitigation, begins.

Step 21. Operation, Maintenance, Repair, Replacement, and Rehabilitation

The project is deemed complete (under the PPA) and is turned over to the nonfederal sponsor, which becomes responsible for all future O&M and repairs. The operations would be within authorized boundaries, as described in the final ROD. If authorized and funded, adaptive management studies can lead to a request for a change in future operations. (See last section for further discussion.)

5. The Path Forward: MBSD as a Nonfederal Project

Planning for MBSD began as a federal project, but as of September 2016 the state had committed to moving forward with it as a nonfederal project. Figure 2 describes the activities and time needed, as envisioned by CPRA, for initiating nonfederal construction of MBSD. Generally, the engineering and design and the plans and specifications need to be at about the 90 percent completion level so that a final EIS can be prepared, followed by a 408 permission and the 404/10 permit (the order is reversed here, since the permit cannot be granted until the 408 is complete). Under the best circumstances (the figure refers to these as the "not risk loaded" scenario), construction of MBSD would begin in 2021.

[23] If reimbursement is offered, do the payments flow to the state or to the TIG?

Figure 3 focuses directly on the MBSD permit application, showing the points where formal public comments, as well as federal and state agency comments, are solicited. There is no opportunity for public input on the 408 review except when comments are made on the EIS, which includes analyses that may assist the 408 review.

Both figures suggest linear and parallel activities leading up to the ROD that would include the 408 permission and the 404/10 permit decision. However, in reality these are iterative and interactive activities. CPRA anticipates that the alternative (design and operations) proposed in the initial permit application may be altered during the permit review process, presumably as part of discussions among the Corps, the other federal agencies, and the applicant. The ROD will define the project design being allowed by the Corps and how that project can be operated.

