



VOLUME 29, NUMBER 5

PUBLISHED BY THE ENVIRONMENTAL LAW INSTITUTE®

SEPTEMBER-OCTOBER 2007

# Rethinking Restoration and Protection in Coastal Louisiana

BY DONALD F. BOESCH

*A number of reports and plans have been created in hopes of restoring Louisiana's coast. Yet achieving a more sustainable landscape requires sober, flexible, and urgent action. Below, this author highlights some of the scientific issues that need to be addressed for these plans to be successful.*

In the perspective I offered in *After the Storm* immediately following Hurricanes Katrina and Rita, I addressed nine myths about the storms' causes and consequences that were then in wide currency. I also offered some thoughts on coastal restoration planning. For the most part, these myths have been dispelled and the views I offered have been shown to be more realistic by ensuing popular accounts (*e.g.*, McQuaid and Schleifstein 2006) and more formal post-storm forensics (IPET 2006). Furthermore, the planning for the future of the Louisiana coast has taken on both a new complexity and sense of urgency.

Here, I focus on recent developments in integrating coastal ecosystem restoration and hurricane protection from my vantage points as long-time observer and current advisor. I conclude with my own perspectives on some key technical challenges confronting coastal ecosystem restoration within this new planning imperative.

Just as Hurricane Katrina struck, the National Research Council (NRC) was preparing to release its review of the U.S. Army Corps of Engineers' Louisiana Coastal Area Ecosystem Restoration Plan (LCA Plan). Due to the storms, the NRC delayed the finalization of the report, added some comments on the implications of the impact of the 2005 hurricanes, and released the pre-publication version of *Drawing Louisiana's New Map: Addressing Land Loss in Coastal Louisiana* (NRC 2006) in November 2005. While the NRC essentially endorsed the goals of the LCA Plan, it found

that the plan lacked a conceptual "map" representing the desired outcome that would guide the restoration. Further, the NRC was critical of the narrow group of projects selected for the first phase of the LCA Plan, particularly efforts to stabilize the Mississippi River Gulf Outlet, and suggested that more emphasis be placed on very large river diversions in the lower Mississippi River delta to retain more sediment within the coastal system.

Along with Leonard Shabman of Resources for the Future, I convened in December 2005 a group of scientists and engineers, most of whom had been advisors in the development of the LCA Plan to offer unsolicited advice to the Corps, the state, and the na-

*Continued on page 6*

## SPECIAL ISSUE

### Hurricanes Katrina & Rita Two Years Later

BOESCH, *continued from page 1*

tion on how planning for the future of the Louisiana coast should be rethought. Our report, *A New Framework for Planning the Future of Coastal Louisiana After the Hurricanes of 2005* (Boesch et al. 2006), was issued on January 26, 2006—warp speed for such a consensus-based report. This report argued that planning for ecosystem restoration, flood protection, and navigation must be thoroughly integrated and that achieving a sustainable coastal landscape must be a foundation principle. Although these recommendations are largely founded on common sense, they have had an important if subtle influence on the subsequent discourse and planning.

Other groups of technical experts later issued reports (American Geophysical Union 2006; America's Wetland 2006) that made similar points and, in the latter case, stressed the importance of large scale diversions to conserve the riverine sediment supply within the coastal system, as recommended in the NRC report. More recently, many of the same experts who prepared the *New Framework* report published a review and perspective in the open scientific literature (Day et al. 2007). They described how the planning context had changed and become more urgent following the hurricane devastation and suggested that this is an object lesson for other low lying coastal areas in an era of climate change.

The federal and state governments also responded by restructuring and energizing their coastal planning processes. The Louisiana Legislature created the Coastal Protection and Restoration Authority (CRPA) and mandated that it develop a comprehensive and integrated "master plan" for both hurricane protection and ecosystem restoration. The U.S. Congress required the Corps to submit a similarly integrated plan, termed the Louisiana Coastal Protection and Restoration (LaCPR) Plan, by the end of 2007. Meanwhile, the Corps and the state moved forward with the establishment of a Science and Technology Program for the LCA Program, even though the LCA Program still awaits authorization in the pending Water Resources Development Act. The Science and Technology Program includes a Science Board that provides oversight and advice on the Science and Technology Program and state and federal coastal restoration planning. The Science Board was empanelled in June 2006 and includes members of the NRC committee and the review committee that advised in the preparation of the LCA Plan. I have served as the chair of this Board, providing advice on both the state's master plan and the LaCPR plan preparation.

In April 2007, the CPRA released its final comprehensive master plan (CPRA 2007) after public reviews, including evaluation by the Science Board, of two drafts. This plan was quickly approved by the Louisiana Legislature. The master plan attempts to apply principles raised by both the NRC's review of the LCA Plan (starting with a conceptual map and putting greater emphasis on lower river diversions) and the *New Framework* report (integration of ecosystem restoration and hurricane protection and achieving a sustainable coastal landscape). The integrated planning is based on a "multiple lines of defense" concept, wherein maintenance of barrier islands, extensive expanses of wetlands, and interior levees and flood gates are all expected to contribute to attenuation of storm surges and protection of coastal population centers.

