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Gulf Coast Restoration Task Force
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Background Statement of
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Introduction. The 225,000-square mile northern US Gulf has nationally important fish, shellfish and wildlife resources. Those resources are highly dependent on the coastal estuarine and tributary riverine systems of the northern Gulf coast stretching from Florida to Texas. The overall physical and biological health of the Gulf depend therefore on the health and in turn the restoration of these coastal estuarine and riverine ecosystems. During my 38 years at EDF I have participated in efforts to protect a number of these coastal and tributary riverine ecosystems.

The northern Gulf ecosystem has suffered from the loss of coastal wetlands along the entire Gulf coast, alterations in the fresh water flows and other hydrologic modifications of tributary rivers and their floodplain wetlands, extensive filling of coastal wetlands for development purposes and excessive inputs of nutrients and other pollutants. Protection and restoration of these Gulf coastal rivers, estuaries and their wetlands are important for the long-term health of the northern Gulf ecosystem. A comprehensive Gulf restoration program would therefore encompass actions such as:

- Continued restoration of the Florida Everglades that in part is directly linked to the Gulf pursuant to the Comprehensive Everglades Restoration Plan;
- Protection and restoration of the wetlands and reduction of pollution in major Gulf coastal rivers such as the Apalachicola and Mobile rivers and their bays (e.g., identification of the 26 highest priority restoration units in the Mobile River Basin, www.fws.gov/southeast/SHC/stories/SHCMobileRiverBasin.html);
- Preservation of that very special free-flowing river, the Pascagoula;
- Improving stream flow in a number of the rivers of Texas through the purchase of water rights for environmental purposes (see, e.g., "Texas Gulf Coast Restoration Priorities", Audubon Texas et al.);
- Acquiring floodplain wetlands along these rivers;
- Rebuilding oyster reefs along much of the Gulf coast.

However, as we look at the coastal ecosystems of the northern Gulf coast and the rivers that create its numerous estuaries, the largest and most important one by far is the Delta of the Mississippi River (MSR), the centerpiece of this magnificent coast. With a watershed that covers 41 percent of the continental

US (slide 1), this River together with its western distributary the Atchafalaya River and its Delta are the major physical and biological drivers of the northern Gulf.

This world-class Delta, the 7th largest in the world (slide 2), is in a state of decline, due to the way in which the Mississippi River has been managed for navigation and flood control and the damage caused by coastal Louisiana and Gulf OCS oil and gas operations on-shore infrastructure (slides 9-11 and 13-14). At the same time, coastal subsidence and erosion in this Delta increased its vulnerability to damage by the BP Macondo well's oil, and the Delta suffered more from that massive oil spill than other parts of the Gulf coast. Protecting the wetlands of this vast Delta that remain, initiating land-building restorative processes and reducing Mississippi River inorganic nutrient loads must therefore be the centerpiece of any Gulf coast restoration strategy and should be a primary recommendation of this Task Force.

The Central Role of the Mississippi River and Delta in the Northern Gulf Ecosystem. Evidence of the central role of the MSR and Delta, even in its current state, in sustaining the biological resources of the entire northern Gulf, first and foremost its fisheries and rich wildlife, abounds.

Since the MSR watershed encompasses some 40% of the continental US, the 4th largest river watershed in the world (slide 1), the MSR and its continental-size Delta necessarily play a huge role in the greater Gulf ecosystem and Gulf water quality. The MSR system ranks 7th among great rivers worldwide in terms of total water discharge. The mean freshwater discharge of the combined MSR and Atchafalaya River system of some 650,000 cubic feet per second constitutes between 80 and 90 percent of all freshwater delivered by US rivers to the US Gulf of Mexico (GOM) (see "The Central Role of the Mississippi River and Delta in Restoration of the Northern Gulf of Mexico", June 29, 2011, by Paul Kemp and Karen Westfeld, PhD, both of the National Audubon Society and James Tripp and Oluseyi Fayanju of EDF, p. 4 and Figure 1, also slide #3). The next largest US Gulf river, the Mobile River, has a mean discharge by comparison about 1/10 of that and the Pearl and Apalachicola Rivers each half of that discharge. The MSR's discharge of sediment and organic nutrients to the Gulf is proportionately large (Central Role paper, pp. 5-6). The inorganic nutrient loads of the MSR are clearly a problem that must be addressed to reduce the Gulf's dead zone (Central Role paper pp. 7-8).

