

AFTER KATRINA

*New Solutions for Safe Communities
and a Secure Energy Future*

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ABOUT NRDC

The Natural Resources Defense Council is a national nonprofit environmental organization with more than 1.2 million members and online activists. Since 1970, our lawyers, scientists, and other environmental specialists have worked to protect the world's natural resources, public health, and the environment. NRDC has offices in New York City, Washington, D.C., Los Angeles, and San Francisco. Visit us at www.nrdc.org.

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EXECUTIVE SUMMARY

Hurricane Katrina exposed shocking holes in both our social fabric and our security safety net when she tore through the Gulf Coast. The storm also carried important lessons about management—or mismanagement—of essential health and environmental safeguards.

Hurricanes are a fact of life on the Gulf Coast, and, invariably, some turn deadly. But decisions made by policymakers and elected officials have tremendous influence on our ability to absorb a storm's brute force.

Their choices will also determine how quickly and how well communities cope with Katrina's environmental fallout, and whether low-income people of color will suffer as disproportionately in the aftermath as they did in the storm itself.

A century of poor planning and industrial abuse has stripped away much of the Gulf Coast's natural protection against storms and flooding. More than 1 million acres of coastal wetlands in Louisiana have been drained, lost to development, or starved of the Mississippi River sediments they need to survive. These wetlands could have absorbed storm surge and floodwaters, substantially reducing the storm's impact. When the storm came ashore, it swamped aging, underfunded drinking water and sewage systems and hit more than 60 major industrial facilities and four Superfund waste sites hard in New Orleans alone, adding unknown toxins to the stinking, toxic flood.

Katrina caused nine oil spills totaling more than 7 million gallons, together ranking as one of the biggest U.S. spills in history. By contrast, the price shocks still rippling through the oil markets are not ultimately of Katrina's making. Rather they are due to soaring energy demand caused by years of official refusal to tackle our nation's energy dependence by diversifying our energy sources and improving fuel economy performance standards.

Fixing these problems will make Gulf Coast communities safer and more secure and reduce the long-term cost of coping with the disaster. Lessons from Katrina will pay dividends in other regions subject to extreme weather disasters as well.

Planning for a Change

The Natural Resources Defense Council (NRDC) has assembled a team of its best experts on public health, toxic waste, urban design, coastal protection, energy security, and global warming to present a set of policies and practices to protect the safety and well-being of Gulf Coast residents—today, during the recovery, and onward into a healthier, more sustainable future.

Protect Gulf Coast Communities from Toxic and Biological Hazards

The Environmental Protection Agency (EPA), the Centers for Disease Control and Prevention, and independent experts should immediately broaden toxicity testing of water, sediments, and soils. Immediate widespread testing of water, sediment, and dried mud is critical to ensuring the safety of cleanup workers and returning residents, and for identifying toxic hot spots for containment and cleanup. Big industrial facilities, Superfund sites, and other toxic hotspots should be catalogued and evaluated, and any dangerous releases contained immediately. Immediate public disclosure of all information is also critical.

Quickly Restore Safe, Clean Drinking Water Supplies

More than two weeks after Hurricane Katrina hit land on September 17, 2005, 186 public water treatment systems in Louisiana and 229 in Mississippi were seriously compromised, completely out of commission, or unaccounted for; and 172 sewage treatment plants were not fully functioning. Hundreds more in Louisiana, Mississippi, and Alabama were operational but expected to need repair or reconstruction. New Orleans' drinking water system was completely knocked out but has started pumping non-potable water in some areas for fire control. All told, at least 2.4 million people were without access to safe drinking water and bacteria levels in floodwaters greatly exceeded public health standards shortly after Katrina. All these systems will need financial and technical assistance to get back into full, safe operation.

Restore Natural Coastal Buffers to Protect Against Storms

Natural coastal barriers on the Gulf have nearly been destroyed by decades of industrial misuse and government-sponsored re-engineering gone awry. We must adopt a major coastal wetland restoration program in the wake of Katrina to build back what we ourselves destroyed. It is also critical to ensure that flood control projects ordered by Congress and developed by the Army Corps of Engineers are prioritized to protect population centers and serve legitimate flood control purposes, not the call of pork-barrel politics.

