Tulane Institute on Water Resources Law & Policy

FINANCING THE FUTURE III

Financing Options for Coastal Protection and Restoration in Louisiana

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I. SUMMARY

Louisiana faces an unprecedented challenge as it fights to preserve and restore its coast. In response, the State has devised a Coastal Master Plan based on world-class science and engineering expertise. The bold plan puts forth a list of projects and programs designed to have the greatest impact on the coast and the people who live there. Despite its scientific integrity, the Coastal Master Plan lacks a plan for paying for the necessary work. Successful implementation of the Coastal Master Plan will require at least $71 billion more than the State currently has identified. In addition, there are projects and costs not included in the Master Plan that are nonetheless essential to the region's future. While the Federal Government will contribute to lessen this burden, the State cannot afford to wait or rely entirely on federal funds. Meeting the challenges of a changing coast will require financing solutions at the State, local government, and private levels. It is clear that Louisiana and its citizens will have to pursue aggressive measures to secure funds (or collect funds already owed) sooner rather than later. There is no single source of revenue that will pay for our future, but with contributions from stakeholders across the coast, state, and nation, we can turn the goals of the Coastal Master Plan into a reality.

II. INTRODUCTION

Coastal land loss, sea-level rise, and climate change are a crisis in slow motion. The pervasive impacts of a changing environment demand an equally comprehensive approach to solutions. It will require engagement at every level of organization to meet these challenges, from local communities and private enterprise to state, federal and international government. Far from being insurmountable, it is a challenge that we can, and must, meet.

Louisiana's Coastal Master Plan is an ambitious attempt to protect and restore a coast that is vital to the state's physical, economic and cultural identity. At its core, the 2012 Coastal Master Plan, and now the 2017 Draft Coastal Master Plan, is a prioritization of projects expected to have the

most impact on coastal communities and the natural environment, given a limited supply of funds.[2] The Coastal Protection and Restoration Authority (CPRA) estimates that these projects would cost approximately $50 billion, though the 2017 Draft acknowledges the actual cost will be higher.[3] When adjusted for inflation, however, the total price will actually be closer to $91.7 billion.[4] Factor in the cost of local projects not included in the Master Plan, but still essential to the region's future, and the cost easily exceeds $100 billion. Examining the CPRA Annual Plans, a year-by-year budget of revenues and expenses, the sum of identified funds over the 50-year planning period is approximately $20.617 billion.[5] That leaves a $71 billion gap the state needs to fill to turn the Master Plan into reality. These are not firm numbers; all are subject to change. They are, however, illustrative of both the sources and extent of identified funding. Especially as the state works on its 2017 Master Plan, they provide useful context for the scope of funding still required. With that in mind, this paper looks at a spectrum of financing options Louisiana could consider to fill that gap. This paper will consider three areas of potential funding – federal, state/local, and private – and the interplay between them to fill the funding gap.

III. FEDERAL FUNDING: Current Options & Prospects

Federal funding for Coastal Master Plan projects is a key piece of the financing puzzle, but it will not be enough on its own. Additionally, political and fiscal realities dampen the prospect, at least in the near-term, of a meaningful increase in federal dollars. That could conceivably change, given the President-elect's pledge to make significant new investments in public infrastructure. That pledge, however, must be weighed against his promise to reduce taxes and ingrained Congressional opposition to increased borrowing.

The Annual Plans estimate that the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA) funds and revenue sharing through the Gulf of Mexico Energy Security Act (GOMESA) will provide substantial long-term funding. These sources, however, are not guaranteed across the 50-year plan horizon. Public works projects built by the US Army Corps of Engineers (Corps), while not included in the Master Plan, will also play a role in the region's future. All of these funding streams are, to varying degrees, subject to Congressional will. Even as it continues to study and develop new funding sources, Louisiana should be mindful that much of the federal revenue projected in the Master Plan is far from secured. Going forward, securing federal funding for meaningful work in Louisiana will require a commitment to responsible use of existing funds and a strong demonstration of the national interest in preserving South Louisiana.

A. The Authorization & Appropriation Process

Any discussion of federal funding must keep a key concept in mind: a funding authorization is not the same as a funding appropriation. These are related but distinct under the rules that guide federal public works spending. The Constitution grants Congress authority over federal spending: "No money shall be drawn from the Treasury, but in Consequence of Appropriations made by Law."[6] To carry out this function, Congress uses authorizations and appropriations, two

separate types of bills for discretionary spending.[7] Authorization bills are considered by legislative committees focusing on spheres of government action such as the House Committee on Natural Resources or the Senate Committee on Foreign Relations. Authorizations create, continue, or modify programs that executive-branch agencies then carry out. Nothing obligates Congress to appropriate funds for authorized discretionary programs. In fact, many authorized programs and activities go years without receiving appropriated funds, if they receive funds at all.

Appropriations bills fund authorized activities. Generally, Congress passes annual appropriations bills to provide funds for a federal fiscal year (beginning October 1). The annual appropriations process begins with the President's submission of a budget proposal to Congress. Along with the President's budget request, agencies provide reports to justify their individual budgets to the House and/or Senate Appropriations Committees. Once both houses agree on an appropriations bill, it is sent to the President to become law. The appropriations process ideally results in consideration of twelve regular appropriations bills that fund the operations of the Federal Government. Congress may also combine several spending bills together into a consolidated appropriations bill, commonly referred to as an omnibus bill, as they did for FY 2016 and FY 2014.

This bifurcated process can result in unfunded authorizations, increase the time from project conception to completion, and frustrate flexible adaptive planning. In Louisiana, the work of the Army Corps of Engineers demonstrates some of the shortcomings of the appropriations process.

The Army Corps of Engineers, through its Civil Works program, is responsible for developing, managing, and protecting water resources, mainly by constructing, operating, and maintaining water infrastructure.[8] Over more than a century of work, the Corps has built a staggeringly extensive water management infrastructure. This infrastructure "includes approximately 700 dams, 14,000 miles of levees in the federal levee system, and 12,000 miles of river navigation channel and control structures."[9] The Water Resources Development Act (WRDA) is the main legislative vehicle for authorizing the Corps' civil works projects.

Project funding depends on the annual appropriations process. Annual appropriations in the last decade ranged from $4.5 billion to $6 billion.[10] The most recent omnibus budget, passed in December of 2015, appropriated $5.99 billion for civil works in FY2016.[11] While there has been a slight overall increase in the dollar amount of annual appropriations, the share of funds used for operation and maintenance (O&M) of existing structures has increased.[12] New project authorizations continue to outpace appropriations: "There is a backlog of more than 1,000 authorized studies and construction projects. In recent years, few new studies, new construction projects, and new programs have been in either the President's budget request or enacted appropriations."[13] Swelling O&M costs and the backlog of authorizations make meaningful funding for new projects unlikely in the near-term.

The standard process for constructing a Corps project involves two separate authorizations and two corresponding appropriations. First, Congress authorizes a feasibility study to assess a given project, including the cost/benefit ratio. Once study funds are appropriated, the Corps performs the study and delivers a report to Congress. Based on the report's conclusions, the Corps can choose to pursue a construction authorization for the project. A construction authorization is necessary for a project to move forward, but not sufficient. An appropriation must provide funds before construction can begin. For most projects, a non-federal sponsor must share both the study and construction costs. Authorizing and funding just the studies can take years. Once authorized and funded, the average study takes three years to complete.[14] Once the study is complete, authorizing and appropriating funds for construction adds to the timeline, and the actual construction time may take years more. All told, a project can take decades to complete. In contrast, our understanding of the risks and realities of coastal land loss changes daily. The delay from project conception to completion is a poor fit for the challenges facing South Louisiana.

The current ban on Congressional earmarks makes it difficult for priority projects to jump the queue and receive funds before earlier authorizations. The Congressional ban on earmarking means "appropriators can boost funding for individual projects named by the administration, but …they can't name additional projects that aren't included in the President's request."[15] As a result, executive initiative is required to prioritize locally important projects and push them to the front of the line. If the ban continues, securing funds through the Corps' appropriation process will require close coordination with the White House and a strong showing that Louisiana's coastal restoration efforts are in the national interest.

B. MR&T and HSDRRS

State and local governments can work within existing authorizations to reduce the project development timeframe. Pre-existing authorizations, however, can be underfunded, often chronically so. They also generally come with non-federal cost-share requirements and/or responsibility for operations and maintenance.

The Mississippi River and Tributaries (MR&T) Project was authorized by the Flood Control Act of 1928.[16] It provides a continuous authorization for flood control and navigation projects on the lower Mississippi River "to be paid for as appropriations may from time to time be made by law."[17] Generally, the President's budget request intentionally underfunds the MR&T project with the understanding that Congress will augment it later. In FY 2016, for example, the President requested $225 million for the MR&T.[18] The consolidated appropriations act (omnibus) passed by Congress increased that funding to $345 million.[19] While this increase improves the Corps' ability to meet the mandates under the MR&T authorization, it still leaves the project wanting. "In 2008, it was estimated that $500 million was needed annually to permit efficient completion of programmed construction and operation and maintenance."[20] With the Corps already underfunded for existing MR&T work, it is unlikely to be a vehicle for new project funding.

The Hurricane and Storm Damage Risk Reduction System (HSDRRS) consists of multiple projects including 350 miles of levees around the greater New Orleans area. After Hurricane Katrina damaged key components of the system, Congress provided $14.431 billion through multiple appropriations from 2006 to 2009.[21] Of that total, $11.1 billion is dedicated to repairing the damage caused by Katrina, requiring no state cost-share. The remaining $3.331 billion, used to update HSDRRS to new flood standards, requires a 35% state cost share. Normally, the state would have to provide its share of the costs before construction. Thanks to deferred payment agreements between the State of Louisiana and the Federal Government, the state's portion of the funds are not due until after completion of the HSDRRS in 2018.[22] The deferred payments begin in 2019 at nearly $100 million per year over 30 years.[23]

Unless the state can negotiate forgiveness of this debt with the Federal Government, it will have to dedicate significant funds to pay back its share of the costs. Further, once the Corps builds HSDRRS levees to the required height, state and local entities are responsible for operations and maintenance. The cost-share requirements, as well as the operations and maintenance responsibilities, underscore the fact that, even with federally-funded projects, Louisiana bears a financial burden that calls for State-led solutions.

Prospects: *Federal funding will undoubtedly be an important component of Louisiana's coastal efforts. Still, there are impediments to authorizing new projects or using preexisting authorizations. Shepherding a project through the authorization process takes time, and an authorized project cannot be built without an accompanying appropriation. The President-elect's plans for a massive public works program could offer an opportunity to change this situation. It remains unclear how – or if – such a program would be paid for.*

C. The Harbor Maintenance Trust Fund

One of the Corps' oldest responsibilities is maintaining reliable navigability on the Mississippi River. The Lower Mississippi River's port infrastructure is critically important to both south Louisiana and the nation. Maintaining navigable shipping lanes requires virtually constant dredging of the sediment that builds up in the River's mouth.[24] High water events, like the one in January 2016, carry even more sediment than usual and deposit it at Southwest Pass, the entrance to the Mississippi River from the Gulf of Mexico.[25] As the dredges work to maintain channel depth, ships must deal with the depth and width restrictions.[26] Large ships may be forced to wait for the channel to open or reduce their draft by carrying less cargo, which can cost the shipping industry millions of dollars each day.[27]

Shipping industry advocates point to the under-used Harbor Maintenance Trust Fund (HMTF) as a potential source for increased federal investment in navigation. HMTF funds come from a 0.125% tax on all goods imported into the United States.[28] The tax is intended to fund 100% of all harbor operations and maintenance work carried out by the Army Corps of Engineers.[29] While Congress can appropriate an amount equal to the tax receipts from the previous fiscal year for harbor maintenance, it routinely does not. "Since 2003, HMTF collections have far exceeded funds appropriated for harbor maintenance, resulting in a large and growing 'surplus' in the trust fund…Rather than being used for their intended purpose, these user fees are used to balance the federal budget."[30]

Louisiana's shipping industry has echoed these complaints that the HMTF is underutilized. Speaking at a Congressional Roundtable in late 2015, the Executive Director of the Port of South Louisiana stated "[f]ull use of Harbor Maintenance Tax revenues would provide the estimated $70 million per year needed to fully maintain the main river channel and perform dredging of South Pass and other navigation work that has been deferred annually since 2007."[31] Louisiana Rep. Garret Graves reiterated that sentiment at an informal discussion hosted by a House Transportation and Infrastructure subcommittee in February 2016, criticizing the Corps for using funds intended for harbor maintenance on other work.[32] The 2014 Water Resource and Reform Development Act (WRRDA) established a "target appropriation" that ratchets up the percentage of the HMTF used on harbor maintenance projects each year until 2025 when the target is 100% of the tax receipts.[33] It remains to be seen whether these incremental targets will be hit.

