Rebuilding Louisiana's Coast – CWPPRA and LCA in Katrina's Wake

Rebuilding Louisiana's coast

Recovery from the effects of Hurricane Katrina will dominate planning and implementation of public works in Louisiana for the foreseeable future. Coastal wetland restoration programs, CWPPRA, the Coast 2050 Plan and LCA, will play a central role in rebuilding Louisiana's coast. The city of New Orleans, many industries, and coastal communities exist within a changing mosaic of barrier islands, salt marshes and freshwater swamps. Rebuilding after Katrina must address the ongoing and dynamic changes in this mosaic – just as coastal restoration efforts did before the storm.

More importantly, CWPPRA, the Coast 2050 Plan, and the LCA plan have already established some of the capabilities needed to rebuild the coast. The scope of rebuilding spans the entire Louisiana coast and includes the coastal areas of Mississippi and Alabama. Coastal restoration activities already operate at this scale. Compared with restoration, rebuilding Louisiana's coast is directed toward social and economic objectives to a much greater degree. Therefore, the perspective of restoration activities, initially focused on wetland conservation, must expand to address the urgent challenges that now face Louisiana and the U.S.

Rebuilding started with the Coast 2050 Plan

Rebuilding the Louisiana coast started with CWPPRA. CWPPRA, the Coast 2050 Plan, the LCA Plan, and expanded funding provided with passage of the Energy Bill this summer comprise mechanisms for planning and directing activities along the Louisiana coast that are already funded and in place. These programs share the overarching goal that is central to rebuilding the coast - a Louisiana coast that supports and protects the regional and national economy. Benefits identified for coastal restoration also apply to rebuilding:

- protection against floods;
- production of fisheries and wildlife resources;
- protection of water supply and wastewater assimilation capacity; and
- support to activities such as oil and gas development, navigation and tourism.

(Coast 2050 Plan, page 143)

Recovery from Katrina gives new impetus to these activities. The Coastal 2050 Plan identifies four ingredients as critical to success of efforts initiated by the Breaux Act:

- renewed and expanded commitment by citizens of Louisiana that is also shared at the national level;
- extensive program to develop knowledge and apply it through adaptive management of projects and activities;
- process for planning and implementation that involves the public and espouses its values; and
- financial resources sufficient to meet the challenge.

(Coast 2050 Plan, page 144-145)

Over fifteen years of experience accrued following the authorization of CWPPRA, substantial progress has been made in acquiring the first three elements. The disastrous consequences of Katrina demonstrate what is at stake in coastal Louisiana and for the nation and the magnitude of the resources required to succeed.

The shift from restoration to rebuilding requires changes in existing programs. Some projects that have been proposed for coastal restoration under the new LCA Plan may not meet the present needs. However, the mechanisms for developing the scientific knowledge needed to plan and implement these projects can be applied to the rebuilding. These mechanisms generally include research activities coordinated by CREST, the USGS, NOAA, and Louisiana DNR, i.e. collecting data, developing and applying models for analysis, and evaluating risks and benefits of proposed activities.

Rebuilding after Katrina

While it is impossible to predict how the process of rebuilding will unfold, or its timing, we can anticipate that the nature of activities will change as rebuilding progresses through different stages. For purposes of discussing the scientific knowledge needed, we can divide the rebuilding process into short-term, medium-term and long-term stages, referred to here as “crisis management,” “triage,” and “establishing a new normal” respectively.

In the **crisis management stage**, activities will focus on meeting the immediate health, safety and domestic needs of people displaced by Katrina. These concerns will have priority over the next six months. Understandably, the crisis in New Orleans garners the most attention at present, but destruction and dislocation have occurred over vast areas of coastal Louisiana. Response to health and safety concerns will include securing, repairing and reactivating key elements of the municipal and economic infrastructure in the region.