Rebuild for a Safe, Secure, Sustainable Future

Now is a chance to restore New Orleans' 19th century elegance using today's know-how and technology. That means energy-efficient, weather-resistant housing designed according to voluntary federal standards that save money and improve comfort for people who live there, no matter what their income. And it means family-friendly, mixed-use, mixed-income walkable communities like many affected areas had in earlier days.

Maintain Health and Environmental Safeguards

Lobbyists and their congressional allies are already lining up hoping to undercut long-standing health and environmental safeguards in the name of hurricane recovery. In a few select cases, it may make sense to make temporary accommodations in federal health and environmental rules to address legitimate needs. But nearly all of these can be accommodated without changes in current law, much less the blanket suspension legal safeguard being proposed by special interests.

Repair the Racial and Economic Inequity of Health and Environmental Risk

Environmental injustices have long plagued New Orleans and the Gulf Coast region. Cleanup efforts

Decisions made by policymakers and elected officials have tremendous influence on our ability to absorb a storm's brute force.

should adhere firmly to the standing Federal Executive Order designed to ensure environmental justice for communities of low income and color that are exposed to inequitable amounts of toxic pollution. In the rebuilding process, local governments' exercise of eminent domain powers should not be used to take properties in low-income communities of color.

Permanently Protect American Consumers from Energy Price Spikes

In the wake of Katrina, oil and natural gas prices were skyrocketing. Although the worst of the panic-induced run-up has abated, prices remain extremely high and experts are predicting a painfully expensive winter heating season. We cannot drill our way to energy security. The only real solution is to reduce the amount of energy we need to keep the economy humming. That means stronger fuel economy standards and rules requiring more efficient heating and air conditioning equipment and other energy conservation technologies.

Prevent the Added Threat of Global Warming

Global warming didn't cause Katrina. But experts agree the warming climate caused by heat-trapping pollution is adding fuel to tropical storms—elevating category 3 storms into category 4 and so forth. Hotter climate also means more flood risk due to rising sea levels. There is growing bipartisan support in Congress and many states for concrete, market-based limits on global warming pollution.

STOPPING IMMEDIATE PUBLIC HEALTH THREATS FROM HURRICANE KATRINA'S TOXIC FALLOUT

Hurricane Katrina has been, first and foremost, a human disaster—a seemingly endless tale of suffering marked by lives lost, communities dispersed, and families torn asunder. NRDC is doing all that we can to aid the ongoing relief effort in the Gulf states. We are contributing our expertise on toxic pollution, oil spills, and drinking water in order to help meet the immediate challenges, and we are urging our national leaders to make sound policy decisions for a better long-term future instead of hasty responses that, although temporarily convenient, could have significant prolonged health effects for the very communities we are all trying to help.