FIGURE 2. LOUISIANA'S TIMELINE FOR MBSD AS NONFEDERAL PROJECT

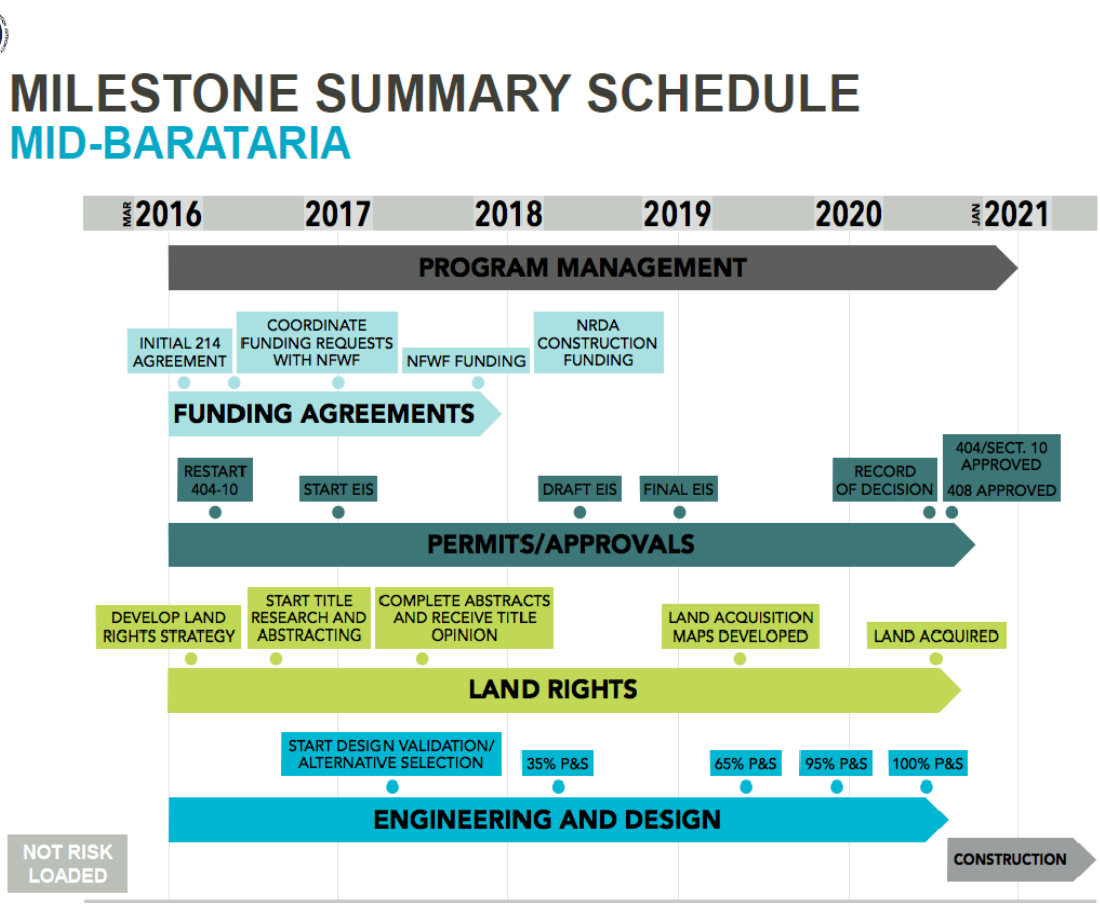
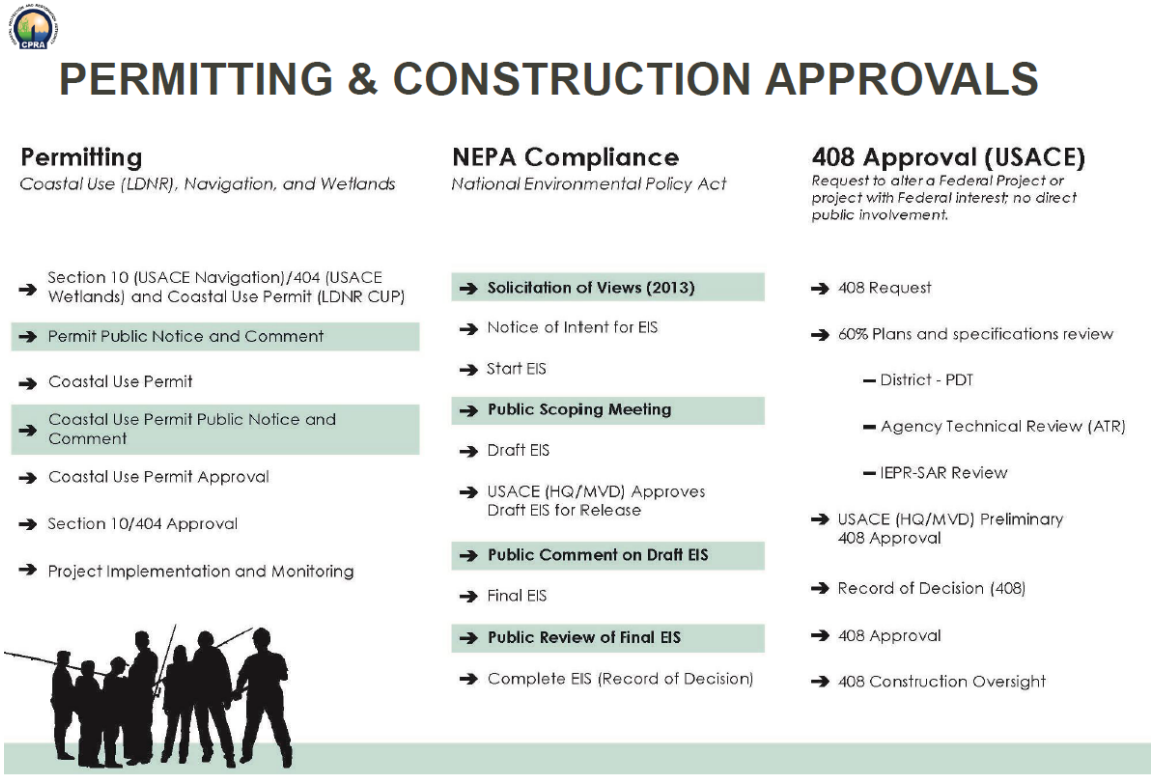


FIGURE 3. PERMIT APPLICATION SCHEDULE FOR MBSD



The rest of this section is organized around activities that lead to the construction and operation of MBSD as a nonfederal project. We define these activities for purposes of this report and describe them as if they are in a sequence beginning with activity A and ending with activity F.

