

The Oil Spill Commission
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Members and staff of President Obama's Oil Spill Commission, I am deeply honored to have been asked to join one of your Gulf coastal restoration panels. While I have worked on coastal wetland protection projects in all five Gulf states during my 37-years at the Environmental Defense Fund, my involvement has been most pronounced in the Mississippi River delta ecosystem of coastal Louisiana.

Background history. The Mississippi River delta ecosystem is one of the great deltas in the world and by far the most important contiguous coastal wetland ecosystem in the United States (#1 and 2). The loss of 2300 square miles of its 7000 square mile extent of a century ago represents by far the most devastating coastal biological loss for the entire country, including the northern Gulf, and is continuing (#3-5). It is therefore altogether appropriate, indeed, imperative, that this Commission address this acute national ecological tragedy in considering responses to the Gulf oil spill. It is my hope that, out this Gulf oil spill disaster, will come some good:

- broad public support for restoration of coastal Louisiana on an emergency basis,
- congressionally approved dedication of 80% of Clean Water civil penalties to a Gulf restoration fund with a major portion committed to coastal Louisiana restoration and establishment of a per barrel oil restoration fee,
- utilization of Natural Resource Damage Assessment funds for this purpose, and
- a Presidential executive order that sets aggressive restoration timelines and sediment reintroduction goals for coastal Louisiana restoration and, absent legislation, restructures the Breaux Act task force as an effective, high-level, multi-agency framework to carry out this critical mission and use these funds.

The primary man-made causes of the collapse of the Mississippi River delta ecosystem over the last century have been the management of the Mississippi River that has historically served national navigation and flood control missions as reflected in the Mississippi River and Tributaries (MR&T) program of the 1928 Flood Control and the impact of on-shore and OCS oil and gas infrastructure and operations (Boesch, D. et al, Scientific Assessment of Coastal Wetland Loss, Restoration and Management, Louisiana, Journal of Coastal Research Special Issue No. 20, May 1994, pp. 36-41). The MR&T program resulted in the construction of a vast system of tributary dams that have reduced sediment supply, revetments, the Old River Control Structure, the Atchafalaya Basin floodway with its guide levees and Mississippi River navigation and flood control levees (#6). These levees in coastal Louisiana have deprived these

coastal wetlands of the very riverine sediments that for 7000 years built, shaped and sustained the 7000-square mile delta ecosystem that existed a century ago. Oil and gas activities contributing to wetland loss have included pipeline canals, navigation channels to transport equipment, disposal of wastes and withdrawal of shallow on-shore oil and gas (#7 and 8).

My first contact with this remarkable delta ecosystem, the 7th largest coastal delta in the world and by far the largest in North America, dates back to early 1974 when we joined a law suit that Terrebonne Parish had brought against the Corps of Engineers challenging the adequacy of the EIS for the then proposed expansion of the Atchafalaya River navigation channel and Bayous Chene Boeuf and Black, a project designed to support the off-shore oil and gas industry. Then, as now, major off-shore rig fabrication yards were located in the vicinity of Morgan City and needed expanded navigation channels as the demand of the burgeoning OCS industry for ever larger pieces of equipment grew. After I received a call of assistance, what caught my attention was the glib statement in the EIS that the dredged materials were to be disposed of on 8000 acres of channel-adjoining wetlands and that this discharge would have a "de minimis" impact on this coastal ecosystem. As I sat in EDF's then East Setauket, Long Island farmhouse office, that statement dumbfounded me. Even if this delta ecosystem then had 80 to 90% of its 7000 square miles of marshes and swamp forests, 8000 acres was still substantial.