CONDUCT IMMEDIATE TESTING FOR TOXIC AND BIOLOGICAL HAZARDS

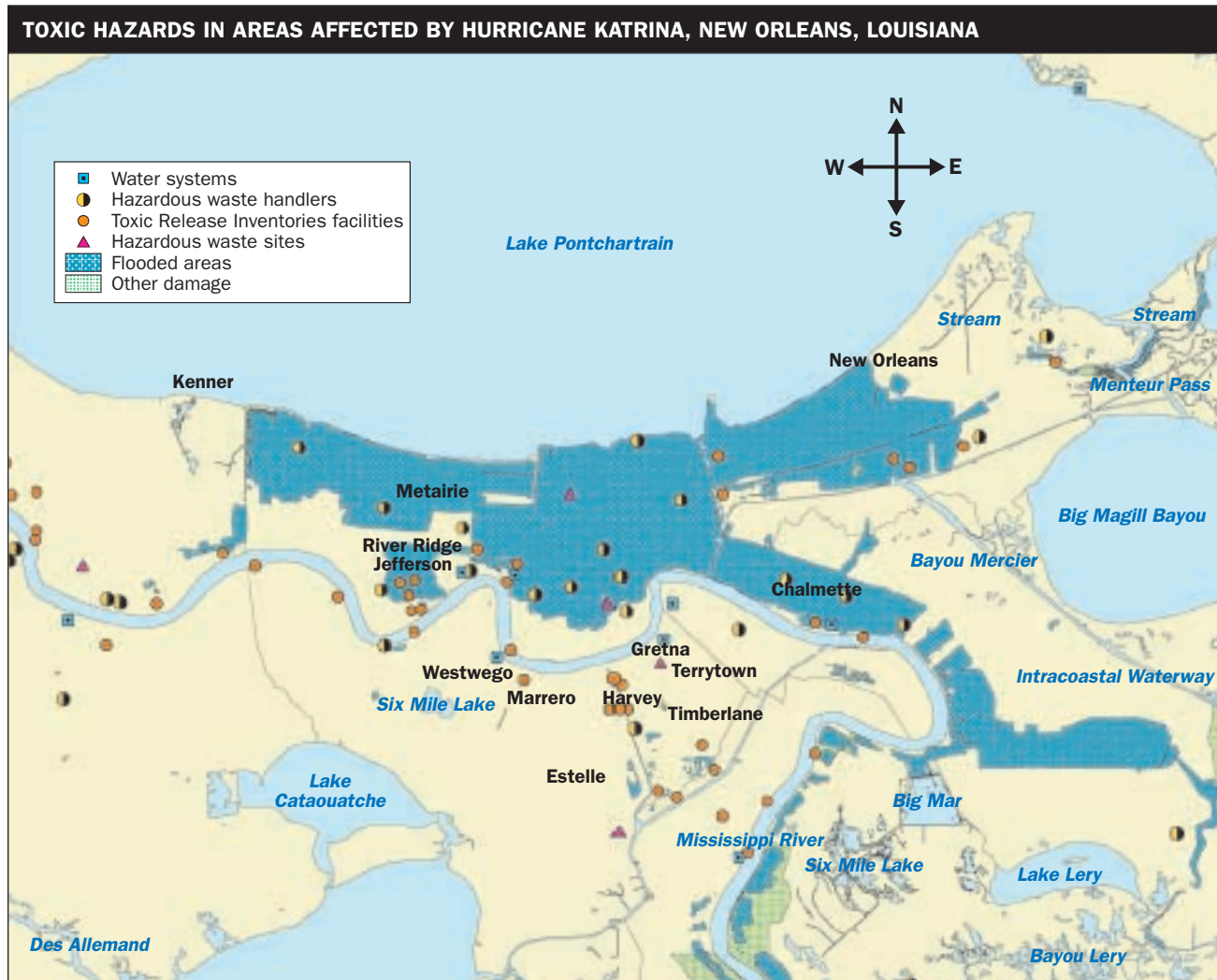
People in New Orleans and the Gulf Coast Are Exposed to Toxic Fallout

The catastrophic flooding in New Orleans and other parts of the Gulf Coast has released significant amounts of toxic substances that are having—and will continue to have—a profound impact on public health. These toxins come from major oil and chemical plants, tank leaks and spills, household and commercial chemical supplies, submerged automobiles and other petroleum-fueled equipment, commercial businesses such as auto shops, and overwhelmed sewer systems. More significantly, over the long term,

releases from many of these sources threaten large-scale contamination of surface water, drinking water, sediments, and soils throughout the region and could compromise air quality.

- ▶ Federal officials identified at least nine oil spills of 10,000 gallons or more and 35 smaller spills resulting from Katrina, which have discharged more than 7 million gallons of oil into the lower Mississippi tributary streams, lakes, and surrounding wetlands.¹
- ▶ There are scores of chemical plants, petroleum refineries, and toxic waste dumps and handlers in the Louisiana parishes most affected by hurricane Katrina. (See map, page 2.)²
- ▶ At least one Superfund site completely submerged in the New Orleans floodwaters, as did many other sites with hazardous materials on-site.³
- ▶ The Environmental Protection Agency's (EPA) preliminary testing of New Orleans floodwater confirms the presence of extreme contamination from overwhelmed sewage systems, with total coliform or *E. coli* levels up to 75 times the level the EPA identifies as safe for human contact.⁴

