



## Katrina and the Environment

By Steven F. Hayward

*The New Orleans flood is shaping up to take its place alongside the Cuyahoga River fire and the Santa Barbara and Exxon Valdez oil spills as one of the major environmental catastrophes of modern times. The issue of hurricanes and climate change—a linkage not established in current climate science—distracts from the most significant environmental lessons of the Katrina disaster. The rebuilding of New Orleans offers an opportunity to begin reversing the long-term Gulf Coast erosion that contributed to the magnitude of the disaster.*

The inevitable politicization of Hurricane Katrina—making it a prism for every controversy from the war in Iraq to tax cuts to race, poverty, and even judicial nominations—calls to mind Winston Churchill’s definition of a fanatic as “someone who can’t change his mind and won’t change the subject.” The environment, an area of policy where serious second thoughts about the Gulf Coast are warranted, was unfortunately no exception to this frivolousness.

The winds had not yet fully died down before global warming was shoehorned into public discussion. Ross Gelbspan wrote in the *Boston Globe*: “The hurricane that struck Louisiana yesterday was nicknamed Katrina by the National Weather Service. Its real name is global warming . . . As the atmosphere warms, it generates longer droughts, more-intense downpours, more-frequent heat waves, and more-severe storms.”<sup>1</sup> Sir David King, Prime Minister Tony Blair’s science adviser, told a British television reporter that “the increased intensity of hurricanes is associated with global warming.”<sup>2</sup> (King has previously distinguished himself by saying that climate change was a greater threat than terrorism, a view that would doubtless find little agreement in London after 7/7.) Even the European Parliament got in on the act, passing a resolution that “expresses its deepest sympathy

with the families of the victims and notes with regret that the *often predicted impact of climate change has become a reality* in that poor sections of society living in coastal regions bore the brunt of the hurricane” (emphasis added).<sup>3</sup>

But the prize for the most breathless hyperbole goes to Robert F. Kennedy Jr., writing on the Huffington Post Internet site. Kennedy suggested that there was poetic justice that the eye of Katrina hit the Mississippi coast because of “the central role that Mississippi governor Haley Barbour played in derailing the Kyoto Protocol,” as if to suggest that had the United States complied with Kyoto, the hurricane might not have happened. He adds: “Well, the science is clear. This month, a study published in the journal *Nature* by a renowned MIT climatologist linked the increasing prevalence of destructive hurricanes to human-induced global warming.”<sup>4</sup> The linkage of hurricanes to climate change did not begin with Katrina. Last fall, the aftermath of the four hurricanes that roared through Florida, a group called Scientists and Engineers for Change put up a billboard in Florida that read: “Global Warming=Worse Hurricanes. George Bush Just Doesn’t Get It.”

### The Consensus on Hurricanes and Climate Change

The irony of these claims is that advocates for urgent action on climate change most often

Steven F. Hayward (shayward@aei.org) is the F. K. Weyerhaeuser Fellow at AEI.

appeal to the “scientific consensus” about the matter. Yet on the subject of climate change and hurricane frequency and intensity, the scientific consensus overwhelmingly rejects the view that the roughly one degree Celsius of warming over the last century is having a discernable effect on hurricane frequency or intensity today. The study Kennedy references, Kerry Emanuel’s “Increasing Destructiveness of Tropical Cyclones over the Past 30 Years,”<sup>5</sup> has attracted wide criticism from numerous climate scientists and hurricane experts because it relies upon shaky estimates of past hurricane wind speeds for which there is no database of accurate measurements.

“It’s a terrible paper, one of the worst I’ve ever looked at,” says hurricane researcher William Gray of Colorado State University.<sup>6</sup> Gray points out, among other simple observations, that if global warming is driving hurricanes, we would expect to see more of them in the Pacific and Indian Oceans. But the storm trends there have been flat or slightly declining. (In addition, data from the National Oceanographic and Atmospheric Administration [NOAA] suggests that Gulf Coast ocean temperatures in the week before Katrina were average or slightly below average.) Most embarrassing for Kennedy is Emanuel himself, who disavowed applying his study to Katrina. Emanuel told the *Independent* newspaper, “I don’t think you can put this down to global warming.”<sup>7</sup>