When I flew down to New Orleans in April 1974 for the first of two federal court trials of this case, I met Terrebonne Parish's coastal geology expert, Sherwood Gagliano, PhD, who had just set up his consulting firm Coastal Environments. He had also co-authored the first paper providing quantitative estimates of coastal land loss at 16.5 square miles per year over the preceding forty-year period (Chatry, Frederic M. and Sherwood M. Gagliano, Shaping & Reshaping a Delta, Water Spectrum Magazine, Fall 1970). That paper also astounded me. How could the country be so ignorant of and not care to do something about this extraordinary amount of man-made coastal land loss? Subsequent studies by USGS and others showed that the rate of land loss accelerated in the 1960's-1980's reaching 30 to 40 square miles per year. I began to realize that very few Americans had any idea what a delta ecosystem of a major continental river is or looks like. It is just too vast. While citizens in the New York metropolitan area, for example, can grasp what the annual loss of 45 acres of wetland islands in Jamaica Bay looks like, they can't get their arms around a loss 500 times that amount. In addition, while very distinctive culturally, coastal Louisiana is far away, and the state and the nation were addicted to exploitation of its massive coastal and OCS oil and gas resources.

In 1980, three years after the Secretary of the Army adopted the first comprehensive set of dredged and fill material disposal regulations under Section 404 of the Clean Water Act (CWA), the State of Louisiana adopted a coastal permitting program as part of its Department of Commerce-approved

Coastal Zone Management Program (CZMA). While its implementation has been far from perfect, this program has led to a significant contraction in the total amount of canal construction and disposal of related dredged material in wetlands, and, insofar as the rate of wetland loss has been reduced in the last 25 years, this program deserves a good part of the credit.

In November 1985, John Day, a noted PhD wetland ecologist at LSU, asked me to speak at a coastal conference at LSU on the subject of citizen action. While I was familiar with at least one non-profit citizens organization with full-time staff working in most every major estuary along the nation's three coasts, the one big exception was coastal Louisiana. Although it is by far the largest, most productive and most important coastal ecosystem in North America, it had no staffed citizens group. Starting in early 1986, a group of Louisiana scientists and voluntary environmentalists in the state, with some urging from me, wrote a Citizens Action blueprint for Louisiana coastal restoration entitled "Here Today and Gone Tomorrow". We released the draft report in April 1987, after four "public" hearings in March, and then a final report two years later in 1989. This formed the genesis of the Coalition to Restore Coastal Louisiana.

In 1990, Congress enacted the Coastal Wetlands Planning Protection and Research Act ("CWPPRA" aka the "Breaux Act"), 16 U.S.C. 1351, that with the Dingell-Johnson Act has provided a steady stream of \$80 million annually for coastal restoration. The Breaux Act task force wrote COAST 2050 that the Corps adopted as the reconnaissance study for the Louisiana Coastal Area (LCA) feasibility study.

In the mid-1990's King Milling, then President of the Whitney National Bank, joined the board of the Coalition as he came to realize that the on-going collapse of the Mississippi delta ecosystem would have profound consequences for the economy of South Louisiana and the country, with the dependence of the on-shore and off-shore oil and gas industry, the navigation industry and the structural integrity of New Orleans and other coastal urban communities on this vast wetland system. King knew former Governor Michael Foster (their grandfathers had started a law firm together) and was instrumental in persuading Governor Foster to host a Coastal Summit in August 2001. Out of this marshalling of State attention and resources came the Governor's Commission on Coastal Protection, Conservation and Restoration with Milling as chair (and of which I am a member) and the initiation of the Corps' LCA and State master planning processes. With the completion of the LCA delta ecosystem restoration Chief's report in January 2005 and in light of the devastation of Katrina, Congress authorized the LCA ecosystem restoration program in Title VII of the 2007 Water Resource Development Act. The State now has underway a revision of its Master Plan, due to be submitted to the State Legislature in 2012. I am serving on its Framework Development Team. Two noted coastal scientists Denise Reed, PhD geomorphologist, and Robert Twilley, PhD, wetland ecologist, are assisting the State with this undertaking.