As contaminated floodwaters recede, the remaining soil will be covered with, and permeated by, these toxic materials, creating a potential public health crisis for any former residents who return to the area



FEMA had geographic data documenting damage by Hurricane Katrina in 13 counties in Alabama, Louisiana and Mississippi as of Aug 31, 2005. This area contains 152 Toxics Release Inventory facilities, 29 of which disposed of 38.8 million pounds of toxic waste on-site in 2003 alone, and 64 hazardous waste sites, including seven Superfund sites. There are also 324 water systems serving 2.4 million people in the 13 affected counties. The map shows proximity of hazardous waste handling facilities, hazardous waste sites, and Toxics Release Inventory facilities to areas where FEMA had documented hurricane damage as of Aug 31, 2005. Map shows only New Orleans and its environs and only those water systems serving more than 5,000 people. At the time this map was made, FEMA's geographic data was still in progress. Source: U.S. EPA, FEMA

before a comprehensive cleanup has occurred; and it is unclear at this point whether an adequate cleanup is being planned. Once the mud dries, contaminated material will likely become airborne dust, spreading the risk even more.

Cleanup workers could face serious occupational health concerns and unknowingly be exposed to any number of toxic contaminants. Just as many responders at the site of the 9/11 attacks were heavily exposed to toxins as they sifted through and cleaned up the rubble, those on the front lines

in New Orleans will be exposed to significant health risks if they are not provided with adequate protective equipment.

Disposal of the debris, including thousands of ruined vehicles, trucks, homes, and other structures, will present an enormous challenge. In the six hardest-hit counties in Mississippi alone, the debris may produce more than six times the solid waste that the entire state generates in a year.⁵ Hazardous materials are interspersed with this waste. And there are reports that the U.S. Coast Guard is considering

A small dog covered in oil was found wandering as cleanup crews worked to recover oil from a ruptured Murphy Oil, USA refinery tank in a Chalmette, LA, neighborhood, September 6, 2005. Nearly 820,000 gallons of oil spilled, spreading into the neighborhood adjacent to the refinery and mixing with receding floodwater from Hurricane Katrina.



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burning much of the material.⁶ The air pollution from such burning—particularly the burning of plastics and other toxic materials—could present enormous health hazards to nearby residents.

Immediate Actions to Reduce People's Exposure to Toxics

► The EPA, the Centers for Disease Control and Prevention, and independent experts should conduct widespread toxic chemical testing of water, sediments, and soils, and should monitor exposure of first responders and cleanup workers. All test results should be shared with the affected public.

The challenge is to ensure an open and honest dialogue regarding the true extent of the contamination of groundwater, drinking water, sediment, and soils. The public must be fully informed every step of the way regarding the nature and degree of the contamination, the planning and response of the relevant government entities, and the potential health consequences associated with exposure to contaminated sites, structures, and other resources.

Cleanup and rebuilding efforts must ensure that the burden of exposure to toxic releases does not fall on minority and underserved communities in the Gulf Coast region, particularly New Orleans, that already

have suffered disproportionate hardship in the wake of Hurricane Katrina.

► The EPA should immediately identify, evaluate, and contain toxic hot spots, such as major industrial facilities and Superfund sites.

The responsible government agencies—along with local citizens and experts—must initiate and follow through with a comprehensive assessment of the environmental damage from toxic releases and potential toxic exposures. They must plan and complete remedial action that is adequate to protect public health in both the short and long term. This must include comprehensive initial and ongoing surface water, groundwater, drinking water, sediment, and soil monitoring, and specific planning for adequate remedial measures.

For example, structures inundated with crude oil or other chemical contaminants may need to be razed, and land that is permeated with such contaminants will remain uninhabitable until remediation occurs, which would require removal of the contaminated soil. Failure to act will threaten responders and returning citizens, and will substantially increase long-term cleanup costs as toxins spread to larger areas and become more expensive and difficult to clean up.