Activity A. Corps Specifies Content for EIS in Scope of Work, CPRA Hires EIS Contractor to Execute Scope of Work, and Draft EIS Is Submitted

As of September 2016, there was no scope of work (SOW) to review. The SOW will suggest what the Corps will require as it seeks an EIS that is "adequate" for supporting its ROD.

Insight into what will be required can be gained from the disagreements that motivated the state's decision to pull back from agreeing to the TSP for MBSD and to apply for a permit to construct MBSD as a nonfederal project. Also, insight can be gained from consultation letters from NOAA and the US Fish and Wildlife Service (FWS), review of Corps' public presentations about diversions within the previous 12–18 months, and from a review of discussions in other venues, including the diversions panel, the CPRA board presentations, and the Operations Working Group. However, these initial speculations are just that—speculations—until the SOW and contract award is available to the public.

Activity B. Corps Reviews Applicant's Permit

The CPRA timeline assumes no significant modification to the draft EIS, no difficulty in "negotiating" a permitable design and operations plan, and no court challenges to the ROD. Also, the frequent mention of adaptive management implies that the permit will be written to facilitate approval of changes in design and related operations in the future,

based on what is learned through AM. Several factors suggest that the CPRA timeline is a best-case scenario.

First, in other contexts, when the draft EIS for a large project is issued for public and agency comment, those comments often lead to additional analysis by the applicant. In fact, even before the draft is released, the Corps' internal review may require analysis that was not called for in the SOW, or the Corps may determine that some analyses in the draft EIS are inadequate. In this process of preparing an adequate EIS, the applicant may be able to modify the design and operations of the originally submitted project. This appears to be the expectation of the CPRA as the applicant for MBSD.[24]

Second, the Corps expects the analyses to provide information adequate for determining whether the applicant's preferred MBSD alternative is the LEDPA. Since there are only two alternatives before the Corps—the proposed MBSD and No Action—the range of options all involve variations in size and operations of MBSD. This is what could be the focus of the EIS—how to operate and achieve the goals of wetland creation while minimizing damage to other aquatic resource functions. The dissolved MBSD planning partnership creates a highly unusual situation for applicant permit review. There is a long history of joint analyses between the applicant and the Corps. Meanwhile, the applicant has conducted its own analysis for preparation for the state's master plan. The results of these analyses at times are not consistent. At other times, the level of detail in the master plan was less than what the Corps considered adequate for MBSD planning as a federal project. The applicant may consider its analyses adequate and sufficient for a permit decision, but the Corps regulatory office may rely on its planning office and find that such analysis is not adequate for making the LEDPA determination. Even if the contractor proposes to use only CPRA models, the LCA MRHDM study has also produced results and reports that can be used in the Corps regulatory review and that are discoverable if there is a lawsuit. It is unlikely that the Corps can ignore its own reports in the EIS.

Third, there is a well-recognized need to identify and resolve potentially difficult trade-offs. As quoted earlier in this report, NOAA's letter to the Corps states, "The challenge is to find a restoration strategy that minimizes adverse impacts to fisheries but also maximizes land building and wetland health." Despite the need to make trade-offs, at this time neither the Corps' regulatory office nor the resource agencies plan to deviate from their standard consultation and review

[24] "To meet these needs, CPRA is considering a collaborative delivery process in lieu of traditional design-bid-build procurement. Two approaches that are being further assessed by CPRA are Construction Management at Risk (CMAR) and Progressive Design-Build (PDB). Among other aspects, both of these collaborative delivery methods involve continuous interaction among the owner, regulators, the engineer, and the contractor. They also require iterative construction cost estimating concurrent with the design process to ensure the project is designed to budget. However, CMAR and PDB would be procured and contracted in different ways. http://coastal.la.gov/collaborative-delivery-market-sounding/.

processes, with the possible exception of some face-to-face meetings to offer comments as an adjunct to formal correspondence. The Corps and the agencies could be imagined to be saying, "We have our processes and we will follow them."