Katrina and Deepwater Horizon. A century or more ago, New Orleans was buffered by 50 miles of dense coastal marsh, swamp forest and barrier islands to the south and 30 miles of such wetlands to the east. When Katrina hit in late August 2005, coastal Louisiana had lost about one-third of its historic wetland land mass. As a result, its urban communities and their levee systems and coastal oil and gas and transportation infrastructure were much more vulnerable to storm surge than would have been the case a century earlier (John W. Day, Jr. et al, Restoration of the Mississippi Delta: Lessons from Hurricanes Katrina and Rita, Science Vol. 315, March 23, 2007). This was brutally evident on the east side of New Orleans and St. Bernard Parish where a massive wall of storm surge, aided and abetted by the Mississippi River Gulf Outlet and the loss of tens of thousands of acres of cypress swamp forests, breached levees and opened these urban communities to the ravages of the storm. In response, Congress appropriated tens of billions of dollars to rebuild levees and other infrastructure and to provide restitution to homeowners and businesses. However, despite the banding together of numerous community groups such as the Lower Ninth Ward Center for Sustainable Engagement and Development that sought restoration of the swamp forests that had historically protected their communities, Congress provided scarcely a penny for wetland restoration. Indeed, Pam Dashiell, former director of the Center, sadly died as she was preparing a power point presentation for the Governor's Commission that was meeting in the Lower Ninth Ward on this subject last December.

In addition, private industry suffered losses. For example, ConocoPhillips, as a result of Katrina, had to spend \$250 million to repair its Alliance Refinery that is close to the proposed location of the LCA authorized Myrtle Grove sediment diversion project, and, in the six months it took to do so, it suffered \$250 million in lost revenues – or a direct loss of \$0.5 billion at this one facility alone.

The Deepwater Horizon oil spill that commenced on April 20 and lasted for almost three months spewing some 5 million barrels of oil into the Gulf riveted the nation's attention on the biological richness of the Gulf with its vast fish, shellfish and wildlife resources, as well as its magnificent barrier islands, beaches and estuaries. This was a sudden, unexpected and intensive environmental as well as economic disaster. Fortunately the span of time of active spilling was limited although the impacts will be both temporary and long-lasting. However, the media focus on the oil spill and its consequences for Gulf resources also brought attention to the other, long-lasting, continuing and horrific disaster that is happening to the Gulf - the collapse of the Mississippi River delta ecosystem.

A comparison of the Mississippi delta ecosystem and other Gulf coastal resources. Although this ecologically and economically disastrous collapse is unfolding gradually, it constitutes, in my view, a far greater and more

insidious calamity for Gulf biological resources than the oil spill. The coastal estuaries of the Gulf - including the mangrove swamps of southwestern Florida, the floodplain forests of great Gulf rivers such as the Suwannee, the Appalachicola and the Pearl, Mobile Bay and its Tensas deltaic wetlands, Galveston and Matagorda Bays and other major estuaries along the Texas coast - provide substantial biological energy and habitat for the fish and wildlife resources of the Gulf ecosystem. However, it is the vast wetland resources of the Mississippi River delta in southeastern Louisiana along with the River-shaped Chenier Plain that are the northern Gulf's crown jewel of the coastal wetlands, its beating heart and font of its extraordinary biological productivity. The evidence for this is simply the vastness of its salt water, brackish and fresh water marshes, its coastal swamp forests and the magnificent maze of wetlands and bayous that generate plant organic material and provide spawning, nursery and feeding habitat for fish, shellfish and wildlife that make up 60% of the marshes and estuaries in the Gulf.

The estuarine wetlands of Florida, Alabama, Mississippi and Texas have shrunk historically due mostly to residential and commercial development dredge and fill operations. Coastal Louisiana has also seen coastal wetlands dredged and filled for these reasons as well as for agriculture. Fortunately, the advent of the federal Clean Water Act Section 404 regulatory program coupled with state coastal wetland protection initiatives has substantially retarded the rate of loss of coastal wetlands due to such activities.

However, the loss of Louisiana coastal wetlands has been proceeding at a prodigious rate even with federal and state coastal wetlands permitting programs in place. The reason is that so much of this loss is associated with the Mississippi River's navigation and flood control levees that restrict introduction of sediments into the compacting sediments of the delta and the historic and on-going infrastructure footprint of on-shore and OCS oil and gas operations. Indeed, by the mid-1980's some 10,000 miles of oil and gas pipeline and equipment navigation canals and their dredged spoil banks occupied almost 10% of the delta's wetland area (Jae-Young Ko and John W. Day, Wetlands Impacts of Energy Development in the Mississippi Delta, Encyclopedia of Energy, Vol. 6, 2004). So long as the Gulf, with its huge reserves, produces oil and gas (#9), the industry will need pipeline canals and navigation channels for equipment transport that traverse the delta's wetlands and coastal storage and refinery facilities.

