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Comments on Louisiana's Draft Comprehensive Master Plan for a Sustainable Coast

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The February, 2007 revised draft of the Louisiana Comprehensive Master Plan for a Sustainable Coast is a significant improvement over the Preliminary Draft Master Plan. As is no surprise given the scope, political challenges, and scientific complexity of the task at hand, much remains to be done. As is intended by the triple-revision process set forth by the CPRA, we suggest additional changes and look forward to discussing these challenges with the CPRA. The stakes are high, challenges substantial, and time short. Nevertheless, no one can contest that the officials, scientists, nonprofits, and regular citizens involved in this process are all dedicated to creating the best coastal restoration and protection plan possible. We remain confident that this process of back and forth will continue to improve the plan finally presented to the state legislature.

1. Systematic Reversal of Land Loss Must Precede New Levees

A disconcerting disconnect between the principles set forth in the Master Plan and the funding priorities laid out in the draft Annual Plan remains and must be addressed. As has become abundantly clear, if coastal Louisiana's communities, culture, economic assets, and ecosystem are to survive and thrive into the future, the state and federal governments must jump start an aggressive program of coastal restoration on a ten-year timeline with a severely constrained budget. Less than 100 years ago, we began an aggressive program of engineering the ecosystem that coastal Louisiana depends upon. While some of the results of that engineering were as intended, for example the ability to extract off-shore energy deposits and efficiently move oceangoing commerce, the larger result has been to send the system into cardiac arrest. More engineering may extend the ability to live and work on the delta but it will only hasten the eventual decline.

If we want the patient to survive, we must restore the natural functioning of the system. This will, in large part, require de-engineering what we have done to this ecosystem over the past century. We must make maximum use of the forces of the Mississippi River to once again nourish and build protective wetlands and coastal forest. Only then can we turn to deciding where and how communities and economic infrastructure fit in.

For this reason we support the program for identifying “Urgent Early Actions” set forth on pages 71-72. To paraphrase, this suggests:

- Moving forward study and design of major sediment and freshwater reintroduction projects;
- Modifying operation of existing structures to maximize restoration benefits;
- Moving forward with projects that provide better-than-100-year protection to densely-populated communities;
- Constructing projects that “maintain or reestablish a landscape feature that is a linchpin for restoring or sustaining the flow of water in a given area,” for example closure of the MRGO at Bayou La Loutre;
- Building projects that “restore natural processes in an area of high projected land loss;” and
- Sustaining natural processes that protect existing communities.

In the sections below we further discuss our ideas about how best to implement such a program. We are, however, particularly concerned about the way the CPRA proposes to initially move forward. As the executive summary of the draft points out, engineered structures “must be integrated into the landscape in such a way that it does not destroy the viability of the ecosystem or encourage unwise development in high risk areas.” The draft annual plan, however, spends almost 40 percent of funds available in the next three years on a series of levee construction projects that coastal scientists agree are likely to damage the wetlands through which they will cut. Moreover, without a fully developed wetlands restoration program in place, it will be impossible to “integrate” projects like Morganza to the Gulf and Donaldsonville to the Gulf with coastal restoration. There is also little support for the assertion that either of these projects will provide greater than 100-year protection, that said protection is limited to densely populated communities, that the proposed earthen-levee design of these structures can withstand attack during a serious hurricane, and that construction of these systems will not repeat the deadly development-inducing mistakes made in developing the New Orleans East levee system.

We must, therefore, withhold our support of this overall plan until it is made clear that new engineered hurricane protection projects for Houma/Thibodaux and the New Orleans’ West Bank will only proceed once they are:

1. integrated into projects for systematic restoration of the Barataria/Terrebonne wetlands; and,
2. limited to provision of .02% protection around areas with greater than 250 people-per-square-mile density.

We need to make it absolutely clear that we do not object to engineered hurricane protection for densely populated communities like Houma, Thibodaux, Larose, Raceland, or the West Bank of New Orleans. We simply believe that a program of pile-supported ring levees, and subsidy for storm proofing and elevation (and possible relocation of particularly vulnerable properties) of properties in less dense areas is much more likely to be effective, sustainable, and efficient. Such a program is also much less likely to stand in the way of the ultimate storm protection system – active restoration of the Barataria-Terrebonne wetlands.

2. The Plan Needs To Present A Clearer Road to Systematic Reversal of Land Loss

In general, the draft Plan does a good job of describing the magnitude of coastal wetland degradation in coastal Louisiana while explaining the national importance of oil and gas, navigation, fishery, and urban/cultural resources that historically have depended on the vast Delta of the Mississippi River.