Intelligent solutions for Louisiana's coast will require not only more dollars but also stretching existing dollars further through efficient spending on projects that serve multiple purposes. Louisiana should push for projects that benefit both navigation and the Coastal Master Plan. For example, Louisiana's coastal wetlands disappear into open water in part because they are starved of flood-borne sediment from the Mississippi River that historically built and sustained the delta.[34] The Corps continuously dredges that same sediment from the Mississippi River. Louisiana's Coastal Master Plan points out that "[b]eneficially using this dredged material to rebuild wetlands is a strategy whose widespread adoption is long overdue. In recognition of this fact, since 2009 the state has required private applicants who want to dredge more than 25,000 cubic yards of sediment to place the dredged material in a coastal restoration project or pay a fee."[35] Yet the Corps, by far the largest dredger in the region, is unaffected by this state requirement, and most of the dredged sediment is disposed of in open water.[36] The Corps also recognizes the potential for dual benefits:

> The Corps fully supports and strives to beneficially use dredged material in all circumstances where it is practical and cost-effective… Currently, approximately 38 percent of the suitable/available material dredged under the O&M program is used beneficially…However, if funding were made available, there is the potential to use up to an additional 15-20 million cubic yards annually to enhance

coastal wetlands through marsh creation, wetland nourishment, barrier island restoration, ridge restoration, and other techniques.[37]

Currently, the annual appropriations for all regional sediment management plans is $50 million with only $10 million available for any one project.[38] Expanding this appropriation, possibly with money from the HMTF, could marry ongoing dredging activity with coastal restoration efforts that protect nationally significant shipping infrastructure.

As federal activities can dovetail with state coastal restoration efforts, so too can the state's coastal restoration plans complement federal activities and support national interests. A cornerstone of Louisiana's Coastal Master Plan is river reintroductions or diversions, controlled openings in the Mississippi River levees that would reintroduce sediment to the delta and restore the river's ability to build land. Diversions could have incidental benefits on navigation as well. "Simulations of three diversion sizes…show that larger diversions have higher sand-to-water ratios. This means that more sand is diverted into the wetlands while a higher percentage of water stays in the river channel, serving the dual purposes of maximizing land-building while maintaining the navigation channel."[39] If a river diversion siphons off sediment that would otherwise shoal up the main river channel, funding for such projects from the Corps' navigation budget may be appropriate. The 2016 Water Infrastructure Improvements for the Nation Act contained a provision that would allow the Corps to pay the operations and maintenance costs for alternative projects if the alternative project lowered the total cost of channel maintenance.[40] This provision potentially allows the Corps to cover O&M costs of a sediment reintroduction project to help Louisiana cover the ongoing costs of the Master Plan's critical land-building efforts.

D. Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA)

At present, the key federal funding streams for projects in Louisiana focus on navigation and flood control, the traditional responsibilities of the Corps. Wetlands restoration through programs like CWPPRA is a smaller portion of the Corps' purview. CWPPRA has a long history of building wetlands in Louisiana.[41] Passed in 1990, CWPPRA has funded 210 projects across the state, benefitting over 100,000 acres of wetlands.[42] CWPPRA funds come from small engine fuel taxes deposited into the Sport Fish Restoration and Boating Safety Trust Fund.[43] CWPPRA funds are distributed through a grant program, and projects in Louisiana require a 15% non-federal cost share.[44]

CWPPRA received reauthorization through 2019; however, the Sport Fish Restoration and Boating Safety Trust Fund has been funded through annual Continuing Resolutions in recent years.[45] While CWPPRA generally provides $30-$80 million annually for restoration projects in Louisiana, these funds are not under the state's direct control. The structure of CWPPRA

frustrates multi-year planning for projects, raising their cost and effectively limiting CWPPRA's scope.[46]

Prospects: *Going forward, CWPPRA will continue to play an important role in financing Master Plan projects, but its enabling legislation depends on continued congressional support beyond 2019. Even if it is not likely to be repealed, neither is it likely to be expanded to put a sizable dent in the $71 billion gap*

E. Coastal Impact Assistance Program (CIAP)

CIAP, authorized in the 2005 Energy Policy Act, set aside a portion of federal revenue from Outer Continental Shelf (OCS) oil and gas development from 2007 to 2010. CIAP funds were intended to help states and coastal political subdivisions protect and restore areas impacted by oil and gas production.[47] CIAP funds were distributed through a grant program administered by the US Fish and Wildlife Service(USFWS). USFWS allocated $495.7 million over the four years of the program, with 65% going to the state and 35% going directly to coastal parishes.[48] CPRA estimates expending all CIAP funds by December 2016.[49]

The Gulf of Mexico Energy Security Act, enacted the year after authorization of CIAP, is essentially a more permanent version of CIAP, providing for OCS revenue sharing in the Gulf of Mexico. As will be detailed in the next section, GOMESA's long-term viability is itself fraught with political and economic uncertainty. An attempt to reauthorize CIAP with GOMESA still in place would likely be contested as double dipping into federal OCS revenue.

Prospects: *CIAP funds represent a limited revenue-sharing mechanism for federal OCS dollars. It is unlikely that CIAP will be reauthorized to provide more funds for Louisiana's coastal protection and restoration efforts.*

F. GOMESA

The Gulf of Mexico Energy Security Act (GOMESA) was a hard-won revenue sharing concession that will provide a much-needed source of recurring funds for the Coastal Master Plan.[50] GOMESA gives four Gulf States a share of federal offshore mineral revenue from the Gulf of Mexico.[51] The states divide the revenues based on a lease area's proximity to each state's coastline. GOMESA splits the first $500 million of federal mineral revenue from the Gulf each year, and the maximum the State of Louisiana can receive is $140 million.[52] CPRA anticipates

GOMESA funds to hit that cap and bring in $140 million annually beginning in 2018.[53] GOMESA revenues are required to be deposited in the Coastal Protection and Restoration Trust Fund to be "used only for the purposes of coastal protection, including conservation, coastal restoration, hurricane protection, and infrastructure directly impacted by coastal wetland losses."[54]

In 2016, Louisiana Senator Bill Cassidy introduced legislation that would raise GOMESA's revenue-sharing cap from $500 million to $835 million in 2027, then back down to $705 million after 2037.[55] The bill followed an unsuccessful attempt by Senator Cassidy to place the revenue sharing language in the senate's 2016 Energy Policy Modernization Act.[56] Both failed for lack of support, which suggests that future attempts to raise the revenue cap face an uphill battle. At the same time, market forces and political pressure threaten to reduce or redirect Louisiana's share of OCS revenue. It is just as likely that Louisiana's share of offshore revenue will decrease or disappear entirely.

GOMESA revenues depend on the continued profitability of offshore oil and gas production. According to Rystad Energy, an oil and gas consulting firm, the break-even price for new offshore development is between $59 and $62 per barrel.[57] Currently, the price is around $50 per barrel, and the Energy Information Administration (EIA) predicts an average of $52/barrel through 2017.[58] Other analysts believe the oil price could fall back to the low-$40 per barrel range before the end of 2017.[59] Low oil prices have translated into anemic interest in recent Gulf lease auctions. A sale of leases in the western Gulf of Mexico in August of 2015 attracted the lowest number of bids on record. In March of 2016, lease sales in the central Gulf fared only slightly better. "[T]he central sale results were the fourth lowest in terms of high bids received since 1983."[60] If oil prices stay low, revenue receipts will decrease accordingly. This does not affect already-producing wells; in fact, EIA estimates that oil production in the Gulf of Mexico will hit record levels in 2017.[61] Future deep-water exploration and spending, however, is being tabled as the market depresses offshore investment.[62]

There is also no guarantee that GOMESA, the act itself, is secure for the future. There is political pressure to redirect GOMESA revenue to broader national programs. Both the 2016 and 2017 budgets for the Department of Interior contain language to that effect.[63] President Obama's budget proposal for 2017 "proposes a $2 billion Coastal Climate Resilience program…This program would be paid for by redirecting roughly half of the savings that result from repealing unnecessary and costly offshore oil and gas revenue sharing payments that are set to be paid to a handful of States under current law."[64] These budget proposals are, of course, not law, but they are evidence of a sentiment that the money might be better used elsewhere. Responsible use of GOMESA funds will go a long way towards disproving that sentiment, but political pressure to redirect funds will persist. Indeed, it could increase under a Trump administration, given his plans to both increase defense and infrastructure spending, while also lowering taxes.

Prospects: *The future of GOMESA is far from certain. Even as Louisiana's delegates propose expanding the Gulf States' share of revenue, other federal actors are pushing to divert GOMESA money to broader federal programs. Additionally, economic factors could make this political struggle moot if oil and gas development in the Gulf declines.*

G. Deepwater Horizon Funds

Money flowing to federal, state, and local entities from the *Deepwater Horizon* oil spill will contribute significant sums to Louisiana's restoration efforts. Louisiana is set to receive nearly $6.8 billion over 15 years from settlements with BP and others.[65] That total includes $5 billion from the Natural Resource Damage Assessment (NRDA) process, $1 billion for economic damages, and $787 million from Clean Water Act (CWA) penalties.[66] The $1 billion received for economic damages will not be spent on coastal restoration; it will be directed to the Budget Stabilization Fund, the Medicaid Trust Fund for the Elderly, and the Health Trust Fund.[67] The remaining $5.787 billion will be directed towards projects in the Coastal Master Plan. Responsible use of *Deepwater Horizon* funds is necessary to preserve a measure of state control over future spill money.

Under the Oil Pollution Act of 1990 (OPA), the NRDA process seeks to compensate the public for natural resources lost or damaged by an oil spill.[68] NRDA empowers federal and state agencies to act as trustees for restoration funds.[69] Trustees assess pre-spill conditions, evaluate injuries caused by the spill, and then develop and implement a restoration plan with a goal of returning natural resources to the condition they would have been in if the spill had not occurred. The NRDA trustees have flexibility to replace lost resources with equivalent natural resources, even if the replacement is not exactly the same as what was lost.[70] This flexibility allows the trustees to direct funds to Master Plan projects that seek to compensate for lost values *in toto*, rather than recreate the coast precisely as it was before the spill. Abuse of this flexibility, however, could lead to stricter, and possibly less effective, requirements for spending recovery funds.

In most cases, civil and administrative penalties for oil spill-related Clean Water Act violations are deposited into the Oil Spill Liability Trust Fund, where the money pays for response to future spills.[71] In 2012, Congress passed a one-time abrogation of this requirement applicable only to the *Deepwater Horizon* spill. The Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States Act of 2012 (RESTORE Act) diverts 80% of the CWA penalties to the Gulf for restoration work. RESTORE Act funds are divided into five funding streams, commonly referred to as "pots."[72] Under pot 1, 35% of the RESTORE Act funds are divided evenly among the states. Pot 3 allocates 30% of RESTORE Act funds based on the portion of state shoreline oiled, coastal population, and distance from the

state to the spill. Combined, these two pots will contribute $765 million to Louisiana's coastal restoration efforts that would otherwise have gone to future spill recovery.