While federal and State permitting programs have reduced the impacts of such infrastructure by conditioning permits on improved disposal of dredged material practices or required backfilling of new pipeline canals, these operations still have an extensive, on-going cumulative impact on Louisiana's coastal wetlands. Thus, even with truly effective enforcement of federal and state regulatory programs that could further reduce the rate of future wetland loss, they

alone will not reverse the tragic rate of loss of these delta wetlands, let alone begin the process of rebuilding and restoring this amazing system.

Consequences of deltaic collapse for the Gulf. Scientists have defined a complex but positive relationship between the extent and quality of coastal and estuarine wetlands and Gulf biological productivity and health. As the Mississippi River delta ecosystem continues to collapse, Gulf fishery and wildlife resources will suffer. Some scientists have pointed out that wetland complex may provide long-stored organic energy to the Gulf, but as the collapse consumes that wetland capital it will increasingly depress Gulf biological well-being. In addition, the shunting of Mississippi River water to the Gulf, water that historically would have flowed through its floodplain and delta wetlands during high flow periods, has exacerbated the contribution of the nutrients from the central agricultural states to the Gulf's dead zone.

The continued collapse of Louisiana's coastal wetlands has mounting national and regional economic impacts. The loss of storm buffering capacity is intensifying the vulnerability of the nationally vital Mississippi River navigation system and the GIWW and the on-shore oil and gas infrastructure of Gulf OCS operations, as well as the urban communities that support these economic activities to storm surge (#10).

The Coastal Louisiana wetland ecosystem restoration program. The power of riverine sediments to build land is evident in the Atchafalaya Basin and Bay with its new delta lobes (# 11 and 12) in contrast to the wasteful discharge of sediments at the mouth of the River (#13). Protection and restoration of coastal Louisiana's coastal wetlands entail four kinds of projects: 1) diversion projects that reintroduce sediment and fresh water from the Mississippi River into adjoining wetland basins and distribute Atchafalaya Basin sediments more broadly, 2) conveyance of dredged material, primarily from the River's mouth, via pipeline or barge for sustainable wetland creation, 3) rebuilding of Louisiana's eroding deltaic fragment barrier islands and 4) re-engineering of thousands of miles of oil and gas canals.

After years of work by the Corps, other federal agencies, such as USGS, the Fish and Wildlife Service, NOAA and EPA, the State, Louisiana's extraordinary coastal scientists and the NGO community, Congress authorized 17 near-term restoration projects for construction in Section 7006(c) and (e) in 2007 WRDA's LCA Title (#14), many initially investigated through the CWPPRA process. The State is also pursuing a number of projects, including a long-range sediment pipeline transport project in central Barataria Basin, funded through the Community Impact Assistance Program (an amendment to the Outer Continental Shelf Lands Act, 43 U.S.C. 1356a). In addition, these state and federal agencies and Louisiana's scientists have begun to investigate prospective large-scale sediment reintroduction projects of the sort described in Section 7002 of 2007 WRDA largely through the State 2012 Master Plan revision process.

In his February 2010 FY 11 budget, President Obama proposed that Congress approve the LCA program as a “new start” (one of two in the country) with \$19 million in construction funds as well as \$16 million in LCA planning funds. The Senate Energy and Water Subcommittee has endorsed this proposal, but its House counterpart has not. It is critical that this program move beyond the planning to the construction phase.

The 17 LCA near-term restoration projects constitute a program that is intended to help stabilize the delta’s barrier islands, beneficially use dredged material for targeted areas, including those devastated by the now-blocked Mississippi River Gulf Outlet, modify existing structures such as the Caernarvon and Davis Pond fresh water diversions, add other such diversions and provide for two sediment diversion projects that could take restoration to a whole new level. A rough estimate of the cost of these 17 projects is \$5 billion, although the full cost of the MRGO restoration project that includes no authorized cost cap may push that up.