In the **triage stage**, government and businesses will begin to address the difficult choices of where to begin rebuilding. This stage may last for 18 or 24 months. The broad design of the coast-wide rebuilding effort will begin to take shape as a result of these decisions. Governments will face the choice of whether to replace, relocate or abandon entirely municipal facilities and transportation infrastructure. These decisions will have consequences that will force other decisions. For example, a decision will be made whether to upgrade the highway bridge at

Leeville. This bridge forms a vital transportation link to Port Fourchon, a staging area for servicing offshore oil and gas facilities. A proposed upgrade was under discussion just before Katrina. Current conditions at the Port Fourchon facility and decisions by the oil and gas industry about its long-term viability will determine the outcome of this proposal. The post-Katrina status of wetlands and other natural resources also bear on such decisions. Will it be feasible to maintain a road to Port Fourchon if the surrounding wetlands disappear, exposing the road to erosion from tides and waves?

Beyond 24 months, **the new "normal"** configuration and condition of coastal Louisiana will begin to emerge. By this time the long-term trajectory of rebuilding will begin to take shape. Decisions taken in the triage stage will be implemented, and the consequences of these for individuals, communities and businesses will become evident. Planning activities will assess the risks and opportunities associated with the reconfigured coast. Government and businesses will begin to make decisions about what investments to make in order to mitigate risks and exploit opportunities. These will include, for example, decisions about construction of levees, the availability and cost of insurance, emergency planning and emergency response measures. Planners will seek answers to such questions as these: What is the effect of present decisions on expected losses from future storms? What are the effects of present decisions on the resilience and recovery of natural resources from future storms?

Knowledge needed for coast-wide rebuilding

As found for restoration activities initiated under CWPRRA, establishing and maintaining a knowledge base to support a coordinated coast-wide rebuilding effort poses major challenges. Mechanisms to develop and apply knowledge for coastal restoration can be employed to rebuild Louisiana's coast but with changes. Rebuilding requires a broader scope in developing and applying knowledge. Different stages of rebuilding have different knowledge needs.

Broader base of scientific information required

The shift from restoration to rebuilding requires broadening of the scope of activities for acquiring scientific information and developing knowledge, Figures 1 and 2. Recovery from Katrina focuses on restoring and sustaining communities and infrastructure to support economic activity. The supporting activities of collecting data, developing and applying models, and evaluating risks and benefits remain the same, but these must now be applied more broadly. For example, evaluating risks and benefits now requires data and techniques of analysis that address explicitly community and economic endpoints.

Figure 1: Restoring Louisiana's coastal wetlands requires knowledge to evaluate effects on ecosystems from the interaction of engineering activities with nature processes. The applied science module (CLEAR) comprises a comprehensive database and a set of analytical tools applied to evaluate ecological benefits of restoration.