We do not believe that the standard processes can effectively define and make those tradeoffs, in large part because the advocates' vision, that includes replacing the current and degrading ecosystem with a different one, has not been explicitly accepted by either the Corps or federal resource agencies. The local offices of the federal agencies may be reluctant to make tradeoffs and declare diversions to be the LEDPA or feel they are not authorized to do so. Establishing field staff–level working groups to expedite consultation may not be adequate. Similarly, placing the MBSD on the federal pemit review dashboard may also be insufficient. To expedite the permit review process, it may be necessary to elevate the MBSD permit decision to regional offices or headquarters. (See further discussion on the last section).

Activity C. Corps Issues 404/10 Permit, 408 Permission Decision, and ROD

We assume here that the ROD will allow MBSD to be built (in some still-to-be determined form) and operated (perhaps with compensatory mitigation), but not necessarily on the schedule described in CPRA's timeline. With that assumption, we consider how implementation might be delayed or perhaps halted.

- *Challenge to ROD.* A common challenge is that an EIS did not provide adequate information to support the Corps' decision. The administrative record would be examined and the court would hear arguments about whether the decision might have been different if data or analyses missing from the EIS had been included.
- *Challenge to 404/10 permit decision.* Opponents would argue that the decision was not the LEDPA because it failed to comply with the requirements of one or more laws and derivative regulations. This kind of argument is most effective when the Corps believes (or asserts that) it has limited discretion in allowing some environmental damages (maybe with compensatory mitigation), as with the ESA or the MMPA (e.g., freshwater wetland acres increase as salinity necessary for dolphin habitat decreases).
- *Challenge to property takings.* Once the MBSD project begins to secure lands, easements, and rights-of-way (LERW), property acquisition terms must be negotiated. If properties are secured using the police powers of the state, some property owners might go to court arguing that their compensation is too low (in effect, a property takings argument).

Activity D. CPRA Secures Funds for Construction

Assuming the ROD allows the project to move forward, the next step is funding. CPRA intends to use settlement funds for MBSD construction, and Figure 2 suggests that the process to secure natural resource damage assessment (NRDA) trustees' approval for funds (such that the pace of spending matches capacity) will have been initiated while the 404/10 and 408 reviews are underway.

However, the state's Trustee Implementation Group may require a final design and operation plan before it can approve funding, and certainly it will require that the permits and permission be in place. Until it is formed and meetings are held, there is no way to know how the TIG, which includes the Department of Defense, will operate.

If compensatory mitigation is required, then the current federal mitigation rule, which favors purchases from private mitigation banks over in-lieu fees and permittee-responsible mitigation, may apply. Funds would need to be available to purchase bank credits or to create equivalent credits.

Activity E. Contracts, including Compensatory Mitigation, Are Let, Construction Begins

Activity F. Project Operations Begin

Because MBSD would be a nonfederal project, the funds for operations, maintenance, and repairs would be the responsibility of the state. If AM is expected (maybe even reflected in the permit), the state will bear the cost for that AM program.

6. Challenges to Speeding the Pace of MBRE and MBSD Decisionmaking

6.1. Modeling

6.1.1 Irreducible Uncertainty

At a minimum, diversion plan formulation requires systemic analysis of current and expected future Mississippi River and receiving basin hydrology. This includes analysis of the amount and timing of water flows, the amount and timing of sediments in those flows, and how diversions deliver and deposit sediments in their receiving estuaries under current and future conditions. Biological analysis of the effect of new freshwater pulses on vegetation and animal species currently living in a saline environment is also needed.

Prediction using models is standard planning practice. Models predict future conditions (e.g., wetland and other ecosystem conditions) both with and without the proposed construction. Louisiana and the Corps have made significant investments in data and modeling for such analysis. However, the complexity of water-sediment-vegetation-species relationships and the unprecedented scale of the proposed diversions and their consequences mean that disagreement between models and analysts should be expected. Uncertainties remain—inevitably—relating to the following: (1) the effects of sea-level rise, subsidence, storms, and oil and gas development on land building; (2) the volume of sediment in the Mississippi River water column; (3) the amount of kinetic water energy to deliver that sediment from the river channel to the estuary; and (4) the establishment of vegetation that anchors new land building.