Page 13 of the introduction explains that “when one considers the human cost, the risks to infrastructure, and the danger to wildlife and landscape, it is clear that we must take bold action.” This would suggest that the State Plan would put forward a set of wetland restoration proposals that would effectively deal with high rates of land loss. Unfortunately, the Plan still lacks a compelling vision of a restored coast and restoration processes. It may be because Plan drafters did not feel able to step back and first conceptualize what a de-engineered system would look like, and then determine how best to place communities and infrastructure within that repaired system. Given the advanced damage already done to the system and challenges presented by global sea level rise, however, anything short of such an analysis will continue to fall short.

As for now, the levee protection and wetland restoration proposals do not appear to be integrated at all (except through graphic juxtaposition on p. 49), and it is not clear how the levee proposals comply with the five bulleted guidelines presented in the box at the top of p. 40. The entire levee program and therefore much of the draft Plan does not appear to be the outcome of a systematic scientific and engineering assessment of what wetland restoration and hurricane protection measures can work effectively together at a cost that is feasible and on a time line that will be genuinely useful. If the CPRA has this information it needs to work on better presenting it. If not, the CPRA should clarify when the discussion relates not to concrete proposals but instead more of an identification of needs and issues.

It is clear that restoration and protection concepts are better developed in some areas than others, and the Plan can be of enormous public use if it makes the situation clear to the public and does not propose that there are projects ready to go when many years of effort remain before us.

Proposals for the area East and South of New Orleans are most developed, including: various barrier island rebuilding measures; restoration measures east of the River in the greater MRGO region; and, the outline of a major lower river diversion coupled with more modest measures such as the Myrtle Grove diversion and sediment pipeline into the Barataria Basin. However, the description of the Mississippi River Delta Management project, incorporating one or more major sediment diversions below Myrtle Grove, does not get us much beyond what COAST 2050 proposed. The Master Plan should go further, describing the purpose and expected scope of the Delta Management Project's results while also explaining that communities and individuals impacted by any eventual diversion will receive storm-proofing, elevation and relocation assistance as requested. As discussed below, if the whole region is to survive this project must not be hamstrung by parochial concerns – nevertheless, those whose lives will be most directly impacted deserve straight talk about how the State will help them.

As to the central portions of the coast, it is unclear what the Plan is proposing to address “extreme rates of land loss”, let alone restoration. Greater use of the GIWW as a conveyance channel does not do this. The draft Plan does not look at effective use of Atchafalaya River water and sediment as a strategy for large-scale protection and restoration in central and eastern Terrebonne Parish via a third outlet through the east guide levee; nor does it consider some kind of large diversion or sediment conveyance strategy for the central coast on either side of Bayou Lafourche beyond the very small, 1000 cfs Bayou Lafourche project. If the CPRA is going to consider such options, it should identify them in the Plan.

The western part of the coast, without an obvious source for freshwater and sediment, is discussed below.

3. The MRGO Proposal Is an Excellent Example of a Major Restoration Program Near Ready For Implementation

We certainly support the proposal for total closure of the MRGO and restoration of wetlands on the east side of the River together with some set of levee structures. Our own report on MRGO closure incorporates these features. This would include rebuilding the Bayou La Loutre ridge and constructing an appropriately-sized diversion at Violet that will provide significant amounts of freshwater, as well as some sediment, into this sub-basin, with the hopes of restoring the coastal swamp forest and other wetlands that MRGO decimated.

However, we have two specific concerns with the bullets on p. 39. As our MRGO report states, the MRGO channel should be restricted in specific locations in terms of its width and depth. This would not entail completing filling in the channel – there is not enough sediment to do that anytime soon – but redesigning the channel to retard the flow of freshwater from Violet and elsewhere. Second, the bullet regarding completion of the IHNC lock once again seems to be linking that project with MRGO closure. If that is not the intent of the State Plan, it should be explicit that MRGO closure should proceed immediately, not linked in anyway to the IHNC lock project. The IHNC lock project is very expensive and will take a long time to build even if the Congress appropriates the requisite funds. MRGO closure should proceed on the fastest possible time schedule in light of Katrina experience, and the Plan should make it clear that MRGO closure and the Violet diversion are very high priority projects that should be completed within three years. Delay is inexcusable. This sense of urgency for MRGO closure should be emphasized in the Plan.

4. Shoreline and Ridge Restoration Needs to Support Restoration, Not Focus on Locking in Current Conditions

The plan needs further discussion of how the navigation channel bank stabilization program fits into the wetland restoration program. Will it have any impact on it? There is no question that navigation channels are economic necessities that have often changed the hydrology of the surrounding areas, but a discussion of how those changes can be managed and/or adjusted would be helpful. Also, it is unclear from the draft Plan what is being proposed for the ridges colored in orange on p. 32.