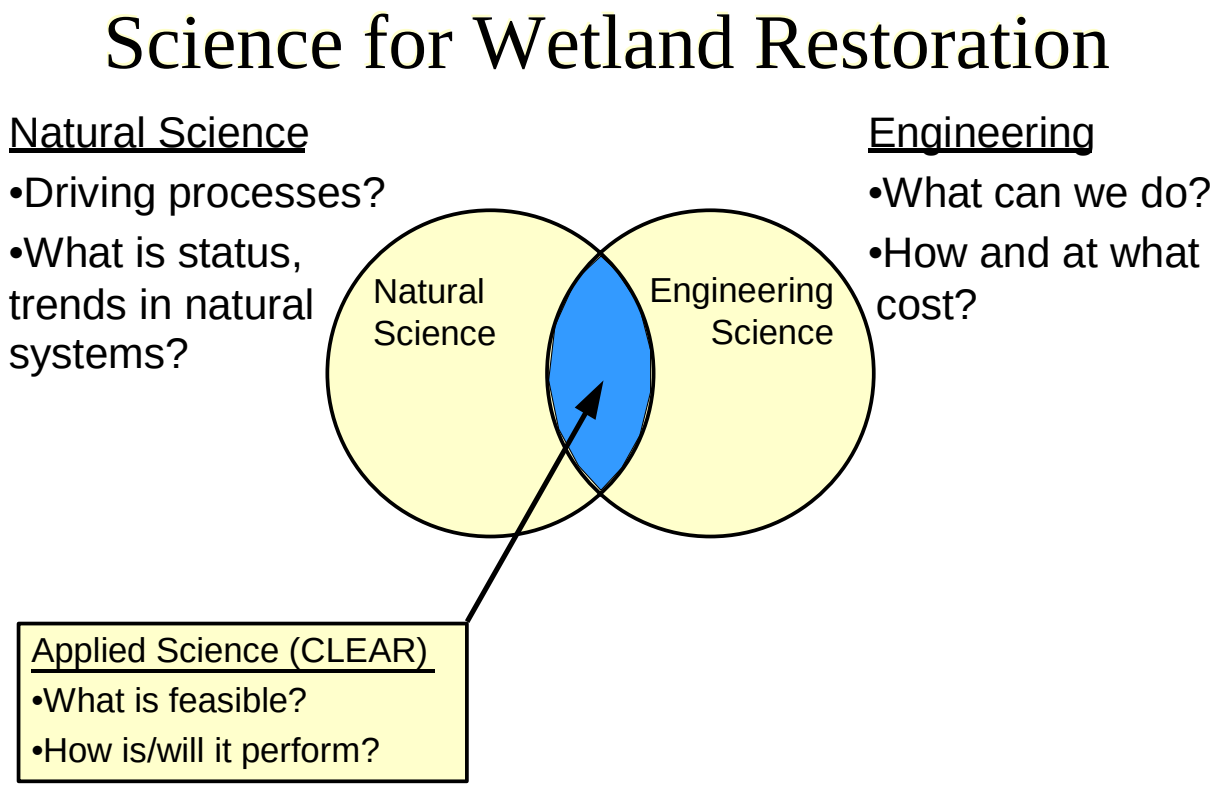
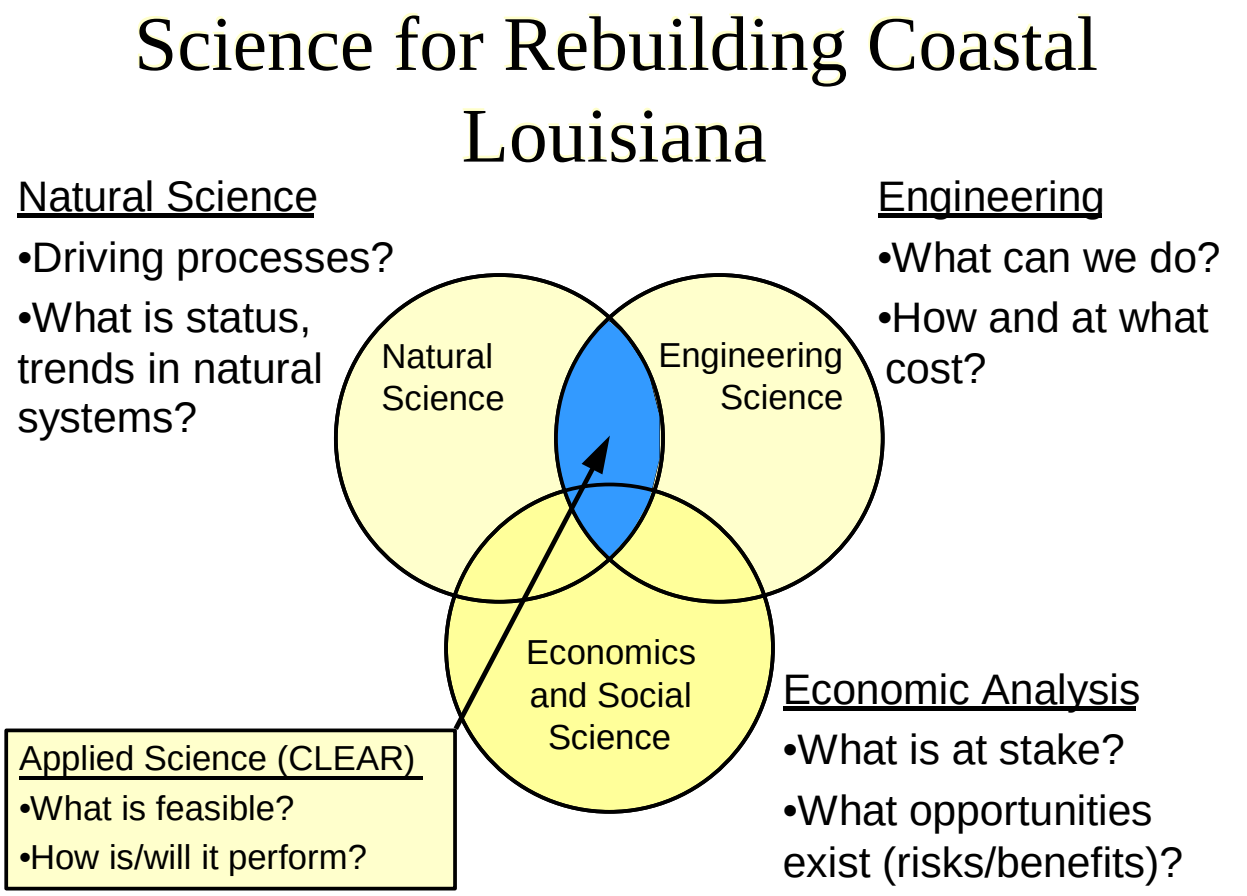