Indeed, the “consensus” runs decisively in the other way. In 2001, the Intergovernmental Panel on Climate Change (IPCC) Third Assessment Report concluded: “Changes in tropical and extra-tropical storm intensity and frequency are dominated by inter-decadal to multi-decadal variations, with no significant trends over the twentieth century evident. Conflicting analyses make it difficult to draw definitive conclusions about changes in storm activity, especially in the extra-tropics.”<sup>8</sup> And NOAA, in its annual hurricane forecast issued at the beginning of August, noted: “(The) confluence of optimal ocean and atmosphere conditions has been known to produce increased tropical storm activity in multi-decadal (approximately 20–30 year) cycles. Because of this, NOAA expects a continuation of above-normal seasons for another decade or perhaps longer. NOAA’s research shows that this reoccurring cycle is the dominant climate factor that controls Atlantic hurricane activity. Any potentially weak signal associated with longer-term climate change appears to be a minor factor.”<sup>9</sup>

In plain English, the IPCC and NOAA statements are referring to the phenomenon, well known to scientists, of ocean temperature changes that occur naturally from decade to decade, known as the “decadal oscillation.” This phenomenon drives hurricane activity much more strongly than the so-far small change in global atmospheric temperature. While the number of Atlantic hurricanes has trended up in the 1990s, the trend was interrupted whenever there was an El Niño condition in the Pacific Ocean. (Of course, in strong El Niño years, California suffers damage from heavy rain. The relation of El Niño to climate change is still speculative.)

Even Kevin Trenberth, a scientist with the National Center for Atmospheric Research (NCAR) whose advocacy of the climate-hurricane connection has been discussed previously in *Environmental Policy Outlook*,<sup>10</sup> has become more circumspect of late, writing in *Science* magazine in June: “[T]here is no sound theoretical basis for drawing any conclusions about how anthropogenic change affects hurricane numbers or tracks,

and thus how many hit land . . . Model projections of how wind shear in the hurricane region responds to global warming caused by increased carbon dioxide in the atmosphere tend to differ, and it is not yet possible to say how El Niño and other factors affecting hurricane formation may change as the world warms.”<sup>11</sup>

And finally, in a forthcoming edition of the *Bulletin of the American Meteorological Society*, Roger Pielke Jr., Chris Landsea, Max Mayfield (the director of NOAA’s hurricane center who sent out the first recommendation that New Orleans be evacuated), Jim Laver, and Richard Pasch write:

Since 1995 there has been an increase in the number of storms and in particular the number of major hurricanes (category 3, 4, and 5) in the Atlantic. But the changes of the past decade in these metrics are not so large as to clearly indicate that anything is going on other than the multi-decadal variability that has been well documented since at least 1900. Consequently, in the absence of large and unprecedented trends, any effect of greenhouse gases on the frequency of storms or major hurricanes is necessarily very difficult to detect in the context of this documented variability.

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change sideshow  
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The authors conclude, “Because the global earth system is highly complicated, until a relationship between actual storm intensity and tropical climate change is clearly demonstrated and accepted by the broader community, it would be premature to conclude with certainty that such a link exists or is significant.”<sup>12</sup>

As Paul Recer warns on Slate.com, “environmentalists may risk embarrassment if they exploit the theoretical link to promote their causes. . . . Until the science clarifies, environmental groups that use Katrina as a way to boost their campaign for tougher controls on greenhouse emissions risk provoking a backlash. Exploiting bad news and facile pseudoscience to seek support and fresh donations is a good way to lose credibility.”<sup>13</sup>

## The Real Environmental Issues of Katrina

The hurricane–climate change sideshow distracts from more significant environmental aspects of the Gulf Coast disaster. The first concerns the immediate problem of the contaminated floodwater in New Orleans; the second is the long-term problem of the slow erosion of the Gulf coastline at the mouth of the Mississippi River that contributed to the vulnerability of New Orleans.