5. Maximize the Impact of Land Sustaining Diversions

As you know from numerous earlier comments, we consider the Myrtle Grove diversion and sediment conveyance to be very high priorities for any restoration initiative in the Barataria Basin. The draft Plan proposes a Myrtle Grove diversion with a capacity of 5000 to 15,000 cfs (p. 35). At the Lafayette meeting, we discussed Myrtle Grove options at far higher capacity. The Corps in the text of the LCA report describes a Myrtle Grove diversion of only 2500 cfs, apparently to prevent any significant change in the salinity regime of Barataria Basin. Even at 15,000 cfs Myrtle Grove would have capacity only 50% greater than the Caernarvon Diversion. Why not provide for a sediment diversion at or near Myrtle Grove (perhaps at a bend that would maximize opportunities for sediment capture) with capacity in the range of 25,000 cfs or higher with the understanding that the diversions would be pulsed – designed to take advantage of high River flows. In our view, furthermore, a sediment pipeline should be designed to convey sediment towards the western part of Barataria Basin (we recognize that the 20-mile CIAP proposed sediment pipeline might be such a project)". The State Plan should set a time schedule for the design and implementation of this project.

The State Plan should consider a far more ambitious Bayou Lafourche project. The current 1000 cfs project was designed primarily to augment fresh water supplies in the Bayou for urban use. It is not clear that the engineering team evaluating this project has conceived it as a potential wetland restoration project. Bayou Lafourche would provide by far the most efficient way of conveying significant amounts of Mississippi River water and sediment into the central coast. It would not entail destruction of thousands of acres of wetlands such as one version of the Third Delta might entail. An enlargement of Bayou Lafourche as a restoration project would have an impact on the urban communities that have encroached on its floodplain. The Plan talks about the need for trade-offs. This part of the coast has become extremely vulnerable to storm surge as a result of massive wetland loss. A creatively designed Bayou Lafourche project, perhaps with a channel that skirts part of the most heavily urbanized areas, combined with relocation and/or elevation of vulnerable properties, should be presented as a real option for central coast restoration. We would urge an assessment of the impacts on central coast restoration and the urban communities in this corridor of a Bayou Lafourche diversion with up to a 10,000 cfs maximum capacity and an even larger one with a capacity in the 50,000 to 100,000 cfs range during high flow pulsing. Otherwise, the Plan has no proposal for reintroduction of water and sediment into the central part of the deltaic plain that has been suffering very high subsidence and wetland loss rates.

6. It Is Time to Accelerate Design and Construction of Land Building Diversions.

An ambitious Myrtle Grove diversion project can prove to the citizenry of coastal Louisiana that sediment diversion and conveyance can be a reality on an accelerated time schedule. However, the potential for large-scale wetland protection and restoration will not have reality until the large Lower River diversion described at pp. 36-37 proceeds. If this project is not ready to proceed until 2017, there is much reduced justification for seeking a major additional infusion of OCS funds for wetland restoration between now and 2017.

A driving trip from New Orleans to Venice on the west side of the River and back on the east side reveals how few people and facilities are evident below Myrtle Grove in the narrow corridors between the River levee and hurricane protection or bay levee on either side. The draft Plan, while talking about trade-offs, proposes maintaining these existing levees at current height. This should be reconsidered. Existing communities that are still inhabited and are important for oil and gas servicing industries or fishing can be protected to a similar degree by pile-supported ring levees, coupled with provision for evacuation. This would allow for consideration of a lower River management plan that would include dismantling of large stretches of levees so that River overbank flooding and sediment dispersal could be accomplished cost-effectively. As the draft Plan states, "In order to allow the river to create new land, science tells us that we must turn the river loose and let it resume doing what it did for thousands of years; spread water and sediment into broken marsh and shallow water to create new delta lobes." Redesigning the whole levee system below Myrtle Grove would be a start for reconnecting the river

and its surrounding wetlands. The Plan should set forth a process and schedule, perhaps including appointing an internationally renowned group of experts to design the basic parameters of such a strategy for letting the river “loose” while providing for navigation. Following the adoption of basic parameters for the redesigned levee system, diversion, and navigation structure, a design competition or design-build RFP process could be used to expedite progress. The major engineering firms must be engaged if this hugely challenging and exciting restoration program is to move forward over the next five years with construction underway in time to give everyone confidence that large-scale restoration is becoming a reality.

