Preface

In December 2005, the U.S. Congress directed the Secretary of the Army to: 1) conduct a comprehensive hurricane risk reduction design and analysis 2) develop a full range of flood risk reduction, coastal restoration, and hurricane risk reduction measures for South Louisiana and 3) include consideration of "Category 5" events. The United States Army Corps of Engineers (Corps) was charged with conducting the Louisiana Coastal Protection and Restoration (LACPR) planning and technical effort. The purpose of the LACPR report includes communicating the risks and the range of implications associated with managing those risks as well as engaging leaders and stakeholders in a process of risk-informed decision making.

The LACPR report meets the Congressional direction. The LACPR Final Technical Report presents a suite of alternative plans that could provide risk reduction and restoration for a range of alternatives, including the Category 5 threshold of storm events. The report further indicates the types and potential magnitude of the tradeoffs required for implementation of each plan to assist local, regional, and national consideration and decision making.

The LACPR report builds on the State Master Plan. The Congressional legislation required the LACPR analysis to be conducted in close coordination with the State of Louisiana. The State has worked with the Corps throughout the LACPR effort at the local, regional, and federal levels. In addition to weekly team meetings, the State participated in Regional Working Group and Federal Principals Group meetings. The Corps has also briefed the State's Congressional Committees throughout the LACPR effort. In May 2007, the State of Louisiana finalized their State Master Plan (www.lacpra.org) which provides the State's conceptual framework of a sustainable coast and is the overarching vision for LACPR. The LACPR technical report complements the State Master Plan by presenting detailed technical evaluation of those components within the Corps' mission.

The Corps sought the expertise of the National Academies. In June 2007, the National Research Council of the National Academies established a committee to review LACPR. The Committee reviewed the LACPR's February 2008 and March 2009 drafts with the purpose of providing the Corps with an external independent technical assessment, including an assessment of the economic, engineering, and environmental methods, models, data, and analyses used in the report. The Committee's concerns were related to:

- The lack of a single recommended plan and priority projects;
- The feasibility of sustaining the coast, given uncertainties about the availability of sufficient sediment;
- Quantifying scientific uncertainties associated with wetlands restoration and river diversions;
- Quantifying risk of failure for structural systems;
- Preventing induced development and limiting development in the floodplain;

- Multi-criteria decision making and plan rankings; and
- Adaptive management of a comprehensive systems approach.

This document has been revised to emphasize how the LACPR report addressed the Committee's concerns. The Chief of Engineers will also issue a formal response to the National Academies.

The Corps has amended the LACPR report to include other external comments. A significant purpose of this report is to enable a risk-informed consideration of the approaches for reducing and managing both storm related risk and coastal restoration needs. On June 9, 2009, the Corps released the LACPR report for a 45-day review by other Federal agencies, the State of Louisiana, local government, non-governmental organizations, and the public. The comments received represent the beginning of this important step in the decision process. A document summarizing all comments received during the public comment period and the Corps' responses to those comments has been appended to the Final Technical Report. In response to comments, the LACPR Summary Report has been modified to clarify the report's findings, as well as the path forward.

The LACPR report recommends a multiple lines of defense strategy. The public has sent a clear message that a levees alone approach is not enough. No single measure or approach for achieving risk reduction will be sufficient for achieving the multiple risk reduction objectives established for coastal Louisiana. A multiple lines of defense strategy requires a combination of coastal restoration features, nonstructural measures, and structural components, that include Mississippi River diversions, marsh creation, evacuation, elevating structures, building levees and floodgates. While the public, parish councils, non-governmental organizations, other Federal agencies, and the states of Louisiana and Mississippi all agree that plans should be based on a multiple lines of defense strategy, not everyone agrees on the specific projects that should be built. This technical report presents implementation options and recommends a path forward that includes further consideration of tradeoffs. An important component of the multiple lines of defense approach will be the prioritization of features to achieve greater long-term risk reduction.

Diversions are critical for sustaining the coast. Diversion of Mississippi River freshwater, nutrients, and sediment is essential for the restoration of natural deltaic processes to sustain coastal wetlands in the areas of greatest land loss across coastal Louisiana. Projects to divert freshwater and sediments from the Mississippi River into adjacent estuaries are integral components of coastal protection and restoration plans. Currently, more than 20 diversion projects are either being studied or constructed along the Mississippi River. The LACPR report includes diversions that could be classified as large diversions with high flow design capacities greater than 15,000 cfs with the largest diversion being over 175,000 cfs.