It is estimated that the Mississippi Delta ecosystem constitutes some 60% of all of the coastal wetlands of the northern Gulf ("Central Role" paper pp. 7-8). With most Gulf fisheries and much of the duck, other bird life and other kinds of Gulf wildlife estuarine-dependent, these biological resources are highly dependent on the MSR Delta throughout the northern Gulf ("Central Role" paper pp. 13-16).

Economic importance of the MSR and Delta to the Gulf coast states and the nation. Given their central importance to the biological resources of the northern

Gulf, the MSR and its Delta are also economically critical to the other Gulf coast states. They are important to the commercial fisheries of the entire northern Gulf with their economic significance to all of the Gulf coast states.

The tourism economies of all of the Gulf states, in particular their coastal areas, depend not just on clean and healthy beaches and clean Gulf water, but also on recreational fishing, bird watching and enjoyment and/or utilization of the biological resources of the northern GOM. With the dependence of these resources on the vast MSR Delta ecosystem, all of the Gulf coast states and their coastal economies derive significant benefits from the MSR and its Delta (Central Role paper, pp. 9 and 12-15).

In addition, the abundant oil and gas resources of the central and western planning areas of the GOM are increasingly concentrated off-shore of the Delta, and the on-shore infrastructure of pipelines, refineries, storage tanks and servicing industry such as manufacturing of OCS equipment located through the Delta is likewise concentrated in the Mississippi Delta ("Central Role" paper pp. 15-17 and slides #8 and 14). The navigation system of the lower Mississippi River with its connection to the Gulf and the GIWW in Louisiana are also in the Delta (Central Role paper p. 11). These regionally and nationally vital economic assets depend on Delta wetlands because of their storm buffering capacity that reduces storm surge and wave height.

Louisiana ships substantial amounts of oil and gas and refine product to other Gulf coast states. For example, according to the US Department of Transportation, Louisiana ships to the States of Mississippi and Florida \$4.3B and \$4.5B, respectively, worth of transportation and airline fuels annually (Central Role paper pp. 17-18). Insofar as the integrity of the vast Louisiana on-shore and off-shore oil and gas production and its navigation systems benefit from Delta wetlands storm buffering capacity (Central Role paper p. 10) and the entire Gulf coast region depends on and benefits from this energy and transport infrastructure, all of the Gulf coast states depend on the vast expanse of Delta wetlands. The nation as a whole, of course, benefits from the navigation system of the Mississippi River, in particular the agriculture-exporting states of the Missouri and Ohio River basins.

Collapse of the MSR Delta and its implications for the national biological and economic assets of the Lower MSR and Delta. Over the last century this Delta has lost some 1900 square miles (the most recent USGS calculation) of its historic 7000 square miles of coastal wetlands (slides 4 and 6), a calamitous loss, with projections for much further loss (slide 7). In total, this devastating loss of Delta coastal wetlands ("Central Role" paper pp. 7-8) constitutes some 80-90% of all US coastal wetland loss.

The growth and sustainability of the Delta historically depended on the connection between the River and its Delta wetlands with the River conveying its

sediments into adjacent wetland basins during high water periods and finding new routes to the Gulf when its main stem became hydraulically inefficient (slide 5). Flood control levees have been built along the lower river for more than 200 years. Following the historic Mississippi Basin floods of 1927, however, Congress authorized the US Army Corps of Engineers to devise and implement a comprehensive flood control and navigation program for the Basin. As effective as this program has been for these purposes, with its flood control features recently sorely tested, it has largely severed the River from its Delta and caused the bulk of its sediments to be conveyed to the mouth of the River and into the Gulf (slides 8 and 19).

Because of the role of the Delta's wetlands in sustaining the biological resources of the northern Gulf, this continuing loss constitutes a gradual impoverishment of the fisheries and wildlife resources of the northern Gulf. It also compromises the storm buffering capacity of the Delta's wetlands so critical to the sustainability of the Delta's oil and gas and navigation systems. Yes, this is a growing catastrophe for Louisiana, but it is a calamity for the entire Gulf coast and the nation as a whole.