7. Using the Resources of the Atchafalaya Should Be a Top Priority

The CPRA will be missing a major opportunity and failing in its job to plan systematic restoration of the entire coast if the final Plan continues to say so little about the potential for effective use of Atchafalaya Basin water and sediment to restore portions of the central coast in Terrebonne Parish that have suffered “extreme” wetland loss. We have submitted a proposal for a third outlet through the east guide levee. Since this outlet would be north of Morgan City, it provides for much more restoration potential than relying just on expanded flows through the GIWW. The Atchafalaya River has built a huge amount of land in the Basin and in the Bay through the Lower Atchafalaya River and Wax Lake Outlet over the last 30 to 40 years. A third outlet would allow for the land building capacity to be broadened in a manner that might enhance the unique ecological features of the Basin at the same time and protect Morgan City.

In addition, it is critical that the State Plan address the operation of the Old River Control Structure with a view to optimizing the distribution of flows between the Mississippi and Atchafalaya Rivers for coastal restoration as well as flood control purposes. The Corps is not apt to investigate this issue on its own. Increasing the distribution of flows down the Atchafalaya River would create angst in Morgan City and provide limited restoration benefits without a third outlet designed to take advantage of this extra water and sediment.

8. Hurricane Protection for the Delta and Chenier Plains Still Lacks Strategic Design

On the protection side of the Plan, the rationale for both a 0.2% and 1% levee protection alignment for major parts of the coast is unclear. The plan should establish a set of criteria for why an area would receive one level of protection over the other. Having these criteria set out would also assist with prioritization decisions.

The dual levee alignment program that is proposed for the entire coast of Louisiana from the Mississippi River to the Texas border strikes us as environmentally destructive, very expensive, probably infeasible and counter-productive. The draft Plan refers to a strategically designed hurricane protection system, but we see little evidence of strategic

design, except for an attempt to differentiate between 0.2% protection in some places, 1% protection in others, and combinations of the two in yet other places. The draft Plan states, properly, that development incursions into wetland areas that would be “protected” by this vast levee system should not be countenanced, but provides no realistic mechanism whatsoever for controlling such land development that is an inevitable feature of such broadcast protection schemes. Proposing land use controls by local governments is not such a mechanism and has worked virtually nowhere in the country. Any incremental “protection” of wetland areas that would induce development must be preceded by a comprehensive program of purchase of development easements, backed with a credible financing scheme. Land use controls will not work.

Major urban areas in coastal Louisiana can and should be protected through a ring levee system combined with an aggressive and accelerated wetland restoration diversion and sediment conveyance program.

The draft plan has not convinced us that the destructive impacts of historic levee construction will not be repeated because of reliance on leaky levee technology. The draft Plan describes “leaky” levees as an innovative technology that would allow for linear levees to co-exist with wetland restoration projects. There is simply no scientific evidence that periodic placement of water control structures that will, when open, allow for the passage of flows of water and sediment will substitute for more open flows of water and sediment. Levees will serve to impound water and block the exit of salt water following storm events a la the Rita experience in the Chenier Plain.

It remains unclear how the Plan addresses what happened to both flood control structures and hydrologic management structures (i.e. “leaky levees”) during Hurricanes Katrina and Rita. The single page in the Plan that purports to address these “lessons” provides no specifics about how the plan was informed by the major forensics reports that have been issued in the past year. Those revising the updated Plan will also have the benefit of the official state report on Katrina failures recently released by LDOTD after 3 months of internal state review, and the lessons presented in this report should also be addressed.

We are also very concerned that the Plan relies on bolstering existing levees instead of building new systems from the ground up. The legacy levee alignments are of unknown composition, and there is simply no evidence that the reliability of such composite earth embankments can be assured in the future against the 100+ year recurrence storm surge and wave. One important lesson of Katrina was that earthen levees constructed across soft marsh soils failed catastrophically, and ultimately created death traps for communities that depended on them, (for example Chalmette and Meraux in St. Bernard). In addition, settling of earth levees affects the constructability and ultimately the reliability of these structures. The building of earthen embankments across the soft soils of the inter-distributary basins (“leaky levees”) is a job that can never be finished, as the USACE found out, even if relatively good clays are available in sufficient volume. The crown elevations for such structures decline at spatially varying rates between

enlargements. Accordingly, the actual level of protection at the time a particular storm strikes will differ from place to place, but will generally be something less than the design level. Armoring to provide protection of embankments against waves and overtopping scour is difficult for structures that are in continual motion. On the other hand, earth levees that are useless against a storm surge are quite effective in blocking natural hydrologic flows and in damaging wetlands.