Priority LCA restoration projects. Since the essence of restoration is conveyance and reintroduction of sediment, those LCA projects that do so are particularly critical. In the long-term the only sustainable way of reintroducing sediment is by using the natural energy of the Mississippi River during high River flow periods – what scientists describe as “replication of natural processes”. The two LCA projects that could potentially be designed to convey and reintroduce sediment using the power of the Mississippi River to distribute those sediments are the Myrtle Grove sediment diversion project and the White’s Ditch diversion project, respectively on the west and east banks of the River approximately midway between New Orleans and the mouth (#15 and 16).

While the Myrtle Grove project that would discharge into central Barataria Basin is described in Section 7006(c) of 2007 WRDA as a “medium” diversion, Congress authorized its modification (along with four others) in response to post-Katrina wetland loss subject to a 150% authorized cost cap. Two years ago, the State, with our support, retained a superb team of engineering firm and academic contractors to conduct detailed sediment data sampling and analysis, to investigate state-of-the-art hydrodynamic and morphological modeling of the River- and Basin-side impacts of the diversion with pulsing capacities of 15,000, 30,000 and 45,000 cfs and to undertake preliminary engineering design of the intake and diversion structure and conveyance channel. The idea of pulsing is to have the capacity to move extra amounts of water and sediment during rising and high River flow periods when the lower River can carry 12 times more suspended load compared to low discharge, with the sand loads making up 19% of high flow sediments compared to zero at low flow (Mead Allison and Ehab Meselhe, The Use of Large Water and Sediment Diversions in the Lower Mississippi River (Louisiana) for Coastal Restoration, Elsevier B.V., Journal of Hydrology, Vol. 367, June 2010).

The White's Ditch diversion is one of six projects to be included in a Chief's Report that the Corps expects to transmit to Congress by the end of this year. Pursuant to a suggestion from the Coalition to Restore Coastal Louisiana, the New Orleans District is proposing a project with pulsing capacity up to 35,000 cfs.

Both the Myrtle Grove and White's Ditch projects should not only contribute to land building but serve as demonstration projects for the larger-scale diversion projects that will be necessary to move towards serious landscape restitution. With the recent signing of the Myrtle Grove cost share agreement, the Corps is assuming major responsibility for moving this project forward. Unfortunately, the Corps has indicated that, even with the impressive technical work that the State has done, it may take up to three years to complete the project's feasibility study. Given the urgency of this project, the fact that Congress has already authorized it and the extent of the State contractors' technical work, this tedious schedule is unacceptable, and unnecessary.

In the wake of the Katrina disaster, the Corps has shown that it is capable, with CEQ and OMB support, of designing and constructing a project as huge and complex as the \$15 billion, 100-year upgrade of the massive greater New Orleans hurricane protection system in less than six years. Coastal restoration is equally urgent. It is high time that the Corps, indeed, the entire federal government, demonstrate that kind of energy in and commitment to the coastal restoration program. Otherwise, we must find some alternative structure that will facilitate a greatly expedited near-term and longer-term restoration program before another catastrophe strikes. After all, the collapse of the delta ecosystem is increasing the vulnerability of the Mississippi River and GIWW navigation systems, oil and gas infrastructure, freight rail and trucking infrastructure and urban communities. Conversely, the sustainability of these nationally vital economic assets depends on comprehensive and robust coastal restoration. Time is of the essence.

In addition to these two sediment diversion projects, other near-term LCA projects that are critical include the Barataria and Terrebonne Basin barrier island rebuilding projects, the re-engineering of the Davis Pond and Caernarvon freshwater diversions to convey more sediment and the restoration of cypress swamp forests in the MRGO-impacted area. The NGO community with the Lake Pontchartrain Basin Foundation as sponsor has also proposed a very cost-effective modification of the Bonnet Carre Spillway so that its sediment could rebuild the LaBlanche wetlands.