Planning must also include biomonitoring and appropriate protective equipment specifically for the workers who perform cleanup activities in close proximity to contaminated sites, as well as for returning residents, who will ultimately live, work, play, and go to school in the areas affected by the toxic fallout of Hurricane Katrina.

RESTORE SAFE DRINKING WATER AND SEWAGE SERVICES IMMEDIATELY

Damaged and Destroyed Drinking Water and Sewage Services Threaten Public Health

Hurricane Katrina landed a devastating blow to more than 1,000 drinking water supply systems and 172 sewage treatment plants in Louisiana, Mississippi, and Alabama.⁷ Fetid water contaminated by disease-carrying bacteria and parasites, petroleum, and toxic chemicals swamped many water systems' source waters. Power outages have shut off critical pumps, treatment equipment such as chlorinators, control and communications systems, and other equipment essential to providing sewage treatment and to delivering safe drinking water to millions of people in the three states. In addition, flooding and wind damage destroyed or disabled many drinking water systems' collection and treatment equipment, and in some cases ruined portions of their water distribution systems.

More than two weeks after Hurricane Katrina hit land, Louisiana still had 517 water systems affected, Mississippi had 391, and Alabama one, according to an EPA review on September 13, 2005. New Orleans' drinking water treatment system was completely knocked out, and its distribution system suffered heavy damage. The Crescent City's water laboratory was also reportedly flooded. By September 13, very limited service had been restored in some locations, and non-potable contaminated water was being pumped into much of the system for use by firefighters.

As power is restored and preliminary repairs are made, more systems begin to return to service, often telling their customers to boil water.⁸ Scores of public water systems have told customers their water is not

safe to drink and that they must boil their water before consuming it; such "boil water alerts" do little or nothing, however, to protect consumers from many chemical contaminants. Likewise, reports are also coming in from other locations without functioning water supplies that there are continuing shortages of bottled water.

Louisiana alone estimates that it will need to rebuild 50 percent of affected sewage treatment plants at a cost of \$38 billion. People exposed to sewage-polluted water can contract any illness that is spread by ingestion of fecal-contaminated water. Viruses are believed to be the major cause of polluted water-associated diseases, and they are responsible for gastroenteritis, hepatitis, respiratory illness, and ear, nose, and throat problems. Gastroenteritis, which can also be caused by bacteria, is a common term for a variety of diseases that can cause symptoms such as vomiting, diarrhea, stomachache, nausea, headache, and fever.

Widespread contamination by raw sewage, dozens of petroleum and chemical leaks and spills, and leaching of industrial waste sites have contaminated floodwaters and the available water sources for many systems. This contamination immediately affects systems using surface water but can also contaminate groundwater systems by flooding the wells, or by seeping into the ground and reaching underground wells—in some cases not immediately, but over time.

Virtually no monitoring of tap water and only limited floodwater monitoring—at the time of this publication—have been publicly reported. The EPA reported results from one round of testing at about 30 sites in the flooded areas of New Orleans. However, there have been:

- No reports of chemical testing of water outside of the New Orleans area;
- No test results for water near hundreds of major and minor reported oil and chemical spills; and
- No test results for water around the scores of industrial facilities in the three storm-pounded Gulf Coast states.

Many systems will not meet monitoring requirements intended to ensure drinking water safety. There will be substantial pressure on state officials as well as on the EPA to relax testing and treatment requirements or to exercise “enforcement discretion” to excuse violations. Although in some cases it may be appropriate not to enforce requirements against a system hit hard by the storm—particularly immediately after the event—Katrina should not become an all-purpose or long-term excuse to pardon public water systems that fail to deliver safe, fully tested drinking water to citizens in the affected areas.

Immediate Actions to Restore Safe Drinking Water and Sewage Services

► Congress should immediately appropriate adequate funds to test water in affected water systems and replace or upgrade drinking water infrastructure to avoid future health threats. Preliminary reports anticipate the cost of monitoring to be in excess of \$100 million for the approximately 1,000 affected water systems and source waters, and that drinking water infrastructure repairs and rehabilitation costs for the systems will be in excess of \$6 billion to \$8 billion.

► Congress should appropriate funds to rebuild sewage treatment plants and sewer system pipes to prevent further fecal contamination and reduce the likelihood of waterborne disease transmission.