Causes of the subsidence and erosion of Mississippi Delta wetlands. The causes of this astounding historic and continuing loss of Mississippi River Delta wetlands are well known. The huge sediment loads of the MSR that the River conveyed into its surrounding wetland systems built the Delta. However, the River's flood control and navigation levees have largely severed the River from the Delta. As a result, its sediments are not conveyed by the Mississippi River into the Delta, but are instead shunted to the Gulf through the mouth of the River where they clog the navigation channels. At the same time, this levee system forces the inorganic nutrients that the River carries from its upper Basins into the Gulf where they create an expanding dead zone that damages the commercial and recreational fisheries of the Gulf. The vast on-shore infrastructure of the oil and gas industry in the Gulf, as well as coastal Louisiana, has also seriously impacted the hydrology and wetlands of the Delta.

Louisiana has largely supported and benefited from the MSR's flood control and navigation system, including these levees that starve the Delta of vital sediments, and the Delta's oil and gas operations. However, this MSR flood control and navigation system has been largely driven by federal policies with all of the Gulf coast states, the Mississippi Basin states and the nation as a whole reaping its economic benefits. Similarly, the oil and gas operations of the central and western Gulf, dependent on infrastructure that impacts the Delta's wetlands, have been driven by federal energy policy. The federal treasury has received tens of billions in revenues from these activities over many years.

Sadly, neither the federal flood control and navigation system nor the Gulf oil and gas operations have internalized the costs of their biggest externality – the loss of Delta wetlands. The Corps continues to upgrade and strengthen the levees

along the lower River, levees that would in due time subside and could eventually be breached with no such work, with no assessment of the implications of such work for Delta wetland sediment starvation and land loss. The US Department of Interior regulates Gulf OCS oil and gas production and derives billions of dollars in revenue from this production. Though the on-shore infrastructure necessary for that production and revenue generation has inevitable and severe impacts on the Delta, the Department of Interior engages in little assessment of that impact.

With no formalized process for internalizing these Delta wetland impact externalities, the federal flood control and navigation program for the MSR and Delta and Gulf energy policies, however, are not only undermining the Delta's ecology and thus diminishing the biological resources of the northern Gulf. They are also increasingly compromising the very foundation of the Delta's navigation systems, both the lower MSR navigation system and the GIWW, the urban hurricane protection system in which the federal government has invested billions of dollars, particularly since Katrina, and the flood control system. The mouth of the river is subsiding rapidly (slide #12), the increasing deposition of sediment in the mouth in the face of sea level rise is raising dredging costs, the River is striving to abandon the bird's foot delta, including Southwest Pass, and its outlets to the Gulf above Head of Passes are carrying an increasing share of the River's total flow. In addition, MSR flood stages at vast points were significantly higher than they were during the comparable floods of the spring of 1973 when I started to work for EDF.

The recent flood in the Mississippi Basin has also vividly demonstrated that the federal flood control program, brilliantly designed to convey a record flood to the Gulf and disperse it above the mouth through the Old River Control Structure, the Morganza Spillway and the Bonnet Carre Spillway, was not designed at all with sustainability of the Delta ecosystem in mind. Except through the Atchafalaya (slides # 17-18), little of the vast quantities of sand, clays and silts that the River was mobilizing were conveyed into the Delta's wetland ecosystem around New Orleans and Houma where they are desperately needed to replenish sediment-starved wetlands. Instead, vast sediment plumes exit deep into the Gulf, as was the case during the high River period in the spring of 2008 (Slide #19).

Title VII of the 2007 Water Resource Development Act. Prior to Katrina, the Corps of Engineers and the State of Louisiana devised a Louisiana Coastal Area (LCA) restoration plan for the Mississippi Delta that was incorporated into a January 2005 Chief's report. After Katrina, Congress adopted Title VII of the 2007 WRDA. Reflecting the urgency of Delta wetland restoration in the aftermath of Katrina, Congress authorized for construction a near-term LCA program of 17 restoration projects with an anticipated cost of \$5B or more depending on the final cost of the Mississippi River Gulf Outlet closure and restoration program (slide #20). This LCA program is in addition to the 1990 Coastal Wetlands Planning Protection and Research Act (CWPPRA or Breaux

Act) and CIAP-funded restoration projects, most of which are comparatively small in scale.