To date there has been much less analysis of diversions' effects on animal species. The state has sponsored two preliminary "food web" models. External parties (e.g., NOAA, the Diversion Implementation Panel) have reviewed and raised concerns about the adequacy of those initial analyses. One concern relates to species not included in, or capable of being analyzed by, the models (e.g., oysters, menhaden, sturgeon). Another is the lack of analysis of the models' strengths and weaknesses and explanations for why they differ in their predictions. Species effects are important both for compliance with federal and state species laws (MMPA, ESA, Magnuson-Stevens Act) and for commercial and recreational interests (e.g., oyster and shrimp fisheries, sport fishing providers). Finally, little or no analysis of diversion-specific social consequences—not only for the commercial and recreational fishing industries but also for private property and public infrastructure—has been conducted by the state.

No comprehensive suite of models and analyses should be expected for all aspects of these projects, and for the models that are developed, model prediction uncertainty will never be eliminated.

6.1.2. Model Prediction Uncertainty and the EIS

Often, opponents' initial strategy is to argue that a project's EIS analysis was not adequate to support the Corps' decision (ROD) to seek appropriations or issue a permit. Opponents cite model prediction *uncertainty* as an argument for waiting to request appropriations or issue a permit until there is more definitive analysis.

For this reason, the Corps values reduced model prediction uncertainty when considering a permit for a nonfederal project. The greater the certainty, the easier it is for the regulator to defend the conclusion that the project serves a publicly warranted purpose and need, that a full range of alternatives has been considered, and that the effects of the alternatives across all relevant laws and regulations are sufficiently understood that the LEDPA can be established. And once the LEDPA is established, model predictions are used to set adequate compensatory mitigation requirements.

For MBRE and MBSD there is uncertainty, first, over how specific diversion operations plans (the timing and amount of flows) will promote land building, change environmental conditions, and affect the mix of positive and adverse social outcomes. Technically credible diversion skeptics[25] and diversion opponents will—at least in the near term—be able to exploit scientific disagreement and analytical gaps. Nonetheless, there remains room for reducing model uncertainty and also addressing topics that have received limited analytical attention. The state or NGOs that are advocates for diversions could conduct additional model analyses on topics that are open to scientific disagreement, thereby reducing some uncertainty.

6.1.3. Model Prediction Uncertainty and Adaptive Management

The language and logic of adaptive management can be used to argue that irreducible analytical uncertainty is not a reason for inaction and can be a basis for reaching agreements on a path forward in the face of uncertainty. However, there remains confusion about the difference between real-time adaptive operations and adaptive management.

Adaptive operations will take place in conformance with boundary conditions (e.g., maximum flows) defined prior to the ROD and may be conditional on "triggers" (such as measured salinity in the receiving basins, or dates during which estuary species are particularly sensitive to freshwater pulses). Within these constraints, diversions would be adaptively operated to maximize sediment delivery and land building (based on Mississippi River conditions) and minimize adverse effects (based on predicted estuary impacts). The boundaries and triggers (operational constraints) set as part of any initial authorization or permit will be defined based on decision makers' confidence in the models used and how risk averse they choose to be about possible adverse effects.

The purpose of adaptive management is to modify those constraints and triggers in the future if what is learned over time suggests that "out of bound" changes to operations will enhance land building and/or reduce adverse effects. If the diversion is a federal project, then AM that leads to a desired change in operational constraints will require approval

25 http://www.btnep.org/Libraries/Management_Conference_Meeting_Minutes/MC_66_BTNEP_Mississippi_River_Diversions.sflb.ashx.

after a period of public notice and agency comment. Depending on the nature and extent of the change, approval may be granted by the Corps' District Engineer, under the Chief's discretionary authority, or may require new congressional authorization based on (perhaps) a new feasibility study and EIS. If the diversion is a nonfederal project, then AM that leads to a desired change in operational constraints will require approval by the Corps regulatory office. If an AM process is proposed, it will be best for the applicant to obtain a permit that allows modification to the ROD without a new EIS. Even in that case, however, a public notice and period for agency comment may be required. Examples from elsewhere in the nation might be used to construct such a permit.