Going forward, catastrophe cannot be a viable financing mechanism, and Louisiana should not depend on future spills to fund its coastal protection and restoration efforts. Future oil spills, however, are very likely, if not inevitable. The default option under the OPA will direct fines and penalties from future Gulf oil spills towards the Oil Spill Liability Trust Fund, not to Louisiana and the other Gulf States. In order to replicate RESTORE and direct future spill recovery funds to impacted areas, the Gulf States will have to demonstrate responsible use of RESTORE dollars. While the text of the RESTORE Act limits eligible uses of funds, some of these limits leave room for misuse. "Workforce development and job creation," for example, is a permitted use of RESTORE Act funds that could include activities not in furtherance of, or even deleterious to, the goals of the Coastal Master Plan.[73] As Louisiana spends RESTORE dollars, it should be mindful not only of the project parameters in the Act, but also how the perception of responsible spending strengthens the case for direct allocation of future oil spill dollars.

The need for responsible use of *Deepwater Horizon* dollars extends to Louisiana's coastal political subdivisions. Coastal parishes will receive 30% of the state's share of Pot 1 money, about $92 million.[74] The parish share of RESTORE funding is subject to the same limitations as the state's share -- and susceptible to the same abuses. "This range of options creates an important decision point…whether to leverage the windfall resource for impactful restoration and protection projects or spend the money on roads, ports, government operations or other purposes. The temptation will be to spread the money thinly for political reasons."[75] One way parishes can leverage their share of RESTORE funds is by taking advantage of a proposed state matching program. Parishes that elect to build projects in the Coastal Master Plan with parish dollars can get locally important projects off the ground sooner and receive a financial contribution from the state.

On the other hand, coastal parishes facing budget difficulties may be tempted to divert money earmarked for restoration to plug holes in the general budget. One possibility to guard against is the use of RESTORE reimbursements to remove restrictions on local GOMESA dollars. Under GOMESA, coastal parishes receive an annual share of OCS revenue. Parish GOMESA funds are subject to the same use restrictions as the state share. GOMESA distributes funds up front, while RESTORE reimburses parishes for money already spent. A parish could conceivably use GOMESA funds to pay for a project then seek reimbursement with RESTORE funds. It is unclear whether the reimbursed funds would still be subject to GOMESA's restrictions. If the funds are no longer restricted, the RESTORE reimbursement will have effectively laundered the GOMESA funds into the general budget, halving the amount of parish funds restricted to restoration. Again, even if such a loophole is technically permitted, it would be shortsighted to use. Mishandling of funds will bolster proposals to direct GOMESA revenues to nationwide programs and erode any future claims to direct allocation of spill-related funds.

Prospects: *The ink is dry on the* Deepwater Horizon *settlement, and that amount of money is set. Any chance of state control over future spill dollars rests on the responsible use of current spill-related money.*

H. Federal Funds for Parishes and Municipalities

Parishes and municipalities along the coast face the same challenges as the state with fewer avenues to federal funding. While the fate of these areas is largely tied to the success of the Coastal Master Plan, there are local responsibilities not included in the Plan that are essential to the long-term viability of coastal communities. The costs of providing water infrastructure, floodplain management through land-use regulation and building codes, and maintenance of existing flood control structures, are largely borne by political subdivisions. As noted above, local shares of GOMESA and RESTORE funding, especially if leveraged with state matching funds, can be a shot in the arm for parishes and municipalities looking to implement important projects. These political subdivisions should also position themselves to receive federal funds from sources like competitive grant programs.

The full panoply of federal grant programs is vast and varied. Federal grants range from thousands of dollars from the Department of Commerce to develop regional habitat restoration plans to millions through the Land and Water Conservation Fund to acquire public lands. An exhaustive discussion of all the possibilities here is implausible.[76] That said, coastal political subdivisions should be mindful of three generally applicable factors that can greatly improve their chances of attracting federal funds. First, a municipality with a plan in place, or better still an active program, makes for a more attractive funding option. Second, engagement with philanthropic and non-governmental actors familiar with the federal grant process helps eliminate any learning curve and leverage existing expertise. Finally, partial local funding will always be attractive for federal agencies looking to maximize the value of taxpayer dollars. New Orleans' recent experience with the National Disaster Resilience Competition exemplifies the importance of these three factors.

The City of New Orleans will receive $141,260,569 in National Disaster Resilience Competition (NDRC).[77] The grant competition is administered by the U.S. Department of Housing and Urban Development to fund projects and programs designed to increase resilience and adapt to climate change.[78] New Orleans will use the funding to establish its first-ever "Resilience District" in the Gentilly neighborhood. The proposed Gentilly development is drawn from the City's Resilience Strategy. That document, in turn, drew heavily on the Urban Water Plan. A centerpiece of the Urban Water Plan to be developed as part of the NDRC grant is the Mirabeau Water Garden, a 25-acre space that will integrate public space and lowland water management. It is part of the

effort to "turn the Gentilly neighborhood into a national model for retrofitting post-war suburban neighborhoods into resilient, safe and equitable communities of opportunity."[79]

Funding for the competition comes from the Community Development Block Grant (CDBG) disaster recovery appropriation provided by the Disaster Relief Appropriations Act, 2013.[80] The CDBG generally, and the NDRC specifically, focus on building resiliency from the community level. Two of the objectives of the NDRC are to "leave a legacy of institutionalizing—in as many states and local jurisdictions as possible—the implementation of thoughtful, sound, and resilient approaches to addressing future risks…[and] Leverage investments from the philanthropic community to help communities define problems, set policy goals, explore options, and craft solutions to inform their own local and regional resilient recovery strategies."[81]

In New Orleans, the Gentilly project represents a break from tradition. New Orleans is "done fighting water," it will no longer focus all its efforts on treating it like an invader to be repelled.[82] Instead, the Gentilly resilience district seeks to incorporate water into the landscape. The HUD proposal focused not only on the benefits of the project itself but also on the development of turnkey techniques and solutions to be implemented citywide. According to Chief Resilience Officer Jeff Hebert, "the way we designed our submission was to concentrate these efforts in one area of the city in order to prove its viability and then transfer it to other parts of the city."[83] The HUD grant is not just going to build one project; it is going to build a template for future city investment.

New Orleans' grant can be seen in part as a vindication of the City's engagement with the philanthropic community, specifically the Rockefeller Foundation's 100 Resilient Cities initiative. "This award is proof positive that if a city acts on resilience principles, it will start seeing major dividends...The investments will come from all levels of governments, philanthropic entities, and private sector actors who want to work in resilient places."[84] In New Orleans, HUD saw an opportunity to fulfill one of the objectives of the NDRC program and leverage pre-existing philanthropic efforts at the community level.

Prospects: *It is impossible to say with certainty the amount and types of grants that political subdivisions will receive. All should be aware of the opportunities and, where possible, engage the philanthropic community to maximize chances of winning grants.*

The Federal Government will continue to play a major role in Louisiana's coastal protection and restoration efforts. The traditional sources of funding for the Coastal Master Plan identified above will be essential, but it is important to keep in mind that they are far from guaranteed, and even further from sufficient. Delays inherent in the authorization and appropriation process

hamper the Army Corps of Engineers' effectiveness in dealing with the needs of a rapidly changing coast. Other federal programs like GOMESA and CWPPRA are subject to continued Congressional support. Finally, the *Deepwater Horizon* settlement will provide significant funds for the Coastal Master Plan, but will only be a down payment towards the goals. Prudent use of the settlement money will advance the Master Plan in the near term, and improve the chances of allocating future spill-related penalties directly to the State.

IV. NON-TRADITIONAL FEDERAL OPTIONS

A. National Security

Globally, there is increased recognition of the imminent need to address the risks climate change poses to human welfare.[85] Much of the U.S. legal framework in place to manage these risks, however, relies on environmental, health, and public works justifications.[86] In order to address the risks facing coastal regions effectively, the United States needs to acknowledge the nature - and immediacy - of the risks and invest resources accordingly. This is starting to happen in at least one sphere of action: national security. The Department of Defense (DoD) has begun to assess the national security implications of climate and coastal change. In the DoD's 2014 Climate Change Adaptation Roadmap, Defense Secretary Chuck Hagel wrote "[p]olitics or ideology must not get in the way of sound planning. Our armed forces must prepare for a future with a wide spectrum of possible threats, weighing risks and probabilities to ensure that we will continue to keep our country secure."[87]

There is broad consensus within the defense community that climate and coastal change pose a legitimate threat to national security. The DoD's Climate Change Adaptation Roadmap states "climate change will affect the Department of Defense's ability to defend the Nation and poses immediate risks to U.S. national security."[88] The Navy's Climate Change Roadmap notes that "Climate change is affecting, and will continue to affect, U.S. military installations and access to natural resources worldwide."[89] The 2015 National Security Strategy recognizes that "Climate change is an urgent and growing threat to our national security...Increased sea levels and storm surges threaten coastal regions, infrastructure, and property."[90]

Still, some lawmakers have challenged efforts to respond to this risk: In 2014, House Republicans tried to include provisions in the National Defense Authorization Act that would have prohibited the use of funds on climate change assessments and reports. In June of 2016, the House passed a similar amendment to their defense authorization bill.[91] The amendment prohibited the Pentagon from spending money on a plan to prepare for the impacts of climate change.[92] Though the DoD budget is not immune from politicization, in the face of continued Congressional stagnation, "[t]he most politically feasible and compelling argument for addressing climate change promptly is that U.S. security depends upon it."[93] Treating climate and coastal change as an acute, near-term threat to the lives and livelihoods of citizens bolsters the rationale for funding adaptation sooner rather than later.

Service men and women, like their civilian compatriots, also live and work in at-risk coastal areas. In the United States, a significant number of military installations are already at risk from sea level rise. 10% of all Department of Defense installations are located at or near sea level.[94] In 2008, the National Intelligence Council estimated that at least 30 military installations in the continental US were already facing elevated risk from sea level rise.[95] "DoD assets positioned on coasts and islands will be threatened by increased coastal hazards, which will ultimately threaten the Department's ability to sustain those resources needed for training, day-to-day operations, and assigned missions, in the face of climate change and sea level rise."[96] The Navy has expressed concern that storm surge and sea level rise will increase the likelihood of inundation at coastal installations, which will ultimately restrict mission readiness and availability.[97] The DoD is assessing adaptation strategies because "operational readiness hinges on unimpeded access to land, air, and sea training test space."[98] The Union of Concerned Scientists analyzed 18 military installations along the East and Gulf Coasts.[99] They found that all but two could flood 100 times per year by 2050.[100] Moving bases and training areas away from the coast will not only be costly, it will require a realignment of operational access points and a broader recalibration of strategy as the geographic distribution of forces changes.

Climate change does not pose an immediate risk to coastal installations alone; it also threatens the critical infrastructure that sustains military operations around the world, as well as non-military assets that are essential to national security. "The term 'critical infrastructure' means any systems and assets… so vital to the United States that the degradation or destruction of such systems and assets would have a debilitating impact on national security, including, but not limited to, national economic security and national public health or safety."[101] Treasury Secretary Jack Lew noted that the economic cost of climate change is most notable in the area of infrastructure "which is fundamental to our economy's productivity and competitiveness."[102] The same critical infrastructure that our military relies on also maintains national economic security. For example, the 2014 National Climate Assessment specifically highlighted the vulnerability of Louisiana's Port Fourchon, which is the entry point for 18% of the nation's oil and 90% of the Gulf of Mexico's offshore oil and gas.[103] The Gulf Intracoastal Waterway would also be impacted under current sea-level rise projections. The GIWW allows shipping of fuel and other supplies to critical military installation along the Gulf, like Eglin Air Force Base in Florida.[104] Troop mobility is dependent on petroleum and the continued viability of the fuel supply chain. More fundamentally, the nation's economic security hinges on the energy resources needed to power commerce.

