"Best Practices" for a Strong Coastal Resilience Plan

Coastal resilience plans should include a science-based and publicly-informed decision-making process to build resilience in both coastal communities and ecosystems. Although it is important for resilience planning to occur at all levels of government, these recommendations focus on the state-wide level, based on our experience to date. Climate change will require a clear understanding of trade-offs and a holistic approach to policy and decision-making, therefore it will require strong state leadership to implement.

Planning for coastal resilience is an iterative and evolutionary process that requires long-term commitment by the state and lead agencies. With each iteration of Louisiana's Coastal Master Plan, the process becomes more detailed, the public engagement more extensive, the decision-making more transparent and the modeling more sophisticated thereby improving our understanding about the system and what management actions are needed.

The 2017 Coastal Master Plan is a world-class renowned coastal resilience plan that uses highly sophisticated models and decision-making processes to meet future challenges in sustaining coastal Louisiana. The current Coastal Master Plan includes 124 projects (79 restoration, 13 structural protection, and 32 nonstructural risk reduction) that build or maintain more than 800 square miles of land and reduce expected damage by $8.3 billion annually by year 50, which equates to more than $150 billion over the next 50 years (will pay for themselves three times over the course of implementing the plan).

Most coastal states are in the infancy of coastal resilience planning, similar to the initial 2007 Coastal Master Plan. Based on our experience in Louisiana and as advocates for coastal restoration, we identify below six key principles that we believe are integral to a successful coastal resilience plan. For each principle, we highlight some key elements of Louisiana's approach as well as more general and broadly-applicable best practices.

These principles are:

- Define Goals & Set Clear Expectations
- Anchor Plans in Science
- Account for Uncertainty and Residual Risk
- Take Collective Action
- Focus on Impacts to People
- Identify Funding and Challenges

Define Goals & Set Clear Expectations

Starting resilience planning with a clear and realistic goal articulated helps ensure the efficacy of the planning process, and the broad acceptance of the final plan.

Louisiana's Approach:

- Louisiana Coastal Master Plan identified five broad goals: flood protection, natural processes, coastal habitats, cultural heritage, and working coast. The planning framework developed decision drivers and identified constraints relevant to these goals to select solutions and evaluate how well the plan meets each of these goals.
    - More specifically, for the 2017 Master Plan, the decision drivers in selecting projects were 1) building and maintaining land and 2) reducing flood risk.
    - The constraints factored into project selection were 1) sediment availability and 2) funding.
    - An assortment of additional community and environmental metrics were also examined in the project selection process.

- The Coastal Master Plan makes clear that sustaining the current condition or reverting to a past condition is impossible. Instead, the goal is to achieve a new, consolidated landscape that can still support key ecosystem and services and protect communities/culture.

- The Coastal Master Plan utilizes a 50-year planning horizon. Projects and solutions are evaluated for their long-term benefits, as well as long-term costs, both in terms of energy use and operation and maintenance costs. Beyond 50 years, uncertainties about environmental conditions such as sea level rise, project costs, and other factors become too great for the evaluation results to be reliable.

General Best Practices:

- Resilience plans should recognize the need for swift action to build resilience, identify the most vulnerable areas of the system and identify necessary near-term actions.

- Plans should build consensus around overarching goals/objectives. The government should then respond with the activities and solutions that would best achieve those goals/objectives.

- Plans should integrate and balance the need for community protection and ecological health.

- Plans should explicitly describe the challenges of the future and provide clear expectations of what is possible to be achieved. In most cases, we cannot recreate the coasts of the 20th century.

Instead, we must seek to fashion a new landscape that will support viable natural and human communities into the future.

- Plans should provide solutions for current and future generations. The plan should establish a realistic planning horizon that allows projects and solutions to be evaluated for their long-term benefits, as well as considering long-term costs, both in terms of energy use and operation and maintenance costs.

- Plans should identify resource constraints and be developed in a way that acknowledges the need for efficient use of resources, such as funding, fresh water, sediment, etc.