The Corps' development of the LaCPR Plan is taking a more detailed approach to project selection, design, and integration than

the state's comprehensive master plan. At this writing, it is not clear how these plans will be reconciled and consolidated. To date, a Preliminary Technical Report (Corps 2006) and a draft Plan Formulation Atlas (Corps 2007) have been released. The Science Board's comments on these reports have focused on coastal restoration and sustainability issues. The LaCPR Plan is also being subjected to extensive engineering and economic reviews.

While there are many challenging scientific issues confronting the execution of these new, integrated plans for coastal restoration and hurricane protection, four are particularly noteworthy:

1. *Effects of the coastal landscape on storm surge.* While it is generally believed that coastal features such as barrier islands and extensive wetlands are important in protecting population centers from hurricane storm surges, observational evidence and effective models of this effect are sparse.

2. *Large river diversions.* The substantial consensus of coastal scientists is that large diversions of sediment from the lower Mississippi and Atchafalaya rivers into the coastal system, via discharge flows and pipeline conveyance of sediment slurries, are an essential component to any sustainability plan and must be undertaken soon. There are enormous implications of such diversions for transportation systems, living resources, and the offshore Dead Zone that is already over-enriched with agricultural nutrient runoff. The assessment and design of large diversions is a grand challenge that should not be postponed due to its difficulty.

3. *Leaky levees.* Both the state's comprehensive master plan and the concepts addressed in the Corps' preliminary LaCPR reports include the construction or raising of levees lying between populated areas and the open coast. These would permit tidal exchange under normal circumstances but allow flood gates to be closed to prevent or moderate hurricane storm surges. The coastal science community is skeptical about the efficacy of such a structural approach and concerned that these so-called leaky levees would contribute to the demise of existing wetlands.

4. *Consequences of climate change.* With the highest rates of relative sea-level rise in the country (mostly due to land subsidence) and a history of frequent and intense hurricanes, the sustainability of the coastal landscape and population centers in Louisiana is particularly challenged by climate change and its attendant accelerated sea-level rise and potentially more frequent or intense tropical cyclones. This requires sober appraisal of the consequences and adaptation strategies rather than denial, on one hand, or alarmism, on the other.

---

*Continued on page 40*

THOMAS, *continued from page 32*

16. See Adam Scales, *How Will Homeowners Insurance Litigation After Hurricane Katrina Play Out?*, FINDLAW, Sept. 19, 2005, at [http://writ.news.findlaw.com/commentary/20050919\\_scales.html](http://writ.news.findlaw.com/commentary/20050919_scales.html).
17. See Chu, *supra* note 15.
18. See Joseph Treaster, *Big Insurer Will Pay 640 Katrina Claims*, N.Y. TIMES, Jan. 24, 2007, at <http://www.nytimes.com/2007/01/24/business/24insure.html?ex=1185422400&en=87b9f8b851669b92&ei=5070>.
19. See Joseph Treaster, *Judge Puts Katrina Settlement in Question*, N.Y. TIMES, Jan. 27, 2007, at <http://www.nytimes.com/2007/01/24/business/24insure.html?ex=1185422400&en=87b9f8b851669b92&ei=5070>.
20. See, *National Flood Insurance Program: Issues Exposed by the 2005 Hurricanes: Hearing Before the H. Subcomm. on Oversight and Investigation and the H. Subcomm. on Management, Investigations and Oversight of the Committee on Homeland Security*, 110th Cong., June 12, 2007 (Statement for the Record, Matt Jadacki, Deputy Inspector General for Disaster Assistance Oversight, U.S. Department of Homeland Security).
21. See Liam Plevin, *As Insurers Flee Coast States Face New Threat*, WALL STREET J., June 7, 2007, at A.1.
22. See Gary Michiels, *State Farm Won't Seek New Mississippi Policies*, NAT'L PUB. RADIO, June 22, 2007, at <http://www.npr.org/templates/story/story.php?storyId=7416262>.
23. See, e.g., ProtectingAmerica.org, at <http://www.protectingamerica.org/>.
24. See Edward A. Thomas, *No Adverse Impact: Working Together To Prevent Harm*, NAT'L WETLANDS NEWSL., Jan.-Feb. 2007, at 11.
25. See, e.g., The Homeowners Defense Act of 2007, HR 3355, and The Multiple Peril Insurance Act of 2007, H.R. 920.

