



Making Tough Choices *Hurricane Protection Planning after Katrina and Rita*

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The president and Congress have agreed that the hurricane protection system surrounding New Orleans should be rebuilt—just as it was, but stronger—in time for the next hurricane season, which begins in June. But after that task is completed, there are no specific commitments to future action.

I t's not for a lack of vision about what the future could include; there's been talk of a hurricane barrier spanning the coast and bold new projects to restore coastal barrier islands and wetlands that will dampen the force of future storms. Meanwhile, proposals for port and navigation improvements continue to be made. A price tag for all these projects might exceed \$50 billion, an amount equal to the total budget of the Army Corps of Engineers for the past decade. Clearly, federal, state, and local governments will confront more demands for their budgetary resources than they can satisfy. The reality is that many problems must remain unaddressed or incompletely solved, and many opportunities left to the future.

Despite this fiscal reality, many are clamoring for systems of dikes and flood gates such as those that protect the Netherlands or that are in place on the Thames River in England, without knowing the technical feasibility, economic costs, or ecological consequences of such a project for the Louisiana coast. The extensive damage from Katrina and Rita does not make it any less important to ask whether the costs, financial and environmental, of a "Dutch solution" can be justified for Louisiana's sparsely settled coast. Other alternatives must be examined, including those that protect smaller areas against extreme hurricane events with defenses around population centers; rely on landscape and wetlands restoration to moderate storm surges; and, in some areas, elevate buildings and even encourage and manage retreat from the coastline.

But the best investment strategy can be devised only if it is supported by credible analysis. Congress has long required comprehensive economic and environmental assessments from the water resources agencies, such as the Corps of Engineers, so it can make more informed spending choices. To be sure, questions about the Corps' economic and other analyses have been raised by scientific panels, the Office of Management and Budget, and nongovernmental organizations. Still, the nation's commitment to, and the open debate over, economic and environmental analysis of individual projects is critical to public investment decisionmaking.

Nonetheless, in the rush to respond to Katrina, there have been congressional directives to bypass economic and environmental analysis for new storm damage protection projects. However, an important distinction between economic analysis and economic justification must be made. A benefit-cost analysis need not be the sole determinant of whether hurricane protection systems should be put in place or enlarged, but economic information can still be used to help set investment priorities.

For example, Louisiana coastal restoration plans have been criticized for their lack of economic analysis, even though



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much of the justification for that restoration includes storm damage reduction, infrastructure protection, and commercial fishery enhancements. These are effects that have been traditionally included in an economic analysis of federal water project investments and are equally relevant to assessing investments in wetlands restoration. At the same time, restoration projects may cause adverse effects for navigation, port access, and oyster production—all costs that are amenable to appropriate economic analysis. Properly calculated and utilized economic analysis of effects on storm damage reduction, navigation, and commercial fisheries can add useful information when making choices about how to deploy limited resources to best balance unavoidable competing demands.

A useful economic analysis does not require placing monetary values on all the outcomes of an investment. Some ecosystem outcomes (for example, assimilation of excess nutrients like nitrogen and phosphorous) or outcomes that increase the protection of human life need not be represented in monetary terms. A useful analysis will report the added costs incurred to secure additional benefits, even when benefits are not monetized. Benefits can instead be represented as physical or biological performance measures such as acres of wetlands created, pounds of nutrients removed from the water, or reductions in the population at risk of catastrophic flooding. This kind of information helps decision-makers weigh increased costs against successive increases in the performance measures.

Systematic analysis evaluates what makes common sense. For example, investment in hurricane protection should be focused on where the populations and communities will likely be located in the future. It is likely that some coastal communities, indeed parts of cities such as New Orleans, will decline or even disappear. This process may have already begun before the hurricanes, and it is clear that many residents will not return to some areas. This is why an alternative such as a hurricane barrier that protects the whole coast from storm surge will need to be carefully justified.

As another example, we now understand that protection works allow, and indeed encourage, new patterns of economic activity and change where and how people live and work. Yet in the end, no hurricane protection works are truly fail-safe. Risks will always remain after any plan is implemented. However, the historic focus of storm damage economic analysis was on reduction of inundation damages to property. Clearly, as demonstrated by the New Orleans experience, insufficient attention was paid to this “residual risk” and to the vulnerability of the occupants of protected areas when project protection proved inadequate.