Anchor Plans in Science

Science is the absolute anchor -- because it is the best platform from which to work in a space that is both urgent and uncertain, and because it provides the most solid core around which the politics of decision-making can be organized and managed.

Louisiana's approach:

- Louisiana's Master Plan used an integrative predictive modeling platform to provide holistic understanding of the coastal environment and determine the effects of both individual projects and suites of projects on the coast.

- Louisiana created a decision-support tool to integrate model results and optimize project selection based on set decision drivers and decision criteria (descried above), while considering resource and time constraints.

- An independent Science and Engineering Board, comprising national and international experts, provided independent technical review of the plan.

- Louisiana also consulted Technical Advisory Groups made up of nationally known researchers and practitioners to gain insight into specific technical aspects of the Master Plan processes.

General Best Practices:

- Resilience plans should include a comprehensive evaluation of the both the human and ecological systems. Where possible, this would be supported by a system-wide conceptual or computer model. However, if not available, experts should use the best available science and all available models/tools to describe the functioning of the system, the drivers of change and key stressors,

the system's key uncertainties and how climate change may affect how the system functions and its stressors in the future.

- Resilience plans should provide a list of potential solutions and where/how they could be deployed to address the stressors of the human and ecological systems. Specific projects should be included where they are known, but initial plans may be more conceptual in nature.

- Plans should integrate the social and ecological systems where community and ecosystem resilience can be mutually beneficial. To the maximum extent possible, the plan should use natural systems and processes - which tend to be more sustainable over long periods and offer co-benefits - to build resilience for both communities and the ecosystem.

- Evaluating portfolios of projects can help illustrate their interactions and identify project synergies that increase benefits.

Account for Uncertainty & Residual Risk

Coastal resilience requires decision-making in the face of ongoing uncertainty, particularly regarding rates of sea level rise and flood risks. Acknowledging those uncertainties is key to building a plan that achieves resilience today and into the future.

Louisiana's Approach:

- In Louisiana's Coastal Master Plan, key uncertainties were accounted for in three environmental scenarios to test the robustness of projects against different futures, including different scenarios of sea level rise, precipitation, evapotranspiration, subsidence, storm frequency and storm intensity. Socioeconomic uncertainties, such as economic growth patterns and levee fragility, were accounted for in the decision-making planning tool.

- The Louisiana Coastal Master Plan is legislatively mandated to be updated every six years, using the latest advances in science/modeling/and engineering and to account for the current coastal landscape, including sea level rise, land loss, and the construction of restoration and risk reduction projects, to ensure the most effective plan.

- Louisiana provides all data from the master plan to the public, including community-level risk data through the Flood Risk and Resilience Viewer.

General Best Practices:

- Resilience plans should consider both financial and scientific/technical uncertainties. Although a science-based process, we must also acknowledge that substantial uncertainties remain,

especially in regard to climate change. Key uncertainties should be captured in different environmental and socioeconomic scenarios.

- To accommodate the dynamic nature of coastal processes, building coastal resilience is an evolving process. Resilience plans should lay the groundwork for an effective monitoring and evaluation process that seeks to reduce scientific and engineering uncertainty, assess the success of the plan, and support the adaptive management program.

- In order to respond to changing economic, social, environmental, and climatic conditions, plans should be revisited and updated regularly and after exceptional events such as hurricanes.

- An appropriate planning horizon should be used and uncertainty scenarios used to capture the range of possible futures. Beyond a plan's time horizon, uncertainties about environmental conditions such as sea level rise, project costs, and other factors become too great for the evaluation results to be reliable.

- Resilience plans should acknowledge that risk reduction systems (both structural and nonstructural) and restored coastal habitats cannot eliminate all flooding risks, and that some degree of residual risk will be inevitable. The plan supports and promotes close coordination among all jurisdictional authorities to minimize the risk of property damage and inform stakeholders of ongoing residual risk.

Take Collective Action
Resilience thinking, to be successful, requires multi-sectoral planning and coordination, ideally from the beginning.