Coastal Land Rights Issues. Coastal restoration will have implications for privately-owned coastal underwater land and wetlands. Since 90% of the land in coastal Louisiana is privately owned, much of it by energy companies (with ConocoPhillips owning more than 500,000 acres), a restoration program

that will reintroduce sediment, fill in shallow water, nourish sediment-starved wetlands, raise water elevations and change salinities, at least seasonally, will have consequences for private land resources. The Myrtle Grove and White's Ditch diversion projects will help to determine the most effective, legal and fair way of addressing the private land impacts of restoration projects. The State has been addressing these land rights issues, but much more needs to be done.

The Louisiana Supreme Court's decision in Avenal v. State, 886 So. 2d 1085 (2004), dismissed a series of claims by oystermen for damages that they attributed to the Caernarvon diversion. It is the leading judicial decision concerning the legal capacity of the State to restore this coastal system. The Court found that the State was authorized, if not obliged, to protect and restore the State's coastal wetland zone through, among other ways, diversion of River water and sediment. Act 626, La. R.S. 41:1702 (2006), also authorizes the establishment of a not-for-profit land trust that could receive donations of surface rights with coastal landowners retaining subsurface mineral rights and a set seaward boundary to their claims, a boundary that could otherwise change as wetlands revert to open water. Among other things, the State and private interests are awaiting an opinion of the Attorney General that would clarify the legal capacity of the State administratively to guarantee a fixed boundary for subsurface rights. Effective implementation of this Act is imperative.

Restoration goals. What should our goals be for restoration of coastal Louisiana? What is our vision of the Mississippi River delta ecosystem 10, 20 or 50 years from now? The national importance of reversing land loss and starting the process of rebuilding wetlands calls for the setting of aggressive time goals for action.

Time goals. A suggested goal for completion (planning, detailed design and construction) of the 17 LCA-authorized near-term projects is five years. The goal for completion of the longer-term program – including potentially a major lower River realignment with redesign of the navigation channel at the mouth (the subject of the 2004 LSU Small Scale Physical Model report and the BP-America's Wetland June 2006 science report chaired by Denise Reed) and large-scale upper Barataria and Terrebonne Basin sediment diversions and canal closures - is 10 years. This is ambitious, but commensurate with the need to act immediately to reverse land loss, redress an open wound in the Gulf ecosystem, protect critical national economic assets and avoid further catastrophes of the sort that Paul Kemp, PhD, of the National Audubon Society describes. We can do it by taking full advantage of the resources of key federal agencies, the State, engagement of world-class private sector engineering firms through a large-scale diversion project design competition that my colleague Paul Harrison is pursuing, design-build concepts and help from the White House to build support among energy firms active in the Gulf, the navigation industry and mid-western agricultural interests that depend on the Mississippi River to move half their agricultural exports.

Sediment reintroduction goals. If we adopt this 10-year goal, what is our physical vision of the restoration program that we will have implemented? Right now, very little sediment of the Mississippi River is reaching the delta's subsiding and eroding wetlands except incidentally. Distributary bayous close to the mouth of the River in the bird's foot delta convey sediment, but any benefit there is apt to be temporary since the mouth is rapidly subsiding. Since strategic and sustainable reintroduction of this sediment is a key to restoration, a physical goal is to have projects in place that will sustainably divert and reintroduce at a minimum 70%, and preferably 80 to 100%, of the sediment of the Mississippi River.

In addition, the Atchafalaya River system carries 30% of the flow and sediment of the combined Mississippi and Red Rivers. Confined by the Basin's east and west guide levees, the sediment of that River has achieved a stunning amount of land building within the Basin (#11). The River has also built up magnificent and rapidly growing new deltaic lobes in Atchafalaya Bay (#12) through the Lower Atchafalaya River and Wax Lake Outlet built by the Corps in 1941 as a second flood water relief valve for Basin flood water. However, since the east guide levee retards the flow of that River's sediments into central Terrebonne Basin, another 10-year goal is the reintroduction of some amount of that sediment, perhaps one-quarter to one-third, into the Terrebonne Basin. The third leg of this physical goal is the reintroduction of dredged disposal piles of half of the oil and gas pipeline and equipment canals into those canals.