The AM strategy must include determination of (1) the first construction and operational "increments" subject to AM evaluation; (2) what outcomes are of greatest importance; and (3) how those outcomes will be monitored and analyzed. AM requires carefully developed protocols for identifying critical uncertainties, clearly defined management actions that may affect outcomes, data and analysis to reduce the uncertainties, and adequate funding to conduct the entire AM process. Given the complexities and uncertainties described above, development of the AM plan may be time consuming and require significant attention in the EIS analysis.

6.2. Getting to a ROD

The decision process going forward will need to accommodate differences in perspective on both the ecological baselines against which diversion outcomes are to be assessed and the trade-offs that can be accepted for issuing a ROD. These matters will be especially relevant to speeding the decision process for the 10/404 permit and 408 permission leading up to the ROD for MBSD.

6.2.1. Baselines

To justify federal projects (such as MBRE), the project effects are compared to a baseline. Future, rather than current, natural resource conditions represent the appropriate baseline. Moreover, for the 404/10 review process, use of future conditions is not prohibited by law or derivative regulations and guidance for determining the LEDPA. However, the use of future conditions as the baseline is not common practice in conventional permit reviews. Instead current conditions are most often used. This is common practice because of the funding and time needed to build forecast models and because of the uncertainties associated with forecasting.

For coastal Louisiana, however, extensive modeling efforts are already being used to predict future land loss and associated ecological changes. For the diversions, debate over whether current or future conditions should be used as the baseline is possible. However, it is more likely – given the tools, and history of analysis already available – that debate and consensus-building will focus on alternative future baseline scenarios.

6.2.2. Trade-Offs

If diversions work as hoped, they will build future wetlands but may, in the near-term, reduce current wetland acres, species populations, and commercial and recreational fish and shellfish harvests (or raise the costs of securing those harvests). In other words, the Corps 10/404 permitting process may have to evaluate and resolve ecological and human use trade-offs between, for example, water quality and fisheries. To illustrate phosphorus levels may be deemed more important than nitrogen in assessing water quality effects, or within the fisheries example, croakers may be deemed more important than menhaden. Nonetheless, this is all considered in the context of defining the LEDPA and so the

evaluations must focus on the aquatic resources and the functional categories identified in the 404(b)(1), subparts C through F. Note also that human use of these resources is also a consideration n making any trade-offs. As a specific example relevant to MBSD, a permit that allows a diversion to proceed may call for accepting a loss of current estuarine bottlenose dolphin habitat (a concern under the MMPA) and shrimp populations near commercial port facilities in order to gain future wetland acres in the same geographic area.

Section 404's sequencing requirements (which define the LEDPA) can be generally understood to prohibit projects shown to have negative consequences for any current or future "without action" aquatic resource environmental condition. However, there is one important exception: if the purpose of the proposed project is to provide some form of environmental enhancement. The 1990 mitigation MOA between EPA and the Corps states, [26]

"It may be appropriate to deviate from the sequence when EPA and the Corps agree the proposed discharge is necessary to avoid environmental harm (e.g. to protect a natural aquatic community from saltwater intrusion, chemical contamination, or other deleterious physical or chemical impacts), *or EPA and the Corps agree that the proposed discharge can reasonably be expected to result in environmental gain or insignificant environmental losses*. [emphasis added]"

Also, the 404(b)(1) guidelines, subpart H, define actions that can be deemed to minimize adverse effects. In that subpart, the actions deemed to minimize adverse effects of the proposed project include the following:

"(d) When a *significant ecological change* in the aquatic environment is proposed by the discharge of dredged or fill material, the permitting authority should consider the ecosystem that will be lost as well as the environmental benefits of the new system. [emphasis added]"

These situations seem to apply to the diversions. The vision for diversions is environmental gains (wetlands at a future time). There may be environmental damages as defined by traditional 10/404 (and 408) criteria and by MMPA, Magnuson-Stevens, and other standards. However, in the case of diversions, the wetlands gained in specific locations may be considered an offset (an acceptable trade-off) that minimizes environmental damages. If so, this would allow diversions to be deemed the LEDPA. (This does not mean that diversions are "self-mitigating." Compensatory mitigation may still be required.)