Katrina should be regarded as the culmination of a slow-motion environmental disaster decades in the making. “Toxic soup” is the favored term to describe the combination of sewerage, chemicals, and oil byproducts released in the maelstrom. In an editorial with that term as its title, the *Washington Post* wrote, “No one knows what chemical reactions might take place in that water.” While warning that we should not “engage in scaremongering” because “ecosystems do recover from disasters, both natural and man-made,” the *Post* then goes on to engage in scaremongering:

But because this kind of water pollution is unprecedented, and because it could cause permanent damage to drinking water, agriculture and the fishing industry in the region—and could damage the region’s viability and habitability—it is extremely important that the EPA continue its

daily monitoring of the floodwaters, while they remain in the city and after they have been pumped out.<sup>14</sup>

The *Post* had it right the first time—ecosystems are more resilient than we think, and it is highly unlikely that there will be “permanent damage” to the Gulf’s

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waters. Fortunately the dire circumstances have compelled us to do the right thing immediately, which is to disperse the water into the ocean as fast as possible for it to begin the dilution process, rather than treating the New Orleans basin like a Superfund site and going through an elaborate environmental impact review while the toxic soup sits and metastasizes. The lasting effects of past environmental disasters, including the Santa Barbara oil spill, the *Exxon Valdez* oil spill, and, as we learned recently, the Chernobyl nuclear explosion, have almost always been overestimated.<sup>15</sup> Just as the predictions of the death toll in New Orleans have proven to be vastly overestimated, so too are we likely to find the lasting environmental effects overestimated.

The most significant long-term problem is the erosion of the Gulf Coast near the mouth of the Mississippi River. Even if we were to wave a magic wand and make all prospective climate change disappear, the erosion of the Gulf Coast would continue and the vulnerability of New Orleans would increase. As is well known, the Louisiana coastline has been shrinking rapidly for decades. The Louisiana coastline has been losing an estimated thirty-four square miles of land a year for the last fifty years; the U.S. Geological Survey estimates that Katrina erased thirty square miles of coastal land.<sup>16</sup> Over the last seventy-five years Louisiana has lost a land area the size of Delaware. Last year’s report of the U.S. Commission on Ocean Policy notes that Louisiana accounts for 80 percent of the total annual coastline erosion in the entire United States.<sup>17</sup> A contrast of an older map of Louisiana with a current satellite photo of the actual coastline is jarring.<sup>18</sup>

The erosion of the low-lying coastal marshlands eliminated natural barriers to storm surges and has reduced the river basin’s ability to dilute and filter out

pollution naturally, which has contributed to the worsening problem of hypoxia (nitrogen runoff that depletes dissolved oxygen and creates a “dead zone”) in the Gulf of Mexico. It also accelerated subsidence in and around New Orleans, increasing the area’s hurricane risk. The cause of this erosion is not mysterious: the vast system of dams, levees, canals, artificial channels, and flood control projects stretching all the way to the headwaters of the Mississippi River in the upper Midwest has reduced the amount of sediment reaching the mouth of the Mississippi by two-thirds. In addition, the channelization of the Mississippi around New Orleans and its mouth into the Gulf of Mexico ensures that what sediment still flows ends up mostly out in the gulf, where it disappears beyond the continental shelf. For thousands of years the Mississippi River’s mouth could be likened to a loose garden hose, changing its course rapidly and dispersing sediment widely. Restoring the region’s ecosystem requires finding ways to mimic this long-term dynamic process.

In the aftermath of Katrina numerous media stories have pointed to the example of Holland, which built an extensive system of dikes and sea barriers over the two decades after the nation suffered a catastrophic flood in the early 1950s. The plain suggestion is that something similar should be done—or should have been done—for New Orleans and the Gulf Coast. It turns out that such a project was once planned in the aftermath of Hurricane Betsy in the 1960s. According to the *Los Angeles Times*, President Lyndon B. Johnson approved a project to build a massive hurricane barrier to protect New Orleans from storm surges, but the project was abandoned ten years later after an environmental group successfully sued to block the project. “If we had built the barriers, New Orleans would not be flooded,” Joseph Towers, the former chief counsel for the Army Corps of Engineers in New Orleans told the *Times*.<sup>19</sup> It was after the storm barrier was blocked that the Army Corps raised the levees around New Orleans instead.

It is arguable, however, that the raised levees were more environmentally destructive than the sea barrier would have been. Indeed the existing levees and river diversions probably made New Orleans more vulnerable

to catastrophe, if Michael Grunwald’s superb reporting in the *Washington Post* is correct.<sup>20</sup> (And as we know from Grunwald’s dispatches, much of the massive amount of money the Army Corps of Engineers spent in Louisiana went for “questionable projects” with little relation to flood control.)<sup>21</sup>

The prospective rebuilding of New Orleans provides an opportunity to implement a number of coastal restoration plans that have been on the drawing board for a number of years. The Army Corps of Engineers has a forty-year, \$14-billion plan to restore coastal wetlands in Louisiana.<sup>22</sup> Some plans call for installing a network of pipelines to move millions of tons of sediment to restoration sites.<sup>23</sup> This technique is already in use on a small scale in the region, and the Dutch have used sediment pipelines as a part of their flood abatement system. But sediment engineering on this scale requires large amounts of construction and dredging and may not be commensurate with the scale of the problem.