Louisiana's Approach:

- Prior to Hurricanes Katrina and Rita, the missions and responsibilities associated with restoration and protection were held in different state agencies. Afterwards, the State of Louisiana consolidated the expertise from different agencies into the Coastal Protection and Restoration Authority, therefore one agency had clear ownership of the coastal resilience program.

- Collective decision-making, with clear roles and responsibilities, provides all interested agencies with a seat at the table. Louisiana's coastal activities are governed by the Coastal Protection and Restoration Authority (CPRA) Board. This board is comprised of Secretaries for each of the relevant agencies as well as local governmental representation. The board is given clear authority

to approve each iteration of the Coastal Master Plan and an Annual Plan every year that designates how funding will be allocated for the next 3 years.

- The CPRA Board is chaired by the Governor's Advisor on Coastal Activities. Importantly, this individual is part of the Governor's cabinet, demonstrating the level of priority placed on coastal restoration and protection within the state, and resulting in the advantages of regular direct gubernatorial attention to the issues.

- In Louisiana, Governor Edwards' Executive Order No. JBE 2016-09 highlights the need for the Coastal Master Plan to drive and expedite state action across agencies. This E.O. builds off an Executive Order from the previous administration which required all state agency activities to be consistent with the Coastal Master Plan.

- Governor Edwards has also organized all Cabinet-members to be briefed on the coastal resilience and begun a process of requiring each to provide input into addressing the challenges and strategies for each department of the state to ensure resilience.

General Best Practices:

- Cross-agency collaboration is essential to the success of any resilience plan. Resilience of our coastal systems cross multiple jurisdictional boundaries. For instance, coastal community resilience can involve various entities such as community development, housing authorities, health and hospitals, insurance, education, transportation departments, natural resources, coastal zone management, environmental quality departments, fish and wildlife departments, etc.

- Given the emergency of climate change, it is imperative that all government agencies act quickly and in accordance with the Resilience Plan. Strong state leadership should set overarching goals by which each department must evaluate their role in achieving based on their specific mission.

- A lead/chair position (like a Chief Resilience Officer) can ensure coordination and timely conflict resolution. It is important to consider where that person sits within a state's governance structure, as that can change the nature of their focus and the type of solutions they might pursue (ex. Natural Resources Department vs Emergency Management Department). Ideally, this leader should have direct and regular access to the governor's office.

- Revisions to some laws, regulations and policies may be needed to help the achieve the goals of the Resilience Plan. Resilience plans should highlight where such changes may be needed so that local, state, and federal partners are able to act in concert with the plan.

- Consideration of other state plans (Coastal Zone Management, hazard mitigation, etc) with relevant or overlapping missions is important to ensure consistency across agencies.

- State agencies and their partners must show leadership in defining the path forward. At the same time, achieving a sustainable coast is a collective endeavor. In addition to effective government action, success will require stakeholders to offer their ideas as planning proceeds and make informed decisions about living and working in the coastal landscape. Strong flows of information between agencies and all stakeholders are essential to continued progress.

Focus on Impacts to People

Climate driven transitions along the coast will cause fundamental disruptions (community, economic, cultural, psychological), particularly where retreat will be considered or required. And these transitions will raise multiple questions – including fundamental questions of distributional equity. Because of these fundamental impacts, wherever possible decision-making systems should allow people to participate in choosing their own futures, rather than be subject to more distant decision-making.

Louisiana's Approach:

- Decision-makers should engage the public beyond public meetings. For example, Louisiana hosted informal "Coastal Conversations" around the Louisiana coast to provide a forum for interested public to get questions answered and to get updates from CPRA prior to formal public meetings held for the plan's official comment period.

- Online tools can provide the public ways to access information and engage, including educational and interactive materials on the website; webinars hosted to teach interested members of the public how to use the online tools; and many materials translated into other languages including French, Vietnamese, Spanish.