The long-term goal is formulated in this manner since it is measurable and reflects what we must do – move sediment in a useful way using predominantly the natural flows of the Mississippi and Atchafalaya Rivers while eliminating some of the barriers to that movement. While we seek significant land building and nurturing of existing wetlands as outcomes of the long-term restoration program, that will happen only gradually, depending on the frequency of large-scale flood events. Re-establishment of riverine processes and coastal hydrology is what we should aim for.

It is hard to estimate the cost of the large-scale program that will attain these sediment conveyance goals. A rough estimate may be \$15 billion if we can fully engage private sector firms, but it may exceed \$20 billion, particularly if we do not have an efficient management structure in place commensurate with a public works project of this magnitude and complexity. If we envision completion of both the authorized near-term and longer-term programs within 10 years at a total cost of \$20, this would entail a funding stream that would gradually build up to an average \$2 billion per year. Absent new legislation establishing some new structure or authority, effective utilization of CWPPRA with its Breaux Act task force with its goals and mission defined in an executive order of the President and with participation by high level agency officials could provide an effective administrative framework.

NRDA Linkages between the Deep Water Horizon Oil Spill and Coastal Restoration. The three-month Deep Water Horizon oil spill has done significant temporary damage to Gulf environmental resources and untold longer-term damage to those resources despite heroic efforts to contain and remove surface oil. The federal trustee agencies are conducting a Natural Resource Damage Assessment (NRDA) under the Oil Pollution Act of 1990 (#17) to determine the quantitative scope of the oil spill's impact and damages relative to a pre-spill baseline and to develop and implement a plan for restoration, rehabilitation or replacement of damaged resources (33.U.S.C. 2706(c), 15 CFR 990.30 and 990.52, 40 CFR 300.615(c)).

It will be impossible for BP to undo some of this damage through direct oil removal efforts. Since the temporary damage to Gulf biological resources that was visible during the pendency of the spill cannot be undone, it will require some kind of program to replace and restore damaged resources. In addition, the continuing damage in the form of very low concentrations of oil in deep waters that could affect marine larvae and juveniles as well as expanses of thick oil on parts of the Gulf seabed provides little opportunity for direct cleanup and oil removal. Therefore, the trustee agencies will have to devise a plan to compensate for and replace the short- and long-term damages to Gulf resources that has a reasonable nexus to those damaged resources.

The lingering oil spill and the loss of Mississippi Delta wetlands affect the same biological resources, although in different degrees, places and ways. Both affect the Gulf food chain and Gulf biotic reproductive, nursery and feeding habitats. Both affect the larvae and juveniles of a wide range of biotic species. If very low concentration of highly dispersed oil in the Gulf might injure millions or billions of larvae and juveniles of many different species or oil on the bottom of the Gulf could suppress benthic biota reproduction and growth that would support fish and wildlife higher up in the food chain, then augmenting the flow of food energy by protecting or restoring Louisiana coastal wetlands could contribute to replacing or mitigating for the loss. Implementing barrier island projects that would enhance protection of Barataria and Terrebonne Basin wetlands would also indirectly reinforce this effect. Deepwater Horizon oil that has gravitated to the Gulf's bottom suffocating biota there might be viewed as having a similar affect to the dead zone. Diverting Mississippi River nutrients would allow receiving basin wetlands to take up those nutrients thereby reducing the shunting of agricultural nutrients into the Gulf and the size of its dead zone. These are conceptual linkages between the compounding damages of the oil spill and coastal restoration.

Of the LCA authorized restoration projects, the ones that would most effectively restore or replace resources damaged by the oil spill would be the two sediment diversion projects and the Barataria and Terrebonne Basin barrier island rebuilding projects. These should be the nucleus of a NRDA early action

program. Large-scale sediment reintroduction projects and canal closure projects could also serve this purpose. If NRDA damages were to be dedicated in part to funding any near-term LCA projects, including the sediment diversion or barrier island projects identified above, an administrative structure not requiring additional legislation that could effectively receive these funds with an appropriate directive from President Obama is the 1990 CWPPRA “Breaux Act Task Force”. The federal and State trustee agencies and EPA are all represented on it.