A long-term strategy for restoring the natural balance of the Mississippi River basin and delta will need to consider nonstructural alternatives to the problem along the entire course of the river, and not just in and around New Orleans. Rather than building and reinforcing levees, some low-lying areas along the entire course of the Mississippi should be allowed to become functional flood plains again. Low value lands could be purchased, and private landowners could be indemnified from periodical flood damage. This is likely to be cheaper than building and maintaining levees and relying on sediment pipelines. Natural flood plains also offer the benefit of absorbing and neutralizing nitrogen runoff, and hence contributing to the solution of the hypoxia problem.

Restoring the natural functioning of the mouth of the Mississippi River is a tougher problem, as it might require moving much of the city to be effective. This may not be practical given the importance of existing shipping and energy infrastructure. Thus far the case against rebuilding New Orleans as it was rests mostly on social and economic grounds.<sup>24</sup> But the environmental grounds for second thoughts are at least as compelling.

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## Notes

1. Ross Gelbspan, "Katrina's Real Name," *Boston Globe*, August 30, 2005, available at [http://www.boston.com/news/globe/editorial\\_opinion/oped/articles/2005/08/30/katrinass\\_real\\_name/](http://www.boston.com/news/globe/editorial_opinion/oped/articles/2005/08/30/katrinass_real_name/).

2. Andrew Buncombe, "King: Global Warming May Be to Blame," *Independent* (United Kingdom), August 31, 2005, available at <http://news.independent.co.uk/world/americas/article309214.ece>.

3. European Union, EU Resolution B6-0472/2005, September 5, 2005.

4. Robert F. Kennedy Jr., "For They That Sow the Wind Shall Reap the Whirlwind," *Huffington Post*, August 29, 2005, available at [http://www.huffingtonpost.com/robert-f-kennedy-jr/for-they-that-sow-the-\\_b\\_6396.html](http://www.huffingtonpost.com/robert-f-kennedy-jr/for-they-that-sow-the-_b_6396.html). See also Nicholas Kristof, "The Storm Next Time," *New York Times*, September 11, 2005, available at <http://www.nytimes.com/2005/09/11/opinion/11kristof.html?n=Top/Opinion/Editorials%20and%20Op-Ed/Op-Ed/Columnists/Nicholas%20D%20Kristof>.

5. Kerry Emanuel, "Increasing Destructiveness of Tropical Cyclones over the Past 30 Years," *Nature*, July 31, 2005, available at <http://www.nature.com/nature/journal/vaop/ncurrent/abs/nature03906.html>.

6. Scott Allen, "Hurricanes More Powerful, Study Says," *Boston Globe*, August 1, 2005, available at [http://www.boston.com/news/science/articles/2005/08/01/hurricanes\\_more\\_powerful\\_study\\_says/?page=full](http://www.boston.com/news/science/articles/2005/08/01/hurricanes_more_powerful_study_says/?page=full).

7. Buncombe, "King: Global Warming May Be to Blame."

8. UN Intergovernmental Panel on Climate Change Working Group One, "Observed Climate Variability and Change," *Climate Change 2001: The Scientific Basis* (New York: Columbia University Press, 2001), 104.

9. National Oceanographic and Atmospheric Administration, *Atlantic Hurricane Season Outlook* (August 2, 2005), available at <http://www.noaanews.noaa.gov/stories2005/s2484.htm>.

10. See Steven F. Hayward, "Climate Change Science: Time for 'Team B'?" *Environmental Policy Outlook*, January–February 2005, available at <http://www.aei.org/publication21974>.

11. Kevin Trenberth, "Uncertainty in Hurricanes and Global Warming," *Science* 308, no. 5729 (June 17, 2005): 1753–1754, available at <http://www.sciencemag.org/cgi/reprint/308/5729/1753.pdf>.