Currently, there is no venue or process in place to analytically explore and resolve such trade-offs. One option is to create a structured decisionmaking process that builds on the experience of the Operations Working Group. Ideally, any such process should be chartered by the Executive Office of the President with participation from the Corps, the state, and federal and state resource agencies. This process may add time but may also reduce the likelihood of lawsuits and other sources of delay.

6.2.3. Socioeconomic Mitigation

Stakeholders who believe they will be harmed by diversions include certain fishing communities and residents of certain places where flood frequency or magnitude may increase. These opponents do not accept CPRA's argument that diversions will be "self-mitigating" over time. If their concerns

[26] https://www.epa.gov/cwa-404/memorandum-agreement.

are not addressed, they are likely to take legal or political action after a ROD is issued.

The incentives for a challenge to the ROD might be reduced with a more direct acknowledgment of the possibility of near-term adverse effects and endorsement of mitigation and socio-economic adjustment assistance programs. Such programs would require both impact measurement protocols and agreement on current and future baseline conditions, in order to separate more certain near-term effects from more speculative long-term effects. Methods and procedures could then be developed to compare the near-term effects of diversions against the baseline, and an assistance program would be created to compensate for habitat losses and transitional socio-economic loses. This assistance program would define the following:

- eligibility criteria based on measurable harm to (for example) property holdings, navigation, commercial and recreational fishing, oyster grounds, and existing property rights, including commercial leases and flood easements;
- criteria for assistance, including the nature of evidence to be provided;
- forms of assistance, both cash and noncash;
- administration of the program; and
- sources of funding.

Creation of such a program could reduce opponents' incentive to challenge the MBRE and MBSD RODs and thus allow the projects to move forward more quickly. Acknowledgment of, and compensation for, socioeconomic dislocations could help resolve the socio-economic trade-offs associated with the nationally unique[27] circumstances of coastal Louisiana.

6.2.4. Settlement Award Funds

CPRA has publicly announced that settlement dollars will be available to construct MBSD and MBRE. Several possible issues warrant attention.

First, the state's Trustee Implementation Group must approve the use of NRD funds for diversions. At this time, the Louisiana TIG has not yet formed. But it is not too soon to ask how the state will demonstrate a causal connection between a diversion project and damages attributed to the oil spill. .

Second, how can any TIG concerns about model prediction uncertainty (e.g., about effectiveness, consequences, effects on marine mammals) be addressed? [28]

Third, even if settlement funds are available, diversion construction might be delayed for many years. The predicted costs for MBRE and MBSD already exceed $2 billion—half the total available for all state wetlands and habitat creation. How should funds that will begin to flow to the state once the TIG is formed be used over the next several years? Should the state ask the trustees for permission to "bank" the funds and hold them for diversions? How would it make the case for doing so? Should the state implement other projects as funds come in, and seek additional funds for diversion projects when they are ready to implement? If an AM approach is taken, how can further funding for the next increment of investment, based on what is learned, be assured?

[27] Making the argument that diversions are a unique situation may assure the national environmental community that the actions are not setting national precedent for the applications of these laws.

[28] The modeling work appears to be suggesting that costs are going up and acres are going down, even for CPRA analyses. If these are the final results, the budget justification for diversions as a federal project will be more difficult to make.

Fourth, pressure to implement marsh creation projects may increase. If diversion approvals are bogged down, a "spend now" coalition of contractors, NOAA, the Corps, and other groups may argue for taking advantage of historically low financing costs and public pressure to "do something" with the settlement money. What might diversion proponents suggest for administratively "fencing off" settlement funds for diversions?