► Federal agencies should evaluate the appropriateness of continuing to pump raw contaminated floodwaters into Lake Pontchartrain before the lake is irreparably contaminated.

In the first days of the crisis, officials had no choice but to pump floodwaters anywhere and any way that they could. Much of this water is of course laden with the same contaminants left behind on the flooded landscapes. Now that the worst flooding is over, officials should examine options for treating the most heavily contaminated water that remains. They should also evaluate the long-term damage to Lake Pontchartrain and evaluate ways to minimize its impact on people and habitat.



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The floodwaters swamping New Orleans have become a toxic stew, testing at least 10 times over the U.S. EPA’s limits for sewage-related contaminants such as *E. coli*, viruses, and cholera-like bacteria. Current recovery efforts involve the Corps of Engineers pumping enormous quantities of floodwater into places such as Lake Pontchartrain, which lies immediately to the north of New Orleans—close to residential neighborhoods with children.

► A national, independent inquiry into Katrina and its aftermath should evaluate the utter failure of state and local officials to ensure safe drinking water is available in the event of a hurricane or other disaster—something required by federal law. Preparedness of all states to comply with this requirement should also be reviewed. Federal rules should be amended to require each state and public water system to adopt, and periodically to drill, to evaluate the adequacy of such emergency plans. The plans should be adopted and drilled with input from federal, state, and local authorities as well as citizens.

MAINTAIN A ‘NO EXCUSES’ CLEANUP POLICY WITH STRONG SAFETY AND HEALTH STANDARDS

Some are arguing that we need to have lower environmental health standards as part of our recovery efforts. But there is no reason why we can't protect the health of Gulf residents as we quickly do recovery work. People have already suffered enough and deserve a “no excuses” cleanup approach that does it fast—but also does it right.

Under pressure from oil companies, the federal government has already waived a number of air pollution and fuel standards in the wake of the storm, including the sulfur content requirements for motor vehicle fuels. So far, rollbacks have been only temporary, but there is talk that industry will seek a more permanent suspension of the EPA's sulfur content requirements. This would unnecessarily compromise public health and derail significant upcoming engine standards that depend on the availability of clean fuel. Occupational health standards may also be in danger as efforts accelerate to reclaim devastated areas.

Lobbyists are already working with their allies in Congress to weaken important environmental standards and other protections. Senator James Inhofe (R-OK), chairperson of the Senate Environment and Public Works Committee, has introduced legislation that would allow the EPA to waive *all* laws under EPA jurisdiction, and to waive any law not under EPA jurisdiction for the EPA's Katrina response operations—for up to 18 months.

Most major environmental laws already include emergency authority, often vested in the president, for waivers in the event of a national emergency. Although some limited common-sense waivers may be warranted on a temporary, emergency basis, the disaster should not be an excuse to create sweeping exemptions or to authorize even more unnecessary health and environmental problems—exacerbating existing environmental justice issues and perhaps creating new ones. This is particularly true in light of the massive toxic and chemical contamination caused by the storm.

Key Reasons Not to Authorize Sweeping Waivers

1. On the pretext of high oil prices, refinery owners and their allies are pressing for a host of special extensions from health, safety, and emissions rules. But tight refinery capacity is due to refiners' economic decisions, not environmental law.

Although the total number of refineries has declined since 1981, total capacity has actually steadily increased since the early 1990s, as refiners have found it more cost-effective to expand capacity at existing facilities rather than operate small refineries or build new “green field” plants. Nor have environmental rules squeezed profit margins. In fact, the Department of Energy's Energy Information Administration has determined that environmental requirements have accounted for only a very small share of meager profit margins over the years.⁹

Stories about the plight of refiners are highly dubious as well. In fact, U.S. oil refinery companies are posting record profits, record margins, and record stock prices thanks to high oil demand. For example, shares in Valero Energy, the country's biggest refiner, are up 25 percent since Katrina alone (in line with most other U.S. refiners) and have tripled in price over the past year. In the first six months of 2005, Valero reported profits of \$1.4 billion—up nearly 60 percent over the previous year.¹⁰ On September 9, 2005, the *Washington Post* called refiners' plea about low margins “the oil industry's other Big Lie”:

Every year, Fortune Magazine, in its Fortune 500 issue, calculates the rate of return on shareholder equity for each major industry. Last year, when oil prices were a lot lower than they are now, the average return for both independent refiners and integrated majors was 23.9 percent. This year, it's been even higher. And over the past decade, according to Fortune, the return on equity in the sector has averaged 16 percent, well above the investment hurdle rates in most other sectors of the economy.