The authorized LCA program consists of two “medium” diversions, Myrtle Grove and White’s Ditch (slides #21-23), several very small freshwater diversions, Barataria and Terrebonne Basin barrier island rebuilding projects, the MRGO restoration program and a beneficial use of dredged material and demonstration programs. In December 2010, the Corps completed a Chief’s report for six of these LCA projects, including the White’s Ditch diversion that the Corps smartly redesigned as a sediment diversion with high River flow pulsing capacity up to 35,000 cfs. Most of the other LCA projects are in the planning phase. This program is moving forward, although very slowly and with little sense of urgency that the continuing loss of Delta wetlands should imbue into this process.

We have been working with the State Office of Coastal Protection and Restoration (OCPR) and more recently with the New Orleans District to investigate the feasibility of modifying the Myrtle Grove diversion on the west bank of the River at River mile 60 so that it would have up to 45,000 cfs capacity, allowing it to convey far more River sediments during high River flows that mobilize bottom sediments. Such a modified Myrtle Grove diversion would have considerable power to build land in the central Barataria Basin (slides #21-22) and nurture wetlands struggling to survive. This diversion, coupled with a CIAP- and stimulus-funded long-distance sediment pipeline project would convey MSR sediments deep into the Barataria Basin, the LCA-authorized Barataria Basin Barrier Shoreline (BBBS) project and the modified Davis Pond diversion project (which could be transformed through operational changes into more of a sediment diversion in the upper Barataria Basin), together constitute a significant set of different kinds of restoration projects that could combat land loss in that Basin. They could also begin land-building restoration processes using both the energy of the MSR during high flow periods as well as mechanical movement of sediments (slide #21).

2007 WRDA Title VII also projects a vision for longer-term restoration of the Mississippi Delta in Section 7002. This Section provides for a comprehensive plan that should, among other things, consider a set of large-scale projects to convey River sediment into the Delta wetlands that will take maximum feasible advantage of the sediments of both the Mississippi and Atchafalaya Rivers for environmental restoration consistent with flood control and navigation. While the Corps has not yet embarked on this plan, the State fortunately has taken the lead with a very ambitious revision to its coastal Master Plan that, under State law, must be completed by the spring of 2012. Representatives of the Corps and other federal resource agencies serve on the State’s Framework Development team as do representatives of the navigation and oil and gas industries, state agencies, local governments and civil and environmental organizations, including myself.

Proposed Task Force Recommendations for Action. This state of affairs sets the stage for a number of recommendations for action that we would urge the Task Force to take. They fall under four categories: 1) recommended legislative action, 2) immediate implementation steps by the assembled agencies, 3) comprehensive planning tasks for the agencies, and 4) identification and engagement of private sector resources.

First and foremost Delta restoration should be the Task Force's number one priority. All of the Gulf coast states have legitimate environmental restoration needs, and all five states and their citizens and businesses are served well by BP's \$20B economic restitution fund. However, the Task Force should identify the on-going collapse of the Mississippi River Delta and the imperative to set in place and fund programs short- and long-term programs that will reverse this egregious land loss and reinitiate restorative processes as the highest priority for a Gulf restoration program. Within this context, we recommend the following specific actions:

Legislative Priorities

- 1. Dedication of CWA civil penalties of Gulf restoration.** The Task Force should urge congressional and/or administrative action to dedicate 80% of oil spill Clean Water Act civil penalties to a Gulf coastal restoration fund that the federal resource agencies represented on the Task Force with the Gulf coast states could utilize for Gulf restoration purposes. Consistent with Delta restoration as the Task Force's top priority, a substantial portion, certainly more than half, of Clean Water Act civil penalties directed to Gulf coast restoration should be dedicated to Delta restoration.

Immediate Agency Action

- 1. Establish a Sense of Urgency.** The agencies and offices making up the Task Force, with the support of the White House, should work with the State of Louisiana to remove the Delta wetlands restoration program from the normal Corps of Engineers project development queue and address it with the focus and timeline appropriate for this ecological, economic, and cultural challenge of continental importance. The mounting evidence of the serious challenges confronting the current navigation system at the mouth of the River, linked to wetland loss, subsidence and current management of the River's sediment, reinforces the imperative for such action.

The federal government showed that it could act on this scale when CEQ and the Corps invoked an emergency provision for "alternative arrangements" for complying with NEPA and utilized design-build procedures to compress the planning for, design and construction of the 100-year hurricane protection of the greater New Orleans levee system, a

complex \$15B project that the Corps started in 2006 and has now been virtually completed. Moving delta restoration forward at this kind of pace is possible, using the funds mentioned above, but this Task Force and its constituent agencies must make it clear that they plan to use the resources and authorities at their disposal to achieve success under a vastly expedited timeline.