The DoD perceives climate change as a threat not only to built infrastructure but also to critical natural infrastructure: "The loss of natural areas, such as barrier islands and wetlands, is a fundamental factor determining vulnerability. These areas function as protective buffers, absorbing energy and water from storms…Installation vulnerabilities may be exacerbated by the loss or compromise of protective wetlands, beaches, dunes, and other coastal ecosystems."[105] The Marine Forces Reserve, for example, is the command headquarters for approximately

40,000 Marine Reserves. Headquartered in New Orleans, the base is on the front lines of sea level rise. The Naval Air Station Joint Reserve Base, located farther downriver in Belle Chasse, is at even greater risk. Maintaining the viability of these installations will largely depend on efforts to prevent coastal land loss in south Louisiana. Natural infrastructure also supports troop preparedness by providing training environments and realistic combat conditions. Protecting and restoring these vulnerable natural assets will preserve their own inherent value and help alleviate the risk to built infrastructure.

The DoD's Readiness and Environmental Protection Integration program (REPI) recognizes the strategic value of natural infrastructure. Since 2002, the program has engaged in a strategy designed to ensure the sustainability of military installations.[106] "Pursuant to this authority, the [DoD] funds cost-sharing agreements with state and local governments and conservation organizations to promote compatible land uses and preserve habitats near military installations."[107] The DoD requested $60 million for the project in its 2017 budget.[108] In testimony before a Senate Subcommittee, acting Assistant Secretary Pete Potochney touted the financial benefits of the program: "Even in these difficult economic times, REPI is able to directly leverage the Department's investments at least one-to-one with those of our partners, effectively securing critical buffers around our installations for half-price."[109]

In Louisiana, only two REPI projects have received funding.[110] Through FY 2016, total expenditures in Louisiana (including non-federal partner expenditures) are slightly over $12 million.[111] Only one project is in the coastal zone.[112] The REPI program partnered with the State, Plaquemines Parish, and The Trust for Public Land to preserve 202 acres of wetland buffer around the Naval Air Station Joint Reserve Base.[113] This is a fine start, but expanded use will be necessary to preserve operational readiness at southern Louisiana's coastal military installations.

President's Authority vs. Congressional Purse Strings

Military recognition of the national security threat posed by climate change gives the executive branch some latitude to address the issue, despite Congressional quiescence. The DoD can, and has begun to, plan for risks. Nevertheless, actual implementation of risk-management efforts at military installations is lacking. Constitutional separation of powers ultimately requires Congress to approve funding for climate-resilient infrastructure. Still, the President can use the Commander in Chief power to continue to plan for adaptation and impress upon Congress – and the public generally – the need for funding to implement those plans. In September of 2016, President Obama issued a memorandum, directing the heads of executive departments and agencies "to perform certain functions so that climate change-related impacts are fully considered in the development of national security doctrine, policies, and plans."[114] Under this memorandum, agencies are required to develop implementation plans to identify climate change impacts and "act on climate change-related related threats to infrastructure at the asset, system, and regional level."[115]

Congress has also given the executive branch some authority to take limited action under the National Security Act (NSA). Specifically, the NSA created a Committee on Transnational Threats to "coordinate and direct the activities of the United States government relating to combating transnational threats."[116] A transnational threat is defined as "[a]ny transnational activity that threatens the national security of the United States."[117] Climate change almost certainly fits this definition. It is a global threat not confined to borders, and the military has acknowledged it as a legitimate threat to national security.[118] The authority granted by the NSA to coordinate and direct activities, however, does not necessarily include funding for such activities.

The President's authority to fully address climate change as a national security issue is ultimately circumscribed by Congress' power of the purse. "Congress has nearly plenary authority to limit the President's ability to fund climate resilient infrastructure. Still, as Commander-in-Chief, the President can continue to organize, command, and plan for climate change's impacts at home."[119] While the executive branch can exercise discretion, it cannot go against the express will of Congress. Congress has exercised this will by placing riders to prohibit the use of funds for specific purposes. This illustrates the inherent tension between the executive power over the sword and the Congressional power of the purse.

Ultimately, upgrading and protecting existing infrastructure will require Congress to get on board. While the national security implications do not grant the President authority to override the appropriations process, they do provide political cover as a separate justification for action. Additionally, defense spending is around $600 billion annually. It accounts for roughly 15% of all government spending, and just under half of discretionary spending.[120] Aligning climate change impacts with national security could open up a significant and largely untapped source of funding for adaptation.

Lessons from the Highway

In the past, national security justifications have been instrumental in overcoming political opposition to domestic projects. The interstate highway system is a primary example. In 1944, Congress passed the Federal Highway Aid Act and called for the development of a standardized interstate network of roads to link the nation.[121] By 1947, "the vast majority of the route selection was in place."[122] Nevertheless, construction stalled due to a longstanding ideological divide. On one side, a coalition believed that the states should be in charge of funding and constructing the roads.[123] On the other side, the Federal Government and a coalition of interests (including the American Automobile Association) advocated for federal funding and control of the interstate system.[124] This divide loosely fell along party lines; Democrats favored federal control while Republicans sided with the states.[125]

In 1955, eleven years after the Federal Highway Aid Act, Congress finally authorized funding and construction of the interstate system. Part of the final push that brokered a compromise between the federal and local camps was a new focus on the interstate system's important role in

national security. In January of 1955, The President's Advisory Committee on a National Highway Program issued its final report outlining a plan for a national highway system.[126] The first point in the report's conclusion was that "a safe and efficient highway network is essential to America's military and civil defense."[127] The report specifically presented the military purpose of the interstate system as necessary to evacuate citizens in the case of a nuclear attack. This focus on defense became a focal point of the legislation passed later in 1955. [128]

The physical plans for a national interstate system did not change, but the focus on national security helped shift the narrative away from politically fraught disagreement over the proper balance between federal and state power.[129] It also created an emphasis on expediency and lent political cover to actors who might otherwise have been locked into an ideological stance.

National security has the potential to play a similar role in climate politics. The narrative around climate change is regularly framed along party lines, as the interstate highway system once was. Conservatives advocate for economic growth, as opposed to the precautionary environmental approach of progressives. National security, however, is neither anti-growth nor anti-environment. A recent paper from the Atlantic Council, an international affairs think tank, recommends a shift in policy narratives. "Make the climate security concept part of a comprehensive narrative tying climate insecurity to the United States' core national interests…it needs to be framed as a long-term threat to US national security, requiring sustained attention to a fight against a determined and increasingly powerful foe."[130]

By emphasizing the need to implement climate and coastal change mitigation and adaptation strategies around critical infrastructure, supply chain, training and mobility, and military preparedness, the context for understanding and prioritizing coastal investment might be realigned. Addressing the national security implications supports the larger need for the kind of infrastructural modernization that is broader than environmental protection and critical to the future welfare of the country. "If environmental protection is defined as an issue of the big, intrusive government interfering in free enterprise, then the partisan divide of the past several decades will be reinforced and the issue will remain divisive."[131] On the other hand, if

addressing climate impacts is presented as critical to military and economic security, it could shift public opinion and political will.

Prospects: *The military, across all branches, recognizes that climate change is a direct threat to U.S. citizens as well as a 'threat multiplier' to military preparedness, critical infrastructure, and national economic security. Protecting southern Louisiana protects American lives and property. It also protects military installations like the Marine Corps Forces Reserve Headquarters. Lastly, coastal restoration and protection helps secure critical energy and trade infrastructure that supports military preparedness and national economic security. Louisiana's congressional delegation should advocate for increased DoD spending to protect the coastal zone to the benefit of both the state and national security interests.*

V. STATE FUNDING OPTIONS

As important as it will be to press for funds from the Federal Government, Louisiana cannot afford to depend on or wait for it. It is fundamentally Louisiana's future at stake; the state cannot count on the American people or the Federal Government to invest if it has not done so first. It cannot be over-emphasized that the Federal Government is not obliged to provide — or keep providing — any funding for the conservation, restoration, and protection of coastal Louisiana. That funding is going to have to be earned, a task that will be increasingly competitive as other regions come to terms with their own coastal and infrastructure needs. Further, for projects and programs that are vital to state or local interests, it may be necessary for state and local governments to find the revenues to carry on without federal participation. Even if Louisiana is successful in securing additional federal funds, the use of those funds is generally dependent on a state or local project partner providing a cost share match—normally at least 25%, more commonly 35%. Without a sound financing foundation at the state and local levels, federal funding is no assurance that vital projects will in fact proceed. It will be hard to justify federal spending on the state without a demonstrated local commitment.

Louisiana's relatively small economy and tax base and its current fiscal situation pose hurdles for robust coastal spending. The state is facing its largest budget crisis since the 1980s.[132] Even if creative revenue streams are developed, there will be tremendous pressure to use the funds on hospitals, schools, and other essential government services. The *Deepwater Horizon* settlement will provide an infusion of cash, much of it dedicated to coastal restoration, but it won't be nearly enough. Settlement money can be a down payment, not a long-term revenue model. Like a down payment, the money buys time to develop other sources.

A similar conclusion applies to the ongoing litigation between the State and several of its political subdivisions against various members of the oil and gas industry for injuring their

property and/or failing to meet their obligations to restore the coastal landscape impacted by their operations.[133] These are complex cases playing out in a charged political environment, but they have the potential to produce significant judgements or settlements that could be a source of funding for coastal restoration and protection projects, much as was done with parts of the Deepwater Horizon settlements.[134] This would be most significant for parish governments and other political subdivisions that will be struggling to find the financial freeboard to live up to their responsibilities under the Master Plan and related coastal protection and stewardship programs. As a practical matter, it may also be difficult to pursue some the financing options available to state and local governments if the specter of liability hovers over significant dollars that could be devoted to these causes. In any case, it is important to keep in mind that even if these cases are successful it is not automatic that significant dollars would go to coastal projects. The ultimate fate of those dollars would be determined by the terms of the judgements or settlements arrived at in those case. In short, new dollars only equal project finance if someone makes that happen.

This section discusses the state's current fiscal outlook and some potential options to raise state revenue.

> "Louisiana must lead by example and make responsible investment decisions that will ensure Washington and the nation that protection of the Louisiana coast is in the national interest and worthy of national support. The state should demonstrate that the dollars flowing from this national support will be safeguarded." [135]

A. Taxes

The most straightforward coastal revenue raising measure to consider is increasing current taxes and dedicating the marginal increase to the coastal restoration trust fund. Discounting the obvious political and social difficulties of raising taxes, it is worth considering the options and evaluating them on their merits. Accordingly, the discussion below is descriptive in nature and does not advocate for any or against any financing vehicle.

Louisiana's fiscal woes will continue to put pressure on the state to divert coastal restoration funds for other uses. Even after passing a number of tax increases, the state currently faces a budget shortfall of approximately $600 million for the 2017 fiscal year.[136] Worse, many of the tax increases are temporary measures set to expire in 2018.[137] The state still needs long-term solutions to stabilize the general budget. Further, some of the tax measures used to fill holes in the general operating budget will be unavailable as funding mechanisms for coastal restoration and protection. For example, the state raised its portion of the sales tax in April 2016.[138] As a result, the combination of local and state sales tax in Louisiana now averages 9.99% across all parishes.[139] That increase means Louisiana has the highest combined sales tax of any state in the country.[140] It is, therefore, unlikely that a *further* sales tax dedicated to coastal restoration would be politically palatable. Even if it were, it would at best be an incremental piece of a more

comprehensive financing program. A recent one-cent sales tax, for example, is expected to raise $440 million per year during the 2016-17 and 2017-18 fiscal years.[141]

Before getting into an analysis of any specific type of tax, it is important to make to two points clear. First, there are legal and practical limits to the state's taxing options. Second, there is no single source of untapped tax revenues to cover the funding gap for coastal restoration, protection, and coastal community resilience programs. There are no silver bullets.