As pointed out by the National Academies, the high level of uncertainty of the effects of proposed river diversions suggests the need for careful monitoring and evaluation of

existing diversions. They also stressed the importance of an adaptive strategy that can adjust to and build upon the new information learned from the responses of these coastal wetlands systems to human interventions. Under the Louisiana Coastal Area authority in the Water Resource Development Act (WRDA) of 2007, the Corps and State of Louisiana are pursuing a comprehensive hydrodynamic model and analysis of the Mississippi River to assess cumulative impacts and allocation of sediment under a regional sediment management plan.

Capturing sufficient sediment to sustain the coastal landscape holds many challenges and uncertainties. As emphasized by the National Academies, readily and immediately available sediment is a limited resource in the Louisiana coastal environment. As such, a more detailed description of sediment availability and prioritization of use is needed. Sea level rise and subsidence further present uncertainties for the long-term sustainability of coastal Louisiana. Acquiring adequate sediment resources to sustain the coast involves potential tradeoffs, opportunity costs, and long-term fiscal investment. The Corps is developing a Regional Sediment Budget for coastal Louisiana to determine the feasibility and impact of sustaining the coast. The Corps is also closely coordinating with the Gulf of Mexico Alliance as they develop the Gulf Regional Sediment Management Master Plan. The objective of the Sediment Management Master Plan is to provide a regional blueprint for the beneficial use of dredged material for habitat restoration.

Protection and restoration plans need to be focused on high-priority projects. The LACPR analysis demonstrated that not all landscape features provide the same level of risk reduction. Rule of thumb approaches for estimating the contribution of wetlands to risk reduction are unreliable, e.g. “x miles of wetlands reduce surge heights by y feet”. The LACPR report identifies critical features within the coastal landscape, i.e. wetlands, land bridges, highways, etc. that have a measureable influence on surges. Protecting and restoring coastal wetlands in some areas of the coast provides significant risk reduction potential and ecologic benefit, while in other areas primarily ecological benefits are derived. On a planning unit scale, the LACPR analysis has determined where maintaining the current landscape has a significant contribution to risk reduction. For those areas, measures to balance the projected net loss have been included in the final recommended alternatives.

The Louisiana Coastal Area Program, as authorized by Title VII of WRDA 2007, provides for the initiation of coastal restoration efforts for ecological reasons. Section 7002 of WRDA 2007 also provides opportunities for refining the analysis to improve the understanding of strategic coastal landscape contributions to risk reduction. The LACPR report recommends focused analysis and implementation of strategies to maximize risk reduction. This strategy will help address the challenges of limited resources and funding.

Coastal restoration alone cannot provide “Category 5” risk reduction. Although coastal features can increase the reliability and sustainability of comprehensive risk reduction systems, the coastal landscape alone cannot provide “Category 5,” or even

100-year, risk reduction. To achieve those levels of risk reduction, nonstructural or structural measures are necessary.

Nonstructural measures are a key component for risk reduction; however, their effectiveness depends heavily on actions of entities outside the Corps. Nonstructural measures, such as the relocation, or the elevation of assets above the flood affected zone, can significantly and reliably reduce risks. Successful implementation of nonstructural measures requires the direct participation of individuals and other governmental agencies besides the Corps. A consistent, integrated Federal approach to the application of nonstructural risk reduction measures is critical. Individuals must understand and make informed decision regarding the potential risk associated with continuing to live in high risk areas. Local parishes and the State of Louisiana are responsible for establishing and sustaining effective floodplain management practices through their authorities in permitting, zoning, building codes, and evacuation planning.

Structural measures can provide significant risk reduction benefits but also have significant impacts to consider. For example, the Parish Council and many residents of St. Tammany Parish have shown strong support for the Lake Pontchartrain barrier-weir plan because it would provide risk reduction to their communities. However, Hancock County and many residents in southwestern Mississippi have shown strong opposition to the barrier-weir plan because of concerns about the potential for induced flooding in Mississippi. Further development of any of the structural plans presented in the LACPR report will require detailed feasibility-level design, real estate plans, cost estimates, environmental assessments, and the opportunity to incorporate public comments before a decision is made. Furthermore, other structural alternatives may have significant environmental effects that must be quantified and communicated so decision makers and the public have adequate information for making their decisions.