LINK, *continued from page 21*

In short, Katrina caught us with our risk up and our guard down. To address these issues, we must think big picture and long term. Reform of individual organizations or practices of the overall process will not solve the problem. It will require a holistic look at how the entire system of governments behaves, what drives it, and the interdependencies in the context of time, space, and knowledge. ■

#### REFERENCES

- Interagency Performance Evaluation Task Force (IPET). 2006. Performance Evaluation of the New Orleans and Southeast Louisiana Hurricane Protection System, 9 Volumes. Draft Final. Vicksburg, MS: U.S. Army Corps of Engineers, *available at* <https://ipet.wes.army.mil/>.
- IPET. 2007a. Report of the IPET, Volume I, Executive Summary and Overview, Interim Final, *available at* <https://ipet.wes.army.mil/>.
- IPET. 2007b. IPET Report, Volume 7, Final, Consequences, *available at* <https://ipet.wes.army.mil/>.
- Independent Levee Investigation Team. 2006. Investigation of the New Orleans Flood Protection Systems in Hurricane Katrina on 29 August, 2005.
- Link, L.E. 2006. Stopping Another National Disaster, *Viewpoint, Engineering News-Record*, Dec. 11, 2006.
- Pielke, R., Jr. 2006. An Eye to the Future: Emerging Issues in Flood Risk Management, Wye River National Flood Risk Policy Summit, Queenstown, MD, Dec. 12-14, 2006.
- Resio, D.T. 2006. White Paper on Estimating Hurricane Inundation Probabilities. Probability Methodology—Optimal Sampling. January 29, 2006. Vicksburg, MS: U.S. Army Corps of Engineers.
- Toffler, A. and H. Toffler. 2006. *Revolutionary Wealth*. New York, NY: Alfred N. Knopf.
- U.S. Army Corps of Engineers. 2006. Louisiana Coastal Protection and Restoration Preliminary Technical Report. New Orleans, LA: U.S. Army Corps of Engineers, *available at* <http://lacpr.usace.army.mil/default.aspx?p=report>.

BOESCH, *continued from page 6*

Integrated coastal planning founded on a sustainable coastal landscape is an enormous scientific and political challenge that will require very large financial investments, will, and determination, as well as innovative and critical contributions from the science and engineering community. Given changes in the global climate, our options are quickly becoming more narrow and less desirable with time, thereby requiring urgent action. ■

*Dr. Donald Boesch, a native of New Orleans, is the President of the University of Maryland Center for Environmental Science and was recently recognized for lifetime leadership in ecological restoration at the National Conference on Ecosystem Restoration.*

#### REFERENCES

- American Geophysical Union. 2006. *Hurricanes and the U.S. Gulf Coast: Science and Sustainable Rebuilding*. Washington, DC: American Geophysical Union, *available at* <http://www.agu.org/report/hurricanes/>.
- America's Wetland. 2006. Envisioning the Future of the Gulf Coast, *available at* <http://www.futureofthegulfcoast.org/files/finalreport.pdf>.
- Boesch, D.F. et al. 2006. A New Framework for Planning the Future of Coastal Louisiana after the Hurricanes of 2005. Working Group for Post-Hurricane Planning for Greater New Orleans and the Louisiana Coast. Cambridge, MD: University of Maryland, Integrated Application Network, *available at* <http://www.umces.edu/la-restore/>.
- Day, J.W., Jr., D.F. Boesch, et al. 2007. Restoration of the Mississippi Delta: Lessons from Hurricanes Katrina and Rita. *Science* 315:1679-1684.
- Interagency Performance Evaluation Task Force. 2006. Performance Evaluation of the New Orleans and Southeast Louisiana Hurricane Protection System, 9 Volumes. Draft Final. Vicksburg, MS: U.S. Army Corps of Engineers, *available at* <https://ipet.wes.army.mil/>.
- Louisiana Coastal Protection and Restoration Authority. 2007. *Integrated Ecosystem Restoration and Hurricane Protection: Louisiana's Comprehensive Master Plan for a Sustainable Coast*. Baton Rouge, LA: Coastal Protection and Restoration Authority, *available at* <http://www.lacpra.org/>.
- McQuaid, J., and M. Schleifstein. 2006. *Path of Destruction: The Devastation of New Orleans and the Coming Age of Superstorms*. Little, Brown, New York, NY.
- National Research Council. 2006. *Drawing Louisiana's New Map: Addressing Land Loss in Coastal Louisiana*. Washington, DC: National Academy Press.
- U.S. Army Corps of Engineers. 2006. Louisiana Coastal Protection and Restoration Preliminary Technical Report. New Orleans, LA: U.S. Army Corps of Engineers, *available at* <http://lacpr.usace.army.mil/default.aspx?p=report>.
- U.S. Army Corps of Engineers. 2007. Louisiana Coastal Protection and Restoration Plan Formulation Atlas. New Orleans, LA: U.S. Army Corps of Engineers, *available at* <http://lacpr.usace.army.mil/default.aspx?p=atlas>.