Figure 2: The broader effort to rebuild Louisiana's coast requires knowledge to evaluate the effect of engineering activities on natural systems, communities and the economy. This is addressed by expanding the framework for acquiring and applying scientific information to include information provided by economics and the social sciences. The applied science tools for data collection and analysis (CLEAR) developed for restoration, suitably modified, function to evaluate the broader set of ecological, social and economic benefits of rebuilding.



Timing of Information needs

Crisis management (6 months)

Meeting the immediate health, safety and domestic needs of Katrina's victims will rely on knowledge already at hand. The need to develop new knowledge at a coast-wide scale is minimal.

Triage (24 months)

Making the difficult choices about where and how to start rebuilding requires both a broad assessment of the status of key resources, including changes resulting from Katrina. Scientific information must be assembled to map damaged infrastructure, locate and map geomorphic changes and summarize status of natural resources. In depth information will be required in areas of critical concern, such as sites possibly contaminated by the storm.

Establishing a new "normal" (beyond 24 months)

Rebuilding over the long-term requires the same type of scientific information as for adaptive management for coastal restoration. In this regard, Katrina represents a manipulation of the coast's physical and ecological systems that should be studied in order to better understand these systems. Data collection and analysis will assemble available data (before, during and immediately after Katrina) to document the storm and its effects over the entire coast, reconstruct events and identify factors contributing to the observed effects, document the dynamics of natural processes afterwards in response to these effects/changes. The analysis of these observations will support the development and application of models that capture key physical processes at work. This will include application of existing hydrodynamic models to diagnose patterns of storm surge and wave height. The effects of Katrina may also provide information needed to formulate and test new predictive models of sediment transport and geomorphic change.

A first step

Data collection and retrospective analysis of Katrina must begin immediately for new knowledge to be available to planners within the 24-month time frame when long-term rebuilding is estimated to begin. The objectives for this work will include a comprehensive survey of natural resources along the Louisiana coast, a chronological account of storm surge, wave height and flooding caused by Katrina, and an assessment of the resulting changes to barrier islands, wetlands, and major water bodies. Data gathering for the retrospective analysis also supports the mapping and assessment activities needed develop the scientific information needed in the triage stage of rebuilding. Data must be gathered before the effects of the storm are obscured by the nature recovery to more normal conditions or lost due to interruptions in the normal maintenance of automated sensors.

Information gained from the retrospective analysis of Katrina's effects on coastal processes will provide knowledge needed to answer the two questions that will drive planning and management of rebuilding over the long-term:

- What is the effect of present decisions on expected losses from future storms?
- What are the effects of decisions today on the resilience and recovery of natural resources from future storms?

Further Reading

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