B. Property Taxes

Louisiana could assess a special tax on property. Constitutionally, state property tax "shall not exceed an annual rate of five and three-quarter mills on the dollar of assessed valuation."[142] There is currently no state property tax in Louisiana as property taxes are assessed at the parish level. In calendar year 2015, Louisiana parishes collected $4.389 billion in total tax receipts.[143] Much of this comes from property taxes levied on the real estate, personal property, and property of public service corporations located in the state, valued at nearly $47 billion.[144]After homestead exemptions, the total taxable value of property was $39.851 billion.[145] The assessed value of all real estate was $26,962,280,180.[146] Property taxes averaged 110.13 mills or 11.013% of assessed value.[147]

Among states, Louisiana has a comparatively low property tax rate. Aligning it closer to national averages could raise significant funds. Further, because of the homestead exemption, it is less regressive and places a smaller burden on owner-occupied housing. According to the Tax Foundation, Louisiana ranked 48th in owner-occupied property tax collections for fiscal year 2013, with a per capita average of $849 compared to a U.S. average of $1,439.[148] Another study divided each state's median real-estate tax payment by its median home price to derive an "effective real estate tax rate." Louisiana's effective rate was the third lowest in the country.[149]

Prospects: *If Louisiana imposed a state-level property tax of 5.75 mills, the constitutional limit, on just the assessed value of real estate it could raise approximately $155 million per year.*

C. Gasoline Tax

Another option for the state to consider is an excise tax on gasoline. The state currently taxes gasoline at a rate of 20.01 cents per gallon, compared to a national average of 29.78 cents per gallon.[150] Louisiana's gasoline taxes are the eleventh lowest in the country (including Washington D.C.).[151] In FY 2013-2014, the state taxed 2,268,874,325 gallons of gas and collected $449,369,101 (after accrual adjustments).[152] The gas tax is dedicated to the transportation fund, and could not directly pay for coastal restoration projects.[153] Increased

transportation funding would, however, reduce the pressure to divert coastal dollars for highway projects.

Prospects: *If the state raised its gasoline tax to the national average, an increase of 9.77 cents per gallon, it would raise approximately $221.7 million in revenue.*

D. Reduction/Elimination of Tax Exemptions

Aside from an increase in tax rates, the state could eliminate or reduce exemptions to increase collections. A full assessment of all the exemptions in the state tax code is beyond the scope of this paper. In 2015, the Louisiana legislature commissioned a study to examine the state's tax structure and recommend changes to improve Louisiana's financial outlook.[154] One of the study's recommendations was "to eliminate or scale back substantially the horizontal drilling exemption."[155] The exemption encourages horizontal drilling by exempting operations from severance tax for up to 24 months or until the payout of the well is achieved. Horizontal drilling is one of the primary extraction methods for hydraulic fracturing (fracking).[156] When the exemption was created in 1994, fracking was in its infancy. Despite the fact that fracking has matured and the market continues to expand, the exemption remains. In 2014, the horizontal drilling exemption cost the state over $166 million.[157] From 2010 to 2014, the state forfeited $1.15 billion in severance taxes because of an exemption "created in an entirely different market and technology environment than the present."[158] There are currently no other states that allow a tax suspension on horizontal wells.[159] Further development of the Haynesville Shale and the Tuscaloosa Marine Shale is probable, and the state should sunset the horizontal drilling exemption.

Prospects: *Assuming shale development continues at current levels, eliminating the horizontal drilling exemption could provide another $166 million per year.*

Coastal protection and restoration funding requirements will continue to face stiff competition from the traditional needs of the State. The taxing measures discussed above might be better used toward those ends. None of these options is sure-fire. Louisiana would be the first state with a statewide property tax, and a gas excise tax is a regressive tax that would disproportionately affect low-income Louisianans. Raising taxes to these levels may be unsellable to voters in a state that ranked 48th in median household income in 2014[160]and had the third highest poverty rate in the country.[161] Repealing the horizontal drilling exemption would require significant political will. While exploring these traditional revenue mechanisms, Louisiana should also investigate more innovative approaches to financing the coastal master plan.

E. Pipeline Tariff or Hydrocarbon Processing Tax

This option inevitably comes up when the topic of new revenue sources for the state is discussed. It is mentioned either as a potential source of revenue or as a legal and economic nonstarter. In reality, it is probably neither. A better place to begin a discussion of this option is by considering what a tax might look like and how it might be structured so as to not run afoul of federal law, including the Commerce Clause of the U.S. Constitution.

The state has explored ways to increase taxes on oil and gas activity. A dedicated increase in severance taxes is one option; however, that would only apply to oil and gas produced within the state. The trend over the past decades has been for production to shift offshore or to other states, with Louisiana hosting the supporting and refining industries and shouldering an increasingly disproportionate share of the burdens compared to the benefits. An increase in severance taxes would then be limited in scope and impact as a revenue source.

In order to reach the bulk of the oil and gas activity in the state, the state would need to impose a tax or tariff on oil and gas transported through Louisiana's coastal zone or hydrocarbons processed in Louisiana. By imposing the tariff on oil and gas transported through, not just produced in, the state, the tariff would reach oil and gas originating from federal offshore (Outer Continental Shelf, or OCS), state offshore and onshore locations in coastal parishes, and oil imported by the Louisiana Offshore Oil Port (LOOP). It would be assessed on the value of the oil and gas. A tax on the transportation of oil and gas through coastal Louisiana is a strong option for raising significant revenue from an activity closely related to coastal Louisiana.

The concept of a tariff on the movement of oil and gas through pipelines, many of which are located in wetlands, is not a new one. On several occasions, dating back to the 1970s, the Louisiana State Legislature has attempted to impose such a fee.[162] That history, briefly recounted here, provides guidance on how to avoid the pitfalls that have blocked past attempts.

In 1978, the Louisiana legislature passed a "First Use Tax on Natural Gas."[163] The First Use Tax essentially only applied to natural gas production on the Outer Continental Shelf. The U.S. Supreme Court in *Maryland v. Louisiana* struck down the law as unconstitutional.[164] The Court held that the law violated the Supremacy and Commerce Clauses of the United States Constitution; it was found to usurp power granted by Congress to the Federal Energy Regulatory Commission under the Natural Gas Policy Act, and it discriminated between in-state and out-of-state OCS producers.[165] The Court, however, did not rule out the constitutionality of such a production tax if properly constructed.

Three subsequent efforts failed to become law. In 1982, the Louisiana legislature introduced House Bill No. 1660, calling for a "Coastal Wetlands Environmental Levy" or CWEL.[166] The bill proposed a tax of one cent per mile for each of the first six miles of transportation through Louisiana's coastal wetlands."[167] Although the stated purpose was to fund coastal restoration, the bill failed to include a dedication of funds for that purpose.[168] CWEL received a majority vote of

the legislature but failed to obtain the two-thirds majority required for passage.[169] In 2000, the Senate attempted to pass a hydrocarbon processing tax, but the bill failed to pass a floor vote with 17 in favor and 22 opposed.[170] Most recently, a hydrocarbon processing tax that would impose a 4 percent tax on all oil and gas processed in the state failed to achieve the necessary votes in the House.[171]

These past attempts to tax oil and gas production, including OCS production, have left many with the belief that the concept is unconstitutional. This may not be the case. The most difficult constitutional hurdles that the pipeline tariff would have to clear are the Supremacy Clause, the Commerce Clause, and the Import-Export Clause.

The Supremacy Clause of the U.S. Constitution states that federal laws are the supreme law of the land and that all states are bound by them regardless of state laws or state constitutional provisions to the contrary.[172] The First-Use Tax violated the Supremacy Clause because it mandated that the tax could not be passed backward to producers, and thus forced the burden of the tax downstream to out-of-state consumers.[173] The Natural Gas Act gave the Federal Power Commission, the predecessor of the Federal Energy Regulatory Commission ("FERC"), the power to regulate the determination of cost allocations associated with the sale of natural gas to consumers.[174] The Court found that the structure of Louisiana's tax interfered with FERC's ability to regulate cost allocation and usurped FERC's authority.[175] The pipeline tariff would not have such a provision, avoiding a fatal mistake of the First-Use Tax.

The Commerce Clause of the Constitution has a negative corollary that restricts the States' ability to regulate and affect interstate commerce. This doctrine is known as the Dormant Commerce Clause. In a 1977 landmark case, *Complete Auto Transit v. Brady*, the Supreme Court articulated a four-part test to determine if a state tax violates the Commerce Clause.[176] The Court in *Maryland v. Louisiana* applied this test to invalidate the first-use tax.[177] First, there must be a "substantial nexus" between the taxpayer and the state to warrant the imposition of state tax authority.[178] Here, the physical movement of the taxpayer's property through Louisiana is likely a sufficiently substantial nexus. Second, the tax must be "fairly apportioned", meaning that the tax is structured in a way that does not tax more that the state's fair share and lead to multiple taxation if other states impose the same tax.[179] A pipeline tariff would be fairly apportioned if limited to the distance transported within the state.[180] Third, perhaps most important, the state must treat out-of-state taxpayers and in-state taxpayers equally.[181] Unlike the "First Use Tax", a valid pipeline tariff would not discriminate against out-of-state taxpayers in favor of in-state interests. Fourth, the tax must be fairly related to services provided to the taxpayer by the state.[182] By directing the tax revenue to restore the very coastal wetlands where the pipelines are located, the tax bears a fair relation.

The Import-Export Clause is an enumerated power listed in the U.S Constitution and reserves the power to tax, tariff, or impose duties on goods imported from other countries.[183] A state tax runs afoul of the Import-Export Clause if the tax impinges on the Federal Government's exclusive

regulation of foreign commerce, diverts anticipated federal import revenues to the state, or interferes with the free flow of imported goods among the states.[184] The clause was meant to "prevent the imposition of exactions which were not more than transit fees on the privilege of moving through a State."[185] The question of whether a tariff is a transit fee "must be answered by inquiring whether the State is simply making the imported goods pay their own way, as opposed to exacting a fee merely for 'the privilege of moving through a State.'"[186]

The pipeline tariff might seem to violate the Import-Export Clause with respect to the oil piped from LOOP. The pipeline tariff, however, is not really a fee on the privilege of moving through the State. It is a way to ensure that others can enjoy the privilege by restoring the environment through which it moves. Louisiana's wetlands provide critical protection for the extensive pipeline infrastructure that the nation's oil and gas industry relies on.[187] To the extent that the use of that infrastructure negatively impacts those wetlands, a pipeline tariff is more like a bridge toll that pays for the maintenance of the bridge. Like a bridge toll, the tariff would be a way of requiring oil imported from LOOP to pay its own way by contributing to the maintenance costs for the natural infrastructure it relies on for protection.

Prospects: *Estimates of the revenue potential vary widely. The most recent attempt would have placed a 4 percent tax on the value of hydrocarbons processed within the state. The bill's sponsor estimated that the tax would raise $1.6 billion annually. Other assessments project substantial short-term revenue that decreases over time as refiners take their operations – and jobs – out of the state.*

F. Tax on Water Use

Louisiana has long relied heavily on taxing the extraction of its natural resources—sand, gravel, sulfur, timber, salt, coal and of course oil and gas. The major exception to that is water. For the most part, the state has allowed water (primarily groundwater) to be withdrawn in limitless quantities, for any purpose, without compensation. There have been reasons for that, reasons grounded in riparian rights, property rights, human rights, and a culture that has viewed water as abundant and renewable. There are also reasons that may be changing.