Comprehensive risk reduction is a shared responsibility. If directed by Congress and supported by the State of Louisiana, the Corps may implement some of the coastal restoration, nonstructural, and structural measures described in the LACPR report. However, comprehensive risk reduction and restoration extends beyond the implementation of these features. It must include actions by other Federal and state agencies, parishes, municipalities, and individuals. State and local governments should participate in evacuation planning, land use planning, creation of conservation easements, zoning, and permitting. Recognizing that hurricane threats and risks are inherent to life in South Louisiana, individuals must decide where and how to build or rebuild, how to adequately insure property, and when to evacuate. Evacuation is the most important risk reduction measure for ensuring adequate personal safety during a tropical event or hurricane.

Selecting a comprehensive plan requires merging all the necessary components described above. Each decision influences the other aspects of the plan. For example, a community may decide that nonstructural measures are the appropriate action for them. This decision influences the alignment of levees (structural components). If the

nonstructural plan is not buyout but a raise-in-place plan, then hazard mitigation plans will include evacuation planning, emergency plans, and property insurance. These choices can only be made through the cooperation of the general public with local, state and federal agencies. These tradeoff analyses are part of the LACPR report's recommendations.

Shared responsibility is essential for setting priorities and establishing the path forward to actionable recommendations for implementing LACPR. All parties at the Federal, state, and local level need to be engaged in collaborative decision making. The State of Louisiana must take the lead in driving the comprehensive plan forward. The identification, selection, and implementation of comprehensive, long range plans for the reduction and management of hurricane storm damage risk and coastal restoration is highly complex. Consequently, decisions on these plans require a high level of engagement, collaboration, and cooperation among the Corps, other agencies, and the State. The technical information needed for these discussions is now available through the LACPR report. The Corps recommends the State take a role in leading the implementation of the effort by leveraging the many agencies, communities and individual capabilities and missions. It also recommends an organized communication structure that supports informed decision making by having all parties engaged. This effort can prevent discontinuity of the plan.

The State of Louisiana plays a key leadership role in prioritization. As noted by the National Academies, closer cooperation and collaboration between the Corps and the State will be essential for technical planning, financing, implementation, monitoring, and adaptation. The National Academies also recommended that the Corps and State quickly agree on the elements of a single comprehensive plan for long-term hurricane risk reduction and coastal restoration. As a part of that plan, the Corps and the State should determine a list of high-priority projects for immediate implementation. The State has already begun the prioritization process through development of its annual plans. Each annual plan outlines specific projects that are the priorities for design, implementation, and construction during the upcoming fiscal year, including the determination of approximate costs for each project. The annual plan also details how projects planned by the State will work in concert with other restoration efforts funded through the Coastal Impact Assistance Program (CIAP) and the Coastal Wetlands Planning, Protection and Restoration Act (CWPPRA), as well as projects planned and designed by the Corps.

Numerous project and study authorities exist throughout the coastal area. The Corps has identified existing authorizations and recommended coordination approaches for projects to further advance or expedite the development and implementation of risk reduction alternatives. Many reviewers of the LACPR report expressed concerns that using a combination of individual existing and new authorities is a piecemeal approach and will result in a flawed system. Some have suggested that a better approach would be to authorize the entire Louisiana coastal risk reduction and ecosystem restoration program into a single authority similar to the Everglades restoration program. The

authorization of this authority is at the discretion of Congress. The Corps concludes that the many existing authorities are an available means of expediting implementation.

The Path Forward. Coastwide plans to maintain and/or provide additional risk reduction over the next 50 years potentially require more than $100 billion and will impact the coast and the people who visit, live, and/or work in South Louisiana over decades to come. Before a single comprehensive plan for long-term hurricane risk reduction can be selected, the high-performing alternative plans identified in the LACPR Final Technical Report require decisions about tradeoffs and implementation options. The complex social, environmental, and economic impacts of these potential plans require further evaluation by our local and state partners, as well as prioritizing and sequencing measures for implementation over time.

Prior to December 2009, the Corps will meet with the State of Louisiana to develop the State's priorities of alternative plans and options for implementation. These decisions on implementation options and tradeoffs are a shared responsibility of the Federal Government and State of Louisiana. As established in NEPA, the State and Federal government must balance the need for urgent action with a full understanding of the tradeoffs and impacts of these high performing alternative plans.

The Corps understands the urgency expressed by the public, non-governmental organizations, and the National Research Council and stands ready to move forward with other federal and state agencies to define and resolve tradeoffs as soon as possible. The Corps can then complete detailed design and required environmental documentation which allows for construction recommendation. Regardless of whether plans are ultimately authorized under a single authority or multiple authorities, implementation of comprehensive risk reduction plans will require a long-term commitment and an adaptive management approach.