Fifth, if MBRE proceeds through Steps 14, 15, and 16, proponents could seek administration support to submit the project proposal (as modified) to congressional authorization and perhaps appropriations committees. However, administration support may require the state to guarantee a cost-share for future planning, engineering, and design (or the Corps might need to agree to accept current CPRA engineering and design work as an in-kind contribution to future PED). Given the current stalemate over the future of the LCA MRHDM study, such an agreement may be difficult to secure.[29] Also, if adaptive management costs are expected for a federal project, a similar cost-sharing arrangement will need to be agreed upon.

Because Congress has banned earmarks, any federal funding will require administration support for a "new project start," plus at least some funding to begin implementation as a federal project. With the new start established, an advanced funding agreement from CPRA—using RESTORE/NRD funds as available—might be used to complete project construction. We noted earlier issues associated with securing settlement funds for this kind of purpose.

Finally, there needs to be attention to how funding will be assured for adaptive management, adaptive operations, and long term O&M. A federal project like MBRE, once deemed complete, is turned over to the nonfederal sponsor who becomes responsible for all future O&M (and repairs). This requirement could be waived or reduced through Congressional actions in a WRDA or in other legislation. The responsibility for funding O&M will be a state responsibility for MBSD.

Because O&M and repairs will be a nonfederal responsibility, the institutions responsible for guaranteeing and managing those funds need to be identified and their responsibilities clarified. This may even emerge as a requirement before the 10/404 permit can be issued for the MBSD.

6.2.5. Lands, Easements, and Rights-of-Way

Acquiring lands, easements, and rights-of-way is a state responsibility, even if MBRE is a federal project. Interviewees suggested more than once that LERW acquisition may be a source of delay. Proactive legal analysis of federal and Louisiana statutes and case law related to takings, damages liability, property rights, compensation rights, and other legal issues could help speed the approval process.

7. Conclusion

Sediment diversion projects are large investments meant to address a large problem. They present to their proponents administrative and regulatory challenges without precedent. To be implemented, Louisiana's two proposed Mississippi River

[31]The modeling work appears to be suggesting that costs are going up and acres are going down, even for CPRA analyses. If these are the final results, the budget justification for diversions as a federal project will be more difficult to make.

diversions must secure a variety of local, state, and federal approvals. This report has described major elements of the approval process. As background, we traced decisions affecting the two diversion projects from 2007 to September 2016, when this report was completed. We also detailed two distinct administrative contexts for review and approval: federal versus nonfederal projects (corresponding to MBRE and MBSD, respectively).

By design, these projects are meant to alter environmental and social conditions across a large geographic area. Accordingly, their analysis and evaluation involve a variety of scientific and technical challenges and uncertainties. Opponents may challenge them legally. We have therefore highlighted issues that might slow approval and offered reflections on how social uncertainties, disagreements, and conflicts might be resolved to speed the pace of decisionmaking.

Abbreviations

AER	aquatic ecosystem restoration
AM	adaptive management
ASA/CW	Assistant Secretary of the Army for Civil Works (ASA/CW)
Corps	US Army Corps of Engineers
CPRA	Coastal Protection and Restoration Authority (Louisiana)
CWA	Clean Water Act
CWPRA	Coastal Wetlands Protection and Restoration Act
EFH	essential fish habitat
EIS	environmental impact statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FWS	Fish and Wildlife Service
LCA MRHDM	Louisiana Coastal Area Mississippi River Hydrodynamic and Delta Management
LEDPA	least environmentally damaging practicable alternative
LERW	lands, easements, and rights-of-way
MBRE	Mid-Breton
MBSD	Mid-Barataria sediment diversion
MMPA	Marine Mammal Protection Act
MOA	memorandum of agreement
MOU	memorandum of understanding
NEPA	National Environmental Policy Act
NER	National Ecosystem Restoration
NGO	nongovernmental organization
NOAA	National Oceanic and Atmospheric Administration
NRDA	natural resource damage assessment
O&M	operations and maintenance
OMB	Office of Management and Budget
PED	project engineering and design

PPA	project partnership agreement
RESTORE Act	Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States Act
ROD	record of decision
SOW	scope of work
T&E	threatened and endangered
TIG	Trustee Implementation Group
TSP	tentatively selected plan
USACE	US Army Corps of Engineers
WRDA	Water Resources Development Act