- 2. Adoption of Delta sediment reintroduction and time goals.** The Task Force should imbue the current federal LCA and longer-term Delta restoration planning and design program with a sense of direction and urgency by setting a goal of completing the authorized LCA projects by the end of 2015 and putting in place larger-scale sediment reintroduction projects, including a realignment of the lower Mississippi River and partial or full separation from the navigation channel, that would convey at least 70% (ideally 100%) of the sediments of the Mississippi River into sediment-starved Delta wetland basins by 2020. The Task Force should articulate similar goals for barrier island restoration, effective use of Atchafalaya River sediments and reconfiguration of Delta landscape scarred by oil and gas pipeline and equipment canals.
- 3. Use Existing Authorities To Expedite Construction of Authorized Projects.** While the Presidential Executive Order establishing this Task Force does not grant independent implementation authority, the agencies that make up the Task Force have multiple implementation authorities at their disposal. In addition to their various single-agency authorizations, which they have the option of working together on, the Breaux Act and the 2007 WRDA Section VII both establish multi-agency task forces to implement programmatic Delta restoration. The agencies at the table here must develop and implement a plan for using these existing authorities effectively.
- 4. Expedite Restoration by Building Authorized Projects.** The agencies assembled here have an immediate engineering and construction task list already prepared for them, and should move forward with prioritizing and accelerating design and construction of key LCA restoration projects, first and foremost the modified Myrtle Grove sediment diversion project. Of the 17 authorized LCA projects, several, such as the Barataria and Terrebonne barrier island projects, the MRGO restoration program and the two sediment diversion projects, White's Ditch and Myrtle Grove, are particularly important. However, the project that I would rank the highest is the modified Myrtle Grove sediment diversion project. The State, with our full support, has pursued a bold sediment data collection and analysis and modeling programs with a number of outstanding consulting engineering firms and academics. The Corps is now building on this information.

Corps regulations provide an avenue for accelerated completion of the Myrtle Grove project through design-build procedures, which were utilized during the 100-year levee upgrade. Design-build may include a "fast-

track” schedule, which allows the contractor to combine design and construction activities. The fast-track approach has been involved for several civil projects, including a recent dam project in Oregon. Because design-build requires that full funding be available at the time the contract is awarded, congressional action that provides funding or other means of providing funding must be obtained as soon as possible.

5. **Beneficial use of all Mississippi River dredged sediments.** In terms of specific near-term actions, the Task Force should recommend that all of the materials that the Corps dredges at or close to the mouth of the River be used beneficially, wherever possible, for LCA projects. This may entail piping these materials long distances and will be costly, but the current practice of wasting these materials by dumping them in the Gulf or in Pass a Loutre where they clog up that channel is unacceptable. Other districts spend more money per ton of dredged material with beneficial use as a baseline (Central Role paper p. 12). The New Orleans District and Mississippi Valley Division should follow these examples.
6. **Dedication of New Orleans upgrade mitigation funds for high priority Delta restoration projects.** The Task Force should work with the Corps, EPA and the State to direct the \$250M in New Orleans levee upgrade mitigation funds towards funding of high priority restoration projects, including LCA authorized projects, through an appropriate regulatory vehicle such as a payment in lieu fund rather than having those scarce dollars squandered on small-scale, local projects that ranked as priorities either in the LCA program, CWPPRA or the State’s master plan.

Agency Action – Comprehensive Plan and Approach

Beyond using the funds, authorities, and projects already at their disposal, the Task Force must set out a path toward comprehensive restoration. This necessarily includes the following.

1. **Developing a 21st Century management system for the Mississippi River Delta, driving policy and engineering changes necessary for a revitalized delta, navigation, and flood risk reduction.** The Mississippi River should be managed jointly for Delta restoration/sediment reintroduction, navigation, hurricane protection and flood risk reduction. The Corps does not manage it in this manner today. This will entail a significant re-engineering of the River at and below the Old River Control Structure. Since the Corps considers the traditional flood control and navigation program of the 1928 Flood Control Act to be its primary mission, this may require reworking of historic authorizations including that act. Short of that, an executive order from the President could clarify the necessity to do this as a reflection of congressional directives in 2007 WRDA Title VII. Such legislative or administrative action should be

premised on the fact that both the MSR's navigation and flood risk management systems are facing increasing challenges to which coastal land loss and subsidence contribute and that a program that redirects the River's sediments into the Delta would both promote the sustainability of the navigation system and provide new outlets for an increasingly stressed flood risk management system.