One lesson of the storm is that it is necessary that structures and alignments being considered for critical life-support flood protection be analyzed over a 100 year life-cycle that gives the greatest weight, first, to reliability, and, second, to the speed with which the structures can be deployed. No pile-supported structure failed during Katrina, although sheet-pile or I-Wall structures (that again depend on earth levees) failed almost everywhere they were deployed. Pile-supported solid or gated structures similar to those built in the 1930s at Bonnet Carre and Morganza can be used to more quickly provide reliable protection than any project depending on earth levees. In contrast to the familiar overbank river control structures that have served reliably for so many decades, gates on pile-supported hurricane protection structures can cross wetlands, bays or tidal channels because they will be raised out of the way and lowered only on those rare occasions when their protection is needed.

9. Much More Work Needs To Be Done on the Chenier Plain

We must continue to question the viability of the plan for the Chenier Plain. Hurricane Rita brought massive overtopping of levees and introduction of high salinity waters into fresh marshes. A number of these marshes were artificially impounded, which tended to trap this salt without providing any means for flushing. Clearly, we will need to do something different, and this brings into question the apparently accepted approach to freshwater and sediment management in this region. The draft Plan calls for a comprehensive study of freshwater and sediment resources. This must consider the possibility of a different approach rather than maintaining the present system, and the final Plan should set forth a system for developing such an approach. It is quite possible that an approach that advocates maintaining large freshwater wetland areas near the coast is not sustainable, given predictions for global climate change and higher energy costs.

10. The Plan Fails To Explicitly Lay Out a Non-Structural Strategy For Homes and Economic Assets That Will Not Be Protected Within Ten Years

Our initial comments called for consideration of a number of both structural (i.e., ring levees) and non-structural (i.e., raising structures, zoning, etc.). There is no question that a complete restoration and protection program will take decades to construct, and vulnerable properties will remain even then. Although this may require coordination with organizations like the LRA, the plan will be incomplete until a non-structural program is explained and funded.

11. More Explicit Plans for Addressing Climate Change Uncertainties Should Be Included

Global climate change is addressed briefly in the draft plan, but it is unclear how the Plan has been changed, and will be changed in the future, to address climate change. The historical record shows that Louisiana's deltaic wetlands over the past 5,000 years were able to keep up with even fairly sizeable changes sea level by building and accumulating soil. This was possible because the wetlands had the full benefit of Mississippi River sediment and freshwater. A recent Duke University modeling effort shows that healthy wetlands receiving historic levels of sediment can adapt to as much as ten millimeters of sea level rise, but that sediment-starved wetlands will dissipate rapidly in the face of sea level rise (<http://www.dukenews.duke.edu/2007/03/marshmodel.html>). If coastal Louisiana is to survive the higher sea levels global warming is expected to bring about, the restoration plan must aim to approximate that historic capacity for vertical accretion. This objective should be explicitly stated and its implementation explicitly addressed in the plan.

12. More Explicit Plans for Addressing Energy Cost Uncertainties Should Be Included

In our earlier comments, we pointed out the need for consideration of future cost and availability of energy. This is a topic of controversy and uncertainty, but with enormous implications for a restoration program that has some extremely energy intensive elements (i.e. levee building and maintenance, dredging and sediment transport in pipelines). Some restoration elements might become unaffordable if there are not undertaken early before significant increases in energy costs. Thus, a consideration of energy costs is imperative for delta restoration.

13. Now is the Time to Announce a Design Team and Process For Moving Forward

During the LCA process, the State assembled a remarkable team of scientists and engineers led by Robert Twilley. It is not evident that such a team has been leading the State's planning effort. The Corps has a planning team at work in Vicksburg, but, as far as we can tell, that planning team is focused overwhelmingly on levee system designs. Further, it is not clear that the Corps' storm surge model incorporates wetland features that can affect surge and wave energy. If so, its basic planning tool is incapable of integrating wetland restoration and levee structures as parts of a comprehensive storm protection program. In addition, its process is effectively closed. The State must pursue a process that relies on a team of the best coastal scientists and engineers available and engages the public at the same time in considering the large choices that the State and nation must make as they consider the future of North America's most remarkable coastal ecosystem that actually has the potential to restore and enlarge itself even in the face of global warming and accelerated sea level rise.

The CPRA deserves credit for outlining the scientific challenges facing implementation of coastal restoration and protection efforts. Now is the time to appoint and set in motion a distinguished and independent science team that will answer these questions and keep the projects, altered if necessary, moving toward implementation. This team's first task should be to develop a strong conceptual framework on delta functioning and ensure that elements of the plan do not unnecessary conflict with deltaic functioning.