Groundwater, like oil and natural gas, is a fugacious resource; it moves. Under Louisiana's Mineral Code, it is not owned as private property until someone lawfully takes possession of it.[188] Louisiana charges (subject to some exemptions) a severance tax on oil and gas produced in-state, including from wells on private property. The tax rate is up to 12.5% of the value of the oil and 16.3 cents per Million Cubic Feet (MCF) of natural gas.[189] This is a major source of revenue for the state. Louisiana collects no severance tax on groundwater, even though it is covered by the Mineral Code.

The analogy between water and petroleum is apt up to a point, but incomplete. Water is something essential to life and for which there is often no substitute. Any effort to tax its withdrawal would require special care and attention. On the other hand, a carefully conceived tax could facilitate the conservation of groundwater in ways that ensure its broader availability for drinking water and public health and welfare purposes.

Prospects: *Before a tax on groundwater use could be designed it would first be necessary to know how much groundwater is being used and for what. For the most part that data does not exist today, though the United States Geological Survey has estimated that daily groundwater withdrawals in 2010 were approximately 8,500 million gallons per day. The state now requires the registration of wells with a capacity of more than 1,500 gallons of water per minute, but there is no requirement to measure water use, much less report it, except in areas in which the Commissioner of Conservation has declared an Area of Ground Water Concern.*

G. Sale of Water

Related to a tax on water use is the sale of water, a topic loaded with intriguing possibilities and dangerous crosscurrents. The growing demand for water beyond traditional users (fracking, for example) and beyond Louisiana's borders will likely force this issue, and it deserves careful consideration. Generally, the running waters of the state are public things and cannot be sold—except when they are. Water and other natural resources are held in trust by the state for its people and natural heritage but are not subject to any definitive standards. Presently, constraints are in place on when the state can sell its water and for how much. Since running waters are public things, they are not generally alienable, at least for a profit. For example, riparian landowners (those who own land next to a stream) may use that water on their estates as long as it does not injure another lawful user. A good example of this is a landowner's use of water to irrigate a field or as industrial cooling water. Another example is water utilities licensed by the state to sell water to individuals and business in a given service area. Those consumers may then capture that water and sell it; indeed, much of the modern bottled water industry is based on that model. None of this generates much, if any, revenue for the state.

There are some exceptions to that. The most notable shift in this direction came in 2010 with the enactment of Act 955 (subsequently renewed) to allow the state to sell surface water to non-riparians through the use of Cooperative Endeavor Agreements and the 'payment' of fair market value for the water.[190] In reality, there is no clear standard for determining the fair market value of water. Further, there is no actual payment requirement since the act allows the prospect of amorphous and uncertain economic benefits (i.e. jobs) to suffice. For water sales to become a real source of revenue, the State needs a firmer foundation than Act 955.

The Sabine River Authority (SRA) may sell water to finance its operations, but that authority is rooted in the Sabine River Compact, a federal law. In 2012, the SRA proposed to sell up to 600,000 acre-feet of water from Louisiana's allotment of Sabine River water in Toledo Bend Reservoir to a private water broker for a period of 99 years. Some estimates placed the value to the SRA at more than $54 million annually.[191] Ultimately, that sale was not approved due in large part to questions about its long-term value and impacts on downstream flows. Nonetheless, it is a reminder that others are prepared to put a price on Louisiana's waters. A similar but smaller proposal is pending in Arkansas for Mississippi River water.

A key element to any water sale by Louisiana will be whether the state actually has water to sell. Compared to many states Louisiana has an abundance of water, but abundance does not necessarily mean surplus. Until a comprehensive statewide water budget is completed, it would be imprudent to sell rights over waters that are already in use by municipalities, navigation, ecosystems, and agriculture to name a few. Additionally, if Louisiana enters the private water market, it could find itself in a precarious position, defending its water sales while arguing that states upriver on the Mississippi River cannot do the same. Louisiana should be careful not to prioritize immediate cash flow over long-term water availability and security. A further understanding of what water the state has, and what it needs that water for, must precede any dedication of the resource for sale.

Prospects: *The legal and technical foundation for selling water does not currently exist. The Louisiana State Law Institute has created a Water Code Committee to develop a draft comprehensive water code for the state in response to a resolution by the Louisiana State Senate. That Committee's work will be guided by established water policies and priorities and the best available data and models describing the sources and uses of Louisiana's waters. It is premature to speculate on what the water budget or water code efforts will produce and whether water sales might become a financing vehicle.*

H. Mitigation and Environmental Impact Banks

Under both state and federal law, activities affecting public waters, including wetlands, are subject to regulation and damages to those resources are to be mitigated.[192] When the impacts cannot be avoided, they are to be compensated for in some manner that replaces (in theory) the functions and values of what was damaged or destroyed. This can lead to piecemeal mitigation that fails to deliver desired benefits or even runs counter to the aims of the state's Coastal Master Plan. To gain the benefit of more aggregated efforts and easier compliance, monitoring the use of mitigation banks has been encouraged and grown.

Expanding on the idea of mitigation banks, U.S. Representative Garret Graves (LA) proposed an "environmental bank" which would allow industries, government agencies, and individuals to offset the effects of construction projects on wetlands, wildlife, and oil spills with payments that fund major state restoration projects. The 2016 Water Infrastructure Improvements for the Nation Act called for the CWPPRA Task Force to "issue guidelines for the use, maintenance, and oversight of environmental banks in Louisiana."[193]

Since legal mandate drives mitigation, as compensation for ecological damage to the very landscape Louisiana is committed to conserving and restoring, this cannot be considered a financing option. It is not possible to mitigate our way to a more sustainable coast. This does not mean that mitigation will not play a vital role in caring for our coast, but it is not a bona fide technique for financing actions intended to raise the bar on restoration and protection.

Prospects: *The use of mitigation dollars and assessed fines and penalties to fund work that is consistent with the Master Plan and other comprehensive plans makes sense in many cases. But it is not is a really a financing option. At their cores, the Coastal Master Plan, Urban Water Plan and other such efforts are about making things better. They cannot be predicated on the further damage and destruction of the very things they seek to enhance.*

I. Carbon Tax or Cap-and-Trade

One way to raise revenue is to monetize carbon emissions. This method is elegant in its approach; it generates revenue to combat coastal land loss by attaching a cost to one of its principal drivers. Attaching a price to carbon, whether through a carbon tax or a cap-and-trade, has long been the favored emissions-reduction tool of economists. A carbon price can reduce emissions, spur innovation, and generate revenue. Like any market-based tool, regulatory stability and public oversight are critical to the success of carbon pricing. In Louisiana, carbon pricing could raise substantial revenue for coastal restoration. An emissions trading scheme could also facilitate offset credits generated by wetland restoration.

The landmark Clean Power Plan (CPP) regulations published in 2015 set forth nationwide goals to reduce carbon emissions from power plants.[194] The CPP encourages states to use cap-and-trade mechanisms to achieve their emission reductions and facilitates regional trading by creating nationally uniform emissions reductions rates.[195] Regionally, Louisiana could be in a position to meet and exceed its reduction goals, and the state's electric generators could then sell emissions credits to neighboring states with a more carbon-intensive electric generation fleet.

The election of Donald Trump puts the fate of the Clean Power Plan in legal and political peril. Still, many analysts believe a future with some form of carbon pricing may be inevitable.[196] It

may only be a matter of time before global and national pressure, both political and economic, makes carbon pricing a foregone conclusion. At the 2015 Paris Climate Agreement, 188 countries (including the U.S.) submitted emission reduction pledges, covering 97 percent of global emissions.[197] The International Monetary Fund studied the economic policies needed to achieve these mitigation pledges, and emphasized key role of carbon pricing:

> For reducing carbon emissions ('mitigation'), carbon pricing (through taxes or trading systems designed to behave like taxes) should be front and center. These are potentially the most effective mitigation instruments, are straightforward to administer…raise (especially timely) revenues for lowering debt or other taxes, and establish the price signals that are central for redirecting technological change towards low-emission investments.[198]

Many major companies have already begun to set prices on carbon internally. CDP, an international nonprofit, collects data from corporations around the world. "Across all companies [1,896] reporting to CDP last year, 435 companies have now implemented a price on carbon – more than triple the number that had a price on carbon in 2014. Another 583 said they planned to implement a price on carbon in the next two years."[199] Companies like General Motors, Delta Airlines, and Exxon Mobil are quantifying carbon risk in cost-benefit analyses.[200] The CEO of Royal Dutch Shell stated at the International LNG Conference in April of 2016 that a global carbon price is inevitable.[201] Rather than fight this sea change, states should look to adopt carbon pricing early to take full advantage of the economic benefits.

For states, carbon pricing holds great potential to reduce emissions and raise funds. David Cash, former head of Massachusetts' Department of Environmental Protection, in an interview on the future of the CPP following the Supreme Court stay of the rule, emphasized the momentum of carbon markets and their economic potential. "My perspective is why, in this environment…where there's no question there are huge economic opportunities waiting to be seized, why would a state want to not explore what some of the opportunities for innovation, for job growth, for research and development, for cost savings?"[202] With or without the CPP, carbon pricing could help Louisiana generate revenue, transition to a clean-energy economy, and mitigate the state's contribution to global carbon emissions.

A recent poll shows that there is more support for carbon regulation in Louisiana than one might expect. A statistical model based on nationwide survey data gathered from 2008 to 2014 estimates that 68% of Louisianans supported regulating CO2 as a pollutant.[203] 41% support a carbon tax "if refunded to every American household."[204] Only 25% oppose such a tax.[205] Even in a conservative state, a plurality supports a carbon tax if the state returns the money directly to citizens. These polls suggest that building popular support for a carbon tax is within reach. A tax that dedicates a portion of the revenue to coastal protection and restoration, while returning a portion to residents, possibly as a credit against electric bills, may prove palatable.

Carbon pricing falls into two general categories: a carbon tax and cap-and-trade. "A carbon tax sets the price of carbon dioxide emissions and allows the market to determine the quantity of emission reductions. Cap-and-trade sets the quantity of emissions reductions and lets the market determine the price."[206] Both methods have their pros, cons, and advocates.

The most straightforward carbon pricing mechanism is a carbon tax. It requires tallying carbon content either at the extraction point (mine, wellhead, etc.) or at the emission point, and collecting the tax accordingly.[207] A carbon tax is easier to administer and enforce than cap-and-trade. A cap-and-trade program requires the government entity to undertake an allowance distribution or auction and then monitor the secondary market (allowances traded between purchasers). This adds a layer of administrative complexity.[208] Carbon tax insulates emissions reductions from market fluctuations. Under a carbon tax, if emission reductions are cheaper than anticipated, the tax still provides an incentive to reduce emissions beyond the target.[209] For example, even if emissions reduce due to unforeseen circumstances, like an economic downturn decreasing production, a tax provides a price signal that encourages further reductions. Price stability also allows investors to make decisions without fear of fluctuating regulatory costs.[210] The downside is that a carbon tax is a less certain way to reach emissions goals than simply capping total emissions and auctioning allowances.[211] To be effective, a carbon tax must be periodically ratcheted up to ensure that the price is high enough to achieve desired reductions. While a carbon tax has found success in other nations, notably Canada, the two largest carbon pricing systems in the U.S. use cap-and-trade systems.