12. Roger Pielke Jr., Chris Landsea, Max Mayfield, Jim Laver, and Richard Pasch, "Hurricanes and Global Warming," *Bulletin of the American Meteorological Society* (forthcoming), available at [http://sciencepolicy.colorado.edu/admin/publication\\_files/resourse-1766-2005.36.pdf](http://sciencepolicy.colorado.edu/admin/publication_files/resourse-1766-2005.36.pdf). For a slightly contrasting view, see Stefan Rahmstorf, Michael Mann,

Rasmus Benestad, Gavin Schmidt, and William Connolley, "Hurricanes and Global Warming—Is There a Connection?" *Real Climate*, September 2, 2005, available at <http://www.realclimate.org/index.php?p=181#more-181>.

13. Paul Recer, "The Katrina Science Test," *Slate*, September 12, 2005, available at <http://www.slate.com/id/2125908/>.

14. "Toxic Soup," *Washington Post*, September 10, 2005.

15. See Vakeska Stephan, "Chernobyl: Poverty and Stress Pose 'Bigger Threat' than Radiation," *Nature Online*, September 7, 2005, available at <http://news.nature.com/news/2005/050905/437181b.html>. A study of the aftereffects of the 1969 Santa Barbara oil spill found that ecological damage was short-lived. See Dale Straughan, ed., *Biological and Oceanographical Survey of the Santa Barbara Channel Oil Spill 1969–1970* (Los Angeles: Alan Hancock Foundation, 1971). *Time* magazine added, "Dire predictions seem to have been overstated . . . Now, four months later, the channel's ecology seems to have been restored to virtually its natural state." See "Not So Deadly," *Time*, June 13, 1969.

16. U.S. Geological Survey, "USGS Reports New Wetland Loss from Hurricane Katrina in Southeastern Louisiana," news release, September 14, 2005, available at [http://www.nwrc.usgs.gov/releases/pr05\\_006.htm](http://www.nwrc.usgs.gov/releases/pr05_006.htm).

17. The Ocean Commission report also joined the chorus in warning of New Orleans' vulnerability: "New Orleans' protective levees are designed to withstand only a moderate (Category 3) hurricane storm surge. Were they to fail, the city and surrounding areas could suffer upward of \$25 billion in property losses and 25,000–100,000 deaths by drowning." U.S. Commission on Ocean Policy, *An Ocean Blueprint for the 21st Century* (final report of the commission, July 22, 2004), 174.

18. Several vivid depictions of the loss can be seen at <http://www.nwrc.usgs.gov/special/landloss.htm>.

19. Ralph Vartabedian and Peter Pae, "A Barrier That Could Have Been," *Los Angeles Times*, September 9, 2005, available at <http://www.latimes.com/news/nationworld/nation/la-na-surge9sep09,1,7901524.story?coll=la-home-headlines&ctrack=1&cset=true>. John Berleau also noted other ways environmental activism contributed to the New Orleans disaster in "Greens vs. Levees: Destructive River-Management Philosophy," *National Review Online*, September 8, 2005, available at <http://www.nationalreview.com/comment/berlau200509080824.asp>.

20. Michael Grunwald, "Canal May Have Worsened City's Flood," *Washington Post*, September 14, 2005, available at <http://www.washingtonpost.com/wp-dyn/content/article/2005/09/13/AR2005091302196.html?sub=AR>.

21. See Michael Grunwald, "Money Flowed to Questionable Projects: State Leads in Army Corps Spending, But

Millions Had Nothing to Do with Floods,” *Washington Post*, September 8, 2005, available at <http://www.washingtonpost.com/wp-dyn/content/article/2005/09/07/AR2005090702462.html>.

22. See Louisiana Coastal Wetlands Conservation and Restoration Task Force and the Wetlands Conservation and Restoration Authority, *Coast 2050: Toward a Sustainable Coastal Louisiana* (Baton Rouge, LA: Louisiana Department of Natural Resources, 1998).

23. See Louisiana Coastal Wetlands Conservation and Restoration Task Force, *Watermarks: Louisiana Coastal Wetlands Planning, Protection, and Restoration News* (August 2005), 5–7.

24. See, for example, Jack Shafer, “Don’t Refloat: The Case against Rebuilding the Sunken City of New Orleans,” *Slate*, available at September 7, 2005, <http://www.slate.com/id/2125810/?nav=navoa>.