- 2. Complete the Federal Comprehensive Restoration Plan containing priorities and deadlines for action.** Congress has directed the Corps to prepare a comprehensive plan for coastal restoration, in consultation with the LCA Task Force, and to integrate that plan with the State's Comprehensive Master Plan for a Sustainable Coast (State Master Plan) created by the Louisiana Office of Coastal Protection and Restoration. The State Master Plan and the Corps LACPR report both utilize the Multiple Lines of Defense Strategy to integrate coastal restoration and protection. The Corps' plan is directed to consider strategies to make maximum, feasible use of the sediment from the Mississippi and Atchafalaya Rivers for environmental restoration through, among other means, large scale sediment diversions at the head of major basins, consistent with flood control and navigation. The comprehensive plan must include proposed projects in order of priority determined by their potential to contribute to the creation of coastal wetlands and flood protection as well as utilize Multiple Lines of Defense.

The agencies that make up this Task Force therefore have Congressional authorization to develop a plan that will serve as the necessary comprehensive planning document to guide storm risk reduction and coastal restoration, as well as redesign of the lower River navigation channel, in a holistic, efficient and expeditious manner. In addition to integrating the restoration plan with the Corps' plan for 500 year flood protection called the LaCPR, WRDA requires that the plan be developed in coordination with state planning efforts including, the State Master Plan. Louisiana is currently developing the 2012 State Master Plan.

- 3. Initiate a Process for Integrating Governance of OCS Oil and Gas Operations with Delta Restoration.** Since oil and gas on-shore infrastructure in the Delta related to Gulf OCS oil and gas production cumulatively continues to have serious wetland impacts, the Department of Interior should work with the entire Task Force to initiate a process to assess how its governance of OCS activities under both the Outer Continental Shelf Land Act and the National Environmental Policy Act could be modified to recognize these externalities and to adopt appropriate mitigation policies that could support this nationally vital Delta restoration initiative. After all, the Gulf oil and gas industry would benefit enormously from a Delta ecosystem that is no longer eroding and subsiding and indeed has shifted into a restorative mode.

Engage Private Sector Innovation and Capacity

- 1. Engagement of private sector firms to expedite restoration program implementation.** In order to expedite the implementation of both the short-term LCA program and the longer-term restoration program, the Task Force should make sure that the Corps, the federal resource agencies and the State of Louisiana take full advantage of the private sector and involve private sector engineering firms in the planning, design and construction of specific projects. This would include effective use of design/build concepts that the Corps has used to good advantage to expedite design and construction of the surge barrier on the east side of the Inner Harbor Navigation Canal.

This could also include Task Force support for the Lower River Design Initiative that EDF is pursuing with its NGO partners. Ideally with backing from the State of Louisiana, the Corps, other federal agencies and the navigation industry, this Initiative would set in motion a process that would engage major engineering firms with teams of academic experts to explore in detail how to design the next generation separation of the Lower River from the navigation channel so that the River's sediments could be kept out of the navigation channel as it gets shallower towards the mouth of the River and instead used to build one or more new deltaic lobes.

Conclusion

This Task Force has an exciting opportunity, in the aftermath of the 2010 Gulf oil spill disaster, to revamp and modernize policies, programs and funding for Gulf coast restoration that the President, Congress, the Gulf coast states and the public can espouse. Many Gulf coast-wide coastal protection and restoration projects are deserving of support. All five states should share in NRDA, Clean Water Act civil penalty and other funding that becomes available for Gulf coast restoration.

However, all members of the Task Force should recognize that the Mississippi River and Delta play an enormously critical role in the ecology of the Gulf and the abundance of its biological resources that benefit all of the Gulf coast states and the nation. This justifies special attention by the Task Force to the condition of this extraordinary coastal ecosystem and the national imperative to invest in its restoration while making some fundamental changes to the Mississippi River flood control and navigation system both to support restoration processes and to assure the sustainability of those systems that Deltaic land loss and subsidence are compromising.