The Clean Water Act and BP Funding for Coastal Restoration. The Department of Justice in the early weeks of the oil spill announced the initiation of a civil and criminal investigation. The civil penalty provisions of the Clean Water Act, 33 U.S.C. 1321(b)(7)(A) and (D) authorize the imposition of penalties up to \$1100 per barrel of spilled oil on a strict liability basis or up to \$4300 per barrel upon a finding of gross negligence (#18). Since the federal government has estimated the total discharge to be 4.9 million barrels of oil, a potential civil penalty could be several billions of dollars.

Executive settlement authority to dedicate BP oil spill funds to coastal restoration includes the EPA Supplemental Environmental Projects (SEPs) program (#19). Pursuant to its Final SEP Policy of April 10, 1998, SEPs are beneficial projects that a defendant agrees to undertake as part of a settlement of an EPA Clean Water Act civil penalty enforcement action. EPA has a five-step process to determine if a proposed project qualifies as a SEP. Environmental restoration is an eligible category. The defendant is responsible for implementing the SEP with EPA oversight. The EPA Policy incorporates legal and policy constraints to assure compliance with the Miscellaneous Receipts Act that requires transmittal of civil penalties to the federal treasury.

So as to avoid any possible overuse of such a restoration project mechanism, SEPs that EPA has negotiated have been of modest size. The Department of Justice has often looked askance on the program. With that said, it is hard to distinguish the legal as contrasted to policy constraints in the SEP Policy. If we were to envision a SEP that BP would voluntarily enter as part of an EPA settlement, it could be of a magnitude that dwarfs any other SEP, would be highly visible and should have broad support throughout the executive branch. Thus, it behooves us to determine what a robust SEP that complies with the Miscellaneous Receipts Act could look like if BP were so inclined to support it, and what role the Breaux Act task force could play in project oversight. Even with a robust coastal restoration project SEP, one could anticipate that BP might face quite a sizeable Clean Water Act civil penalty. Senator Mary Landrieu has proposed legislation that would dedicate 80% of any Clean Water Act civil penalties to Gulf coastal restoration. Congressman Steve Scalise has introduced a comparable bill. The entire Louisiana delegation and the national environmental community support these bills.

The Need for Long-Term Sustainable Funding for Coastal Restoration. While BP funds through the NRDA or any Clean Water Act SEP could provide significant funding for and kick start systemic coastal Louisiana restoration, the federal government will have to devise a sustainable and substantial source of funding to achieve the coastal restoration goals enunciated above. The Melancon amendment would provide some very important funding, but more is needed. An article that I authored for the July issue of USA Today magazine entitled "Doubling Down on Disaster" proposed as one funding option the imposition of a \$2 per barrel of oil or natural gas equivalent "restoration fee" on all OCS oil and gas produced in the Gulf. The historic involvement of the oil and gas industry in coastal Louisiana and the Gulf and the storm buffering benefits of a restored coast to coastal oil and gas infrastructure, industry employees and their communities could justify such a fee that could generate \$20 billion or more over a ten-year period.

Another option that would generate \$2 billion annually for Gulf coastal restoration could be a modest fee of \$0.28 per barrel on all imported and domestically produced oil, the equivalent of 0.7 cents per gallon of gasoline. The justification for such a broadly assessed restoration fee is the national economic and environmental benefit of a restored Mississippi River delta ecosystem. The energy infrastructure along and in the Gulf that has helped to power the US economy for the last century and led to the location of the Macondo well has played a major role in delta collapse. It would therefore be appropriate for the energy system to contribute such a fee to its restoration.

Gulf Coastal Restoration vs Coastal Louisiana Restoration. This statement has focused on the national economic and environmental imperative of a comprehensive Mississippi Delta ecosystem restoration program in coastal Louisiana. BP funds that might become available under a NRDA or through a SEP or new federal law that imposes a restoration fee as suggested above would not be limited to coastal Louisiana restoration although that is where the need is by far the greatest. A suggestion for a restoration program in the other Gulf states would be enhanced protection and restoration of the floodplain forested wetlands of the multiple rivers that create estuaries in and flow into the Gulf. The floodplain forests of southern rivers have suffered enormously over the last century. However, the central focus of Gulf restoration must be restoration of the Mississippi River delta ecosystem (#20). The time for action is now.