Congress should require the federal agencies that are

responsible for project evaluations to predict changes in the location of human activity and private investment that will be located in the protected area and estimate the costs of damages if the project does fail. That expected cost must be a part of the benefit-to-cost comparison and bear on the project's justification. In turn, local adoption of strict and enforced zoning and building codes, as well as the maintenance of evacuation plans to minimize this residual risk cost, can be made a condition of the project's construction. These are not new ideas but they have been resisted for years. The time may be ripe for agencies to report the residual risk costs of project investments.

Structural protection projects must also be better coordinated with a reformed National Flood Insurance Program where insurance premiums reflect storm damage risks. Premiums that reflect residual risk provide information to individuals and communities on just how risky their decisions are when they locate a home or business and choose construction practices. The need to require property owners to buy flood insurance for all properties at risk is well recognized, as are many other reform needs for that program's successful operation.

What is less well understood is the perverse incentive effect of the flood insurance program's organization around the concept of a "100-year" storm. A 100-year storm has a 1 percent chance of occurring in a given year but has a significant likelihood of occurring during the mortgage term of most homeowners. In the same way, a more severe, but less likely storm, such as Hurricane Katrina, has a significant likelihood of happening over this same time horizon.

However, properties located outside the "100-year floodplain" are not subject to the requirements of the National Flood Insurance Program. Individuals assume that the absence of an insurance purchase requirement means that there is no risk at all outside the 100-year flood zone. Meanwhile, communities sometimes seek a federal storm damage reduction project to remove the community from the requirements of the flood insurance program in order to allow development behind levees and other storm protection projects that have a very real residual risk. Congress should require properties that benefit from a federal storm damage reduction project to maintain insurance policies against residual flooding risk.

Finally, it is now clear that there must be a broader and more comprehensive coordination of storm protection planning with other projects and their purposes. In the urgency to examine new storm protection projects, these interrelationships cannot be ignored. Too often in the past, insufficient attention was paid to the interactions between engi-

neering structures, which extensively modified hydrologic regimes, and the physical and biological environment. One result was that extensive engineering efforts for managing the Mississippi River and numerous large-scale coastal navigation and storm-damage reduction projects caused widespread, ongoing changes in wetlands and barrier island stability, some say magnifying the storm damages that were realized in the recent hurricanes. Many of these changes either were not foreseen or, if anticipated, were considered to be an acceptable cost of progress on other fronts.

Looking forward, we now understand that some hurricane protection projects may have adverse effects on navigation access or on the coastal landscape. Some wetlands restoration projects will favor a commercially valued fish over a fish with high recreational value. Restoration of the landscape in one area may claim river sediments that could have built land elsewhere in the coastal region. But there may also be project and program complementarities. A navigation channel may serve as an excellent conduit for moving sediment-laden water to areas where a wetlands restoration project is being proposed; in turn, that wetland area may help moderate storm surges and reduce storm damages.

As Congress continues to rely on location-specific water resource studies when deciding to authorize and fund measures to reduce the hurricane and flood threat, it should also demand that plans fully recognize these complexities, interdependencies, and tradeoffs. We know enough and have the tools to do such analysis, to plan smarter, and to invest more wisely. At the same time, each planning situation is unique in terms of the issues to be addressed and the opportunities to address them.

There are no cookie-cutter, one-size-fits-all, environmentally sensitive solutions to flood and storm threats or any other mix of water-related issues. A commitment to sound analysis and rigorous consideration of difficult but unavoidable tradeoffs will be required as the urgency of the post-Katrina moment passes and is replaced by the tough job of making hard investment choices. ■

Further Reading

Working Group for Post-Hurricane Planning for the Louisiana Coast. *A New Framework for Planning the Future of Coastal Louisiana after the Hurricanes of 2005*. Cambridge, MD: University of Maryland Center for Environmental Science, 2006. Available at www.umces.edu/la-restore.

This article is based on testimony given by one of the authors, G. Edward Dickey, before the Water Resources and Environment Subcommittee, House Committee on Transportation and Infrastructure on October 27, 2005. Available at www.house.gov/transportation/.

All photographs courtesy of FEMA: page 29, Jocelyn Augustino; page 30–31, Marvin Nauman (top and bottom), Win Henderson (center).