Louisiana could look to California for an example of an aggressive cap-and-trade system. In 2013, California instituted its "Regulation for the California Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms to Allow for the Use of Compliance Instruments Issues by Linked Jurisdictions," commonly referred to as the California Cap-and-Trade Program.[212] Unlike the Clean Power Plan, which would only apply to emissions from electric power generators, California's cap and trade program is an economy-wide cap on emissions from all sources (in reality, it applies to about 85% of the state's emissions).[213] Under the program, California sets an annual limit on metric tons of carbon dioxide (or carbon dioxide equivalent) that can be emitted in the state.[214] California then creates a number of emissions allowances corresponding to the limit. An allowance is a tradable authorization to emit up to one metric ton of carbon dioxide. The number of allowances offered at each quarterly auction varies. The minimum bid has risen from $10.00 to $12.10 per metric ton, with average bids going as high as $14.10 in November of 2015.[215] Proceeds from the sale of state-owned allowances are deposited into the Greenhouse Gas Reduction Fund (GGRF) and appropriated from that fund for use.[216] To date, about $2.6 billion from the GGRF has been appropriated for a variety of projects including high-speed rail and ecosystem restoration.[217]

Louisiana could also look to a group of northeastern states for an example of an allowance auction program on a regional scale. The Regional Greenhouse Gas Initiative (RGGI) was the first program in the country to place mandatory limits on carbon dioxide emissions from power

plants.[218] The RGGI consists of nine northeastern states that have collectively agreed to region-wide emissions reductions.[219] RGGI requires fossil fuel power plants over 25 megawatts in participating states to obtain an allowance for each ton of CO2 emitted annually.[220] Power plants within the region may comply with the cap by purchasing allowances from quarterly auctions, other generators within the region, or offset projects.[221] Since 2008, 830,593,616 allowances have been sold at 32 regional auctions.[222] The cumulative proceeds from these auctions totaled $2,517,282,500.69 (an average price of $3.03).[223] Different states use the auction proceeds in different ways; across the region, 59% of proceeds fund energy efficiency measures, while direct bill assistance for low-income ratepayers comprises about 13%.[224]

The RGGI delivered $1.3 billion in net economic benefit between 2012 and 2014, even though net revenues for electric generating facilities predictably decreased after their purchase of allowances.[225] "This recent positive economic outcome from the RGGI program results in large part from the states' decision to use [auction proceeds] in various ways that address state policy objectives, primarily by returning funds to electric ratepayers and funding local investment in energy efficiency ("EE") and renewable energy ("RE") resources."[226] Net revenue for power-plant owners is anticipated to decrease roughly $400 million below 2015 value.[227] Most of this loss is driven by energy efficiency that reduces electric sales.[228] Energy consumers, on the other hand, enjoyed net savings of $460 million as energy bills drop over time[229] "RGGI funds were used to protect customers from electricity price increases and were invested into energy efficiency. Consumers end up gaining from these investments because their overall electricity bills go down as a result of improvements in energy efficiency."[230] Additionally, the RGGI was responsible for the creation of 14,155 job-years from 2012 to 2014.[231]

California and the RGGI states have had success with allowance auctions to raise funds and reduce carbon emissions, but both programs have also had setbacks. Both markets experienced sharp downturns in allowance bidding in 2016. RGGI credits sold for 40% less in June 2016 than they did at the December 2015 auction.[232] In California's May 2016 auction, only 11% of the allowances up for sale were purchased.[233] A handful of factors combined to lower prices. California's enabling legislation and the Clean Power Plan both face legal challenges. This regulatory uncertainty has deflated investor confidence. Low confidence combined with oversupply has reduced prices. Both California and the RGGI states allow emitters to purchase "future vintage" allowances. This allows emitters to guard against price spikes but, in California especially, it has contributed to a glut of allowances sold on the secondary market (between businesses after the state-run auction). "It appears that speculators who bought up allowances in earlier auctions, hoping to profit when prices rose, have become disenchanted and are dumping their holdings…Privately, analysts inside and outside state government say that a major factor in the glut of available emission allowances is uncertainty over the program's legality and future."[234] These problems evince the issues of tethering a free-market mechanism to policy

decisions and political will. It is up to leaders to continue to ratchet down emissions goals in the face of industry-backed opposition and to design programs that withstand legal scrutiny.

Prospects: *The state could implement an allowance auction that covered only emissions from the electric power sector, and capped emissions at 36.72 million metric tons (a 10% reduction from 40.8 mmt in 2013).[1] At a minimum bid price of $3/mt, close to the RGGI average, the state could raise $110.2 million per year. If the state implemented price floors corresponding to more aggressive emissions goals, as California has done, the revenue would increase accordingly. An $8 auction at a cap 10% below 2013 emissions, for example, would yield $293.8 million in revenue.*

J. Emission Offsets

A mature and robust emissions trading scheme could also facilitate a market for carbon offsets. "An offset is a measurable reduction, avoidance, or sequestration of GHG emissions from a source not covered by an emission reduction program."[235] A carbon offset or credit represents a metric-ton reduction in emissions to compensate for an emission made elsewhere. Offsets may include credits for reforestation, the establishment of new forest (afforestation), and avoided forest conversion.[236] If, for example, a landowner converted an acre of former farmland into an acre of hardwood forest, they would receive a credit for the carbon held in the newly developed biomass. In California has issued over 40 million offsets.[237] RGGI has regulations in place for offset projects to bring allowances to market, but as of yet no offset projects have been developed.[238]

Louisiana is well positioned to benefit from an offset program. For a variety of reasons, coastal wetlands "provide an optimum natural environment for the sequestration and long-term storage of carbon dioxide."[239] While wetlands are only about 5% of the earth's terrestrial surface, they are estimated to hold 20%-30% of the world's soil pool of carbon.[240] The Louisiana-based Tierra Resources evaluated the commercial potential of tying wetland restoration to an emissions offset market: "The final results revealed that coastal wetland restoration in Louisiana has the potential to produce over 1.8 million offsets per year - almost 92 million offsets over 50 years… [Wetland restoration] could potentially generate $400 million to almost $1 billion in offset revenue depending on the price achieved for the carbon offset."[241] The study also looked at the potential value of offsets from avoided wetland loss. If prevented emissions from wetland conservation qualified for offsets, it could produce an additional 32.8 – 58.1 million offsets.[242]

Prospects: *Tallying restoration and loss prevention, "carbon finance has the potential to bring a total of $540 million to almost $1.6 billion to assist with wetland restoration in the coastal areas of the Mississippi River Delta."*

K. Local Governments & Revolving Loan Programs

For some coastal communities on the front lines, the risks of sea-level rise are immediate. Local responsibilities like drainage infrastructure and levee maintenance will continue to stress budgets as sea-level rise and storm risk increase. Local governments' ability to pay for these responsibilities may be hindered by the traditional revenue mechanisms available to political subdivisions. The ability to leverage funds to catalyze major projects sooner rather than later could be the difference between sustainability and relocation.

Property taxes traditionally make up the bulk of revenue for local parish governments. In addition, levee districts, multi-Parish entities created by state law, have the authority to levy taxes, but only with voter approval.[243] Property tax increases, however, are politically unpopular. While voters in both Orleans and Jefferson Parish approved renewal of a drainage tax in December, voters in St. Bernard Parish have twice rejected property tax increases dedicated to flood protection.[244] State Rep. Walt Leger introduced a bill in 2016 that would have allowed levee boards to tax property without voter approval.[245] "The bill didn't make it out of committee this year. Leger said there were too many pressing issues and there wasn't enough support among legislators. 'It's a tax,' he said. 'People don't like taxes.'" [246]

Even beyond the political resistance to tax increases, property taxes are a limited option. Appraisers are recalibrating their methods to reflect lost value from climate-related risks, which will lower tax collections. Moreover, as sea level rise and storm risk move populations away from the coast, tax bases erode. Parishes could be stuck in a cycle where their ability to pay for basic services is compromised, further depressing property values and spurring relocation.

Traditionally, municipalities issue bonds to raise money for large infrastructure projects, spreading the capital costs out over multiple years through repayment to bondholders. The recession was hard on the municipal bond market, as "the total par amount (face value of the bonds) traded on the municipal bond market dropped by nearly 50% between 2008 and the end of 2012."[247] In the near term, the likelihood of rising interest rates may deter investors from the bond market Interest on municipal bonds is paid at a fixed rate, so if market interest rates rise, the bond's yield will be lower compared to newly-issued bonds. This lower comparative return reduces the market value of the bond. The Federal Reserve raised rates in December 2016, and predicted three further increases in 2017.[248] This is likely to deter investors from the municipal bond market, at least in the near future.

On a longer timeline, municipal bonds suffer from uncertainty and risk related to climate change. To date, credit rating agencies have not actively included climate risk as a major driver in credit ratings, but that may be changing. Fitch, one of the "big three" credit rating agencies, recently reported on how sea level rise could become a factor in credit metrics:

> Sea level rise has not played a material role in Fitch's assessment of the fundamental credit characteristics of any of its rated issuers…However, there are real threats faced by governments in coastal areas. As the effects of sea level rise upon issuers' credit fundamentals become known and measurable, over time these considerations may take on greater importance as a credit factor in Fitch's rating decisions.[249]

A municipality must repay bonds from its general budget. Again, this money largely comes from property taxes. Sea-level rise drives populations away from the coast, eroding the tax base that municipalities rely on to meet bond obligations. Moreover, as climate change impacts property values, it can also increase the costs of maintaining critical infrastructure, meaning costs increase as collections decrease. These budget imbalances negatively impact bond ratings. Even more troubling, we are quickly moving into a time when financial risk and environmental risk come into alignment. It is not unthinkable, in light of CPRA's land-loss projections, that in the near future some 30-year municipal bonds might outlive their issuers. Given the immediacy of the problem, providing a method of upfront financing beyond these traditional tools could be hugely beneficial for many front-line communities.

Local governments are set to receive a significant amount from the *Deepwater Horizon* oil spill settlement through the RESTORE Act and through GOMESA revenue sharing. $92.4 million in RESTORE Act funds will be made available to coastal Parishes over the next 15 years, while GOMESA is projected to provide $35 million per year beginning in 2017.[250] RESTORE funds "can be used for a wide range of eligible activities, including restoration and protection, mitigation, conservation management, state park improvements, infrastructure projects, planning and administrative costs, and tourism and seafood promotion."[251] GOMESA funds are similarly constrained, to be used for "projects and activities for the purposes of coastal protection, including conservation, coastal restoration, hurricane protection, and infrastructure directly affected by coastal wetland losses" as well as mitigation of impacts on natural resources, implementation of marine/coastal management plans, and mitigation of the impacts of OCS activities. [252] As the Public Affairs Research Council (PAR) recently pointed out "This range of options creates an important decision point for the local governments and levee districts: whether to leverage the windfall resource for impactful restoration and protection projects or spend the money on roads, ports, government operations or other purposes."[253] The state currently has a matching program for Parish RESTORE funds. Allowing GOMESA funds to be similarly leveraged with state dollars could jump start critical restoration efforts in coastal communities.

The state could implement a loan program to provide capital for local political subdivisions as another way to leverage available funds. The scope and cost of the projects in the Coastal Master Plan inevitably means that some projects will take priority over others. A revolving loan program would allow parishes and municipalities to jump-start protection and restoration projects of local importance without waiting for the state. Depending on how the loan program is structured, it could also allow local entities to select the measures that best meet local concerns. In the long run, encouraging local autonomy in project selection or even development could foster more trust in the state's restoration efforts among coastal communities.