- In Louisiana, input for the coastal plan is gathered from a diverse range of coastal stakeholders and extensive dialogue with the public. These partnerships included:
    - The Framework Development Team (FDT) served as the primary collaborative group supporting and providing insight and counsel to the Planning Team. FDT membership included federal, state, and local governments; NGOs; business and industry; academia; and coastal communities. FDT members offered specific guidance on major elements of the 2017 Coastal Master Plan.
    - Formal, ongoing focus groups represent Louisiana's coastal communities, landowners, and commercial activities (fisheries, navigation, energy, and industry).

- Through a separate but related effort using US HUD post disaster funds, a community-based planning effort around resilience was implemented in 6 Louisiana coastal parishes:
    - Called LASAFE (Louisiana's Strategic Adaptation for Future Environments), it engaged over 2800 citizens in 71 public meetings, producing resilience policies for use across the state, and funded projects for each parish, ranging from mental health to harbor protection.
    - The approach used federal funding (awarded through a US HUD competition -National Disaster Resilience Competition), and local philanthropy (Foundation for Louisiana) to support and organize the effort.
    - This model presents a great learning opportunity for other states and communities, and the individuals involved are happy to discuss their work.

General Best Practices:

- Coastal flooding and storms are already displacing people, infrastructure, and entire communities. As we address this crisis, sensitivity and fairness must be shown to those whose homes, lands, livelihoods, and ways of life may be affected, in the near term and long term, by resilience plan projects, sea level rise and/or flooding.

- Resilience plans must be developed with the participation of the many diverse interests that live, work, play, and own property in the coastal landscape, along with national interests that have a stake in America's coasts.

Identify Funding & Challenges – The funding challenge is key, as without it plans are only plans. As the current system of government finance (availability and structure) is not sufficient to meet the needs across the county, innovation across funding streams at all levels will be key.

Louisiana's Approach:

- Funding expenditures for Master Plan projects are published in an Annual Plan, for approval by the CPRA Board and ultimately the legislature. Each Annual Plan also contains a three-year projection outlining anticipated future program income and project expenditures. The CPRA Board approves this Annual Plan. Additionally, Governor Edwards has repeatedly allocated state surplus funds to the Coastal Trust Fund.

- In 2006, the same year that the Gulf of Mexico Energy Security Act (GOMESA) was passed into law, Louisiana's citizens voted overwhelmingly to constitutionally dedicate the revenues it received through GOMESA to its Coastal Protection and Restoration Trust Fund. Through

GOMESA, 37.5% of offshore revenues are shared back with Gulf producing states for the purposes of coastal conservation, restoration and hurricane protection.

- GOMESA revenues are the one long-term occurring source of revenue for implementation of the Coastal Master Plan. In the near term, the BP settlement also provides an opportunity to get some important Master Plan projects underway.

- However, the State of Louisiana has a significant funding gap for implementation of its Master Plan. Louisiana decision-makers at both the state and federal level are committed to working to identify ways to fill this gap for enhanced execution of the Coastal Master Plan. At the local and parish level, communities are also contributing, with some identifying ways to raise revenues for coastal protection and restoration including through self-imposed taxes. In years where a state surplus exists, there is a strong track record of surplus dollars being dedicated to the Coastal Trust Fund.

General Best Practices:

- A long-term, predictable funding stream is critical to undertaking large-scale coastal restoration or resilience efforts and translating any resilience plan into reality. Coastal transformation takes time, so a single infusion of resources is not sufficient. A combination of committed state and federal revenue is important to ensure momentum in the work.

- When communities have developed comprehensive coastal resilience plans, these plans can provide an often sorely needed vision for the most strategic places and ways to expend limited funds. With such additional science-based thinking and guidance in place, resources from a patchwork of federal agencies and programs - from FEMA, to HUD, USDA, the Corps, and NOAA - could potentially be patched together more effectively in service of the broader plan.

- Other tools, such as revolving loan funds, should be deployed by the federal or state government to assist communities in accomplishing the resilience priorities. We would recommend that such funds emphasize investment in community-wide, nature-based mitigation solutions.

This document was developed by Restore the Mississippi River Delta Campaign - *National Wildlife Federation, Environmental Defense Fund, National Audubon Society, Coalition to Restore Coastal Louisiana, Lake Pontchartrain Basin Foundation*

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