Texas has grappled with securing capital to address an issue of similar scope and consequence as Louisiana's coastal crisis. While Louisiana faces down the problems of land loss, Texas is straining to secure drinking water for a population projected to reach 51 million by 2070.[254] Like Louisiana's Coastal Master Plan, the Texas State Water Plan considers a 50-year planning horizon, updated every five years.[255] The capital costs associated with implementing the 2017 Texas State Water Plan are an estimated $62.6 billion.[256] While some of this cost will be borne by municipal water user groups, "approximately $36.2 billion, or 58 percent, was reported as requiring state financial assistance."[257]

In response to this need for funding, Texas voters approved the creation of the State Water Implementation Fund for Texas (SWIFT).[258] The SWIFT was initially capitalized with a $2 billion appropriation from Texas' "rainy day fund."[259] The State Water Implementation Revenue Fund for Texas (SWIRFT) is a related fund that issues revenue bonds, backed by SWIFT assets.[260] Revenue from SWIRFT is also used to fund projects in the state water plan. SWIFT "helps communities develop cost-effective water supplies by providing low-interest loans, extended repayment terms, deferral of loan repayments, and incremental repurchase terms."[261] SWIFT allows municipalities to borrow money at lower rates than they could on their own, often at below-market rates. "Interest rates are based on the TWDB's [Texas Water Development Board] cost of funds, which reflects the program's AAA credit rating. This interest rate is further reduced by a subsidy established by the Board for each funding cycle."[262] Loan repayments go back into the fund and, ideally, the interest augments the initial $2 billion investment to make the fund self-sustaining.[263]

The TWDB administers the State Water Plan process and allocates SWIFT loans.[264] The State Water Plan uses a "bottom-up" approach for development. The state is divided into 16 regional water-planning areas.[265] Each area submits a regional plan that assesses need, supply, and shortages.[266] Projects in the State Water Plan come from the regional plans. To be eligible for the SWIFT program, a project and its associated capital costs must be included in the state water plan.[267] 10% of SWIFT funds must go to rural/agricultural projects, while 20% is earmarked for water conservation projects.[268] Applications for SWIFT funding are scored based on a point allocation system established by statute.[269] A maximum of 50 points are available for projects that: serve a large population; serve a diverse rural and urban population; serve multiple entities in a region or across regions and; serve a high percentage of water supply needs within the first

decade of the project.[270] An additional 50 points (maximum) are awarded after assessing: local financial contribution to the project; the ability of the project sponsor to repay; whether the project addresses an emergency need; whether the project is "shovel-ready;" the effect on water conservation; and the priority ranking assigned to the project by the regional water planning group.[271] "The inaugural round of the SWIFT program in 2015 resulted in Board commitments of $3.8 billion dollars to fund implementation of 30 water management strategies in the 2012 State Water Plan."[272] Overall, the SWIFT program is designed to provide approximately $27 billion in financial assistance over 50 years.[273]

The TWDB has considerable authority over year-to-year spending and the accountability that comes with that authority. "A large portion of the proposition's promised success depends on which projects the Texas Water Development Board chooses to pursue. As of now, there are approximately 562 projects proposed as a legislative wish list, including desalting groundwater and sea water, building pipelines, in addition to developing reservoirs and well fields."[274] The prioritization system is designed to remove politics from the equation, but the TWDB will have to take care to avoid accusations of political favoritism. Further, without careful monitoring, SWIFT operating costs and funding outlays could exceed income, resulting in erosion of the fund's capital base. Inflation could also contribute to capital erosion. In either case, the fund may require additional public investment to remain functional.

Prospects: *The potential of a revolving loan program depends on the dollar amount used to form the corpus, the bond rating of the fund, the success in managing risk, and whether the loans are paid back in full. Texas' SWIFT program's reliance on user fees increases certainty of repayment. It is questionable when Louisiana will have the funds to establish a revolving loan program, and how repayment will be structured for projects without identified user groups.*

VI. PUBLIC-PRIVATE PARTNERSHIPS

Experts often tout public-private partnerships (P3s) as an underutilized tool with great potential to help fund climate adaptation and infrastructure resilience.[275] P3s are not a new concept, they've been used in any number of instances where public need and private opportunity have coincided including toll roads, utilities, railroads, and even the "Eads Jetties" at the mouth of the Mississippi River. The common thread is that private participation allows the public partner to avoid or minimize its financial exposure. In return, the private partner gets a revenue stream to secure return on investment or, less commonly, owns an asset of importance to the private partner.

The term 'public-private partnership' eludes any single definition, as the concept can morph to fit the audience and opportunity. Most parties agree on a loose definition of P3 as a "legally

binding contract between a public-sector entity and a private company where the partners agree to share some portion of the risks and rewards inherent in a project."[276] The allocation of risk and cost varies; ideally, risks are borne by the party that can manage them most efficiently, at the lowest cost.[277] P3s can include the design, finance, construction, operation, and/or maintenance of infrastructure, but the public sector usually maintains ownership of the asset.[278] In those cases, the environmental risks and the risk of catastrophic loss are generally borne by the public.

Contracts are broken down into "pure" P3s, where the main source of revenue for the private partner comes from payments made by the government ("availability payments system"), and concessions, where user-charges are levied by private partners on those receiving the services ("user fee system").[279] In an availability payments system, the government sponsor collects revenue from users and makes fixed, recurring payments to the private entity provided the asset maintains the contracted quality standards.[280] This places the risks substantially on the government because the payments do not change relative to use.[281] Under the user fee system, the private sector acquires more of the risk for the investment.[282] Revenue sharing clauses have also become common in P3 contracts. These projects are structured as a middle ground between user fees or availability-payments system. Revenue sharing projects collect user fees, but the government and private entity share the revenue, splitting the risk.[283]

In 2014, Prince George's County, Maryland, entered into a public private partnership to retrofit its stormwater system.[284] The retrofit is similar to portions of the Greater New Orleans Urban Water Plan. "Prince George's County and its partner, Corvias Solutions, hope to retrofit 15,000 acres' worth of pavement and buildings in the largely suburban DC community, installing rain gardens, vegetated roofs, and other water-absorbing landscape features."[285] The contract design is a three-year agreement with Corvias, funded through an initial $100 million from the County.[286] Corvias will be in charge of the design, build, and long-term maintenance of the infrastructure. The county's environmental department director notes "reducing nutrient and sediment pollution to meet mandates imposed by Maryland's Bay watershed implementation plan could cost the county more than $2 billion by 2025 if it relied on conventional methods for upgrading its stormwater system."[287] Instead, the partnership will meet the mandate for half that amount, roughly $1 billion.[288]

In addition to cost-savings, Prince George's County officials have built in financial incentives tied to public policy goals. A key component of the partnership requires Corvias to boost local economic development by using local small and minority-owned businesses. Corvias must meet a 30% target for the first year, a 35% target for the second year, and a 40% target for the third year in order to be paid in full.[289] Corvias also committed to hiring 80% of the workforce from the region. Prudently, the County is dipping its toe in the P3 water before diving in. Corvias will only convert 2,000 acres into green infrastructure using the methods outlined in the partnership agreement by 2017.[290] At the same time, county workers will be using their traditional procurement processes on their own 2,000 acres.[291] County officials will compare the results of the two to determine if the P3 truly results in increased speed and decreased costs compared to the traditional processes.[292] After comparing the two, Prince George's County will decide whether it wants to expand the P3.[293] Corvias must meet the usual requirements of a business: reduce inefficiency and maximize shareholder value. Full payment, however, is conditioned on meeting benchmarks determined by public policy.

Traditionally, municipal bonds have been the dominant form of infrastructure financing for local government, and P3 has been an underutilized tool. Private equity investors have heightened their interest in P3s in part because of the potential to lock in revenue streams during a period of historically low-interest rates. In the context of adaptation to climate change, as discussed above, municipal bonds are a limited funding option. "The municipal bond market would have to multiply several times to assume the potential costs of adaptation."[294] In recent years, the use of P3s has increased, in part due to the limitations of municipal bonds. Changes in the tax code have also helped increase the popularity of P3s. In 1997, the IRS changed the way interest on bonds is taxed. Under the new rule, bonds that fund public works projects operated or maintained by private companies remain tax exempt as long as the contracts are limited to a twenty-year period and the private partner does not share in net proceeds.[295] The new rule effectively eliminated the tax advantage that public entities had to manage their own water resources rather than contracting out to a private company.[296] P3s are not suitable for all projects, but Louisiana can learn from other regions and craft best practices to take full advantage of P3 as one of many available tools. P3s could be especially effective for localized/municipal-level projects like the Greater New Orleans Urban Water Plan, a plan that is not included in the Master Plan, but is nonetheless essential to the way New Orleans manages flood risk, and essential to fulfilling the "multiple lines of defense" concept at the heart of the Master Plan.

At the end of the day, the lack of significant revenue streams tied to coastal restoration and protection projects could be a significant limiting factor on revenue-driven P3s. That does not mean coastal Louisiana is without P3 opportunities. Indeed, coastal Louisiana offers a powerful opportunity for P3s that have asset preservation and cost avoidance as organizing principles. Specifically, there is an opportunity for donations of land rights to further coastal protection and restoration in exchange for more clearly defined and enduring mineral rights. The reasons for this are legalistic, but not hard to understand. Louisiana law, generally, does not allow permanent severance of mineral rights and surface rights.[297] That is the main reason much of coastal Louisiana is owned by companies in the business of finding and extracting valuable minerals like oil and natural gas. Owning wetlands is the key to owning the wealth beneath them.

The State of Louisiana owns the land beneath its navigable waters, and by extension, the minerals beneath those lands.[298] In coastal Louisiana, due to subsidence, erosion, and sea level rise, private lands and minerals can become state lands and minerals as land yields to water. Louisiana law allows the state to negotiate and fix mineral boundaries in cases in which surface rights are transferred to the state or other "qualified conservation organization" to support the state's coastal conservation, protection, and restoration plans.[299] This could allow private landowners to gain something of very real value by donating surface rights as allowed by law: Mineral rights of greater certainty and durability while relieving them of some of the costs of maintaining and managing the lands.

Coastal conservation, protection, and restoration inevitably involves public and private rights. Federal cost estimates of coastal restoration efforts have pegged the real estate costs of coastal restoration work at roughly 20% of the program costs.[300] Under normal federal project cost-sharing rules, the non-federal sponsor – in this case the State of Louisiana – is responsible for these costs. Any arrangement that could allow the state to acquire those rights without expending cash could reduce the financing burden substantially.

Individual coastal restoration projects have used this latter type of P3 but not on a systemic basis, largely because the State's Coastal Master Plans were, until recently, not really implementation plans. Another reason was uncertainty about the State's ability to do larger scale deals under its current laws. Fortunately, a recent opinion from the Louisiana Attorney General reinforces the legality of this approach, making the P3 option much more viable and attractive.[301] None of this is to suggest that negotiating and finalizing these deals would be a simple or formulaic matter. These complex transactions require thought, care and potentially the clearance of additional legal and policy hurdles.

In a political and social climate where privatization is lauded for its economic efficiency, public-private partnerships make a lot of sense. Public entities should proceed with caution, however, as they pursue private partners for infrastructure projects, particularly those that involve our natural resources. Transparency, stakeholder engagement (especially public input), and equitable sharing of risks are common features of successful P3s. Weaker agreements are marked by the heavy-handed private influence that overwhelms public priorities. Privatization of public infrastructure, to any degree, requires balancing the public and private interests. Proper risk allocation is the key to not only increasing investor interest in P3s but also ensuring their success for taxpayers, the environment, and human health. The most effective P3 for a given project will depend on the project type, local needs and priorities, and the public entity's credit rating and capital costs.

VII. CONCLUSION

Louisiana faces an unprecedented challenge as it tries to reimagine and reengineer the way the coast and its people coexist. The Coastal Master Plan represents a resolute and ambitious attempt to manage the crisis and preserve the vitality of the region. While the science underlying the Master Plan's projects has gone through rigorous scrutiny, funding strategies still need to be explored. This unprecedented undertaking will take equally exceptional financing efforts. At the federal level, this means tying the state's efforts to broader national interests. Even with federal assistance, the state has to take the lead and develop innovative revenue streams. This could mean restructuring or augmenting existing taxes or imposing new fees. At the local level, the state should provide methods for Parishes and frontline communities to leverage existing funds and access capital to get important projects off the ground sooner. Finally, securing the region's water future, even beyond the goals of the Coastal Master Plan, will require harnessing the resources and expertise of the private sector. Financing the future of south Louisiana is no simple task, but it is a challenge that we can, and must, meet.

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