And refiners' market power is only growing: The Federal Trade Commission just approved Valero's \$8 billion acquisition of its former competitor: Premcor.

2. Drilling in the United States is just more of the same.

Katrina's spills should be a reminder of the inevitable risks that come with coastal drilling, especially in areas prone to hurricanes and tropical storms. Yet, after Katrina, many in Congress responded by recycling old demands for new or expanded oil and gas drilling off our coastal beaches and in huge areas of rare and protected wilderness, such as the Arctic National Wildlife Refuge. Suggesting that soaring energy prices might be Katrina's "silver lining," Texas Republican Congressman Joe Barton told reporters last week that "we could be drilling off the coasts of several other states."¹¹

Some say the elimination of current coastal protections might be tacked onto hurricane relief legislation. Others say there will be a new plan that would effectively bribe cash-strapped states to open up their shores to oil drilling by kicking back a share of revenue that would ordinarily go to the federal government. Areas at risk include the eastern Gulf of Mexico off Florida's heavily populated beaches, Virginia, California, and the Outer Banks of North Carolina. Even New Jersey could see rigs offshore.

Renewed calls to open the Arctic National Wildlife Refuge to oil exploration and production are similarly impossible to justify based on the short-term supply disruption. Although drilling advocates claim there is potentially 16 billion barrels of oil in the Arctic National Wildlife Refuge, this figure is an extreme upper-bound estimate (1 in 20 chance) of the oil that is potentially recoverable, regardless of extraction costs. Such oil would not hit the market for many years and represents a tiny percent of U.S. consumption. Moreover, a price-adjusted mean estimate, which better represents the basis for production decisions regarding potential future discoveries, shows that there is far less economically extractable oil, which would mean sacrificing this precious resource for a mere one year's worth of U.S. oil.

3. Current law provides the necessary authority to respond to short-term fuel supply disruptions. The EPA's prompt temporary waivers were enough to ensure clean fuel requirements did not worsen gasoline price increases during the last week. No

"There have been 575 reported cases of hazardous substance and oil pollution incidents in the Gulf States as a result of Katrina."

—U.S. COAST GUARD, SEPTEMBER 18, 2005

changes to clean air laws are justified based on the aftermath of Katrina, and for the sake of public health, the clean fuel waivers need to expire as soon as possible. What is at stake with these waivers is significant: When all of today's trucks, buses, and other diesel engines have been replaced by new engines mandated by the EPA, the EPA estimates that this will eliminate more than 20,000 premature deaths and provide net benefits of more than \$140 billion each year.

4. Waiving gas taxes benefits oil companies and hurts consumers. States and the federal government are even considering waiving federal and/or state gas taxes at the pump. But this measure shortchanges transportation trust funds vital to road and rail construction and maintenance. And since it is lack of supply, not cost, that is setting the market price for gasoline, prices are unlikely to drop, and the difference would just add to the windfall enjoyed by big oil companies.

FIX GAPS EXPOSED IN NATION'S DISASTER PREPAREDNESS AND RESPONSE

Despite increased homeland security funding and planning post 9/11, Katrina exposed gaping holes in the combined federal, state, and local capabilities for emergency response, including: (a) repeated failures at all levels to act on reducing known, specifically identified risks to the public relating to a powerful hurricane; (b) severe breakdowns in emergency communication networks; (c) vulnerability of critical emergency power systems to flooding even though the facilities were located in an area chronically prone to minor flooding and previously subject to devastating floods; and (d) conflicting and incomplete evacuation

planning at city, state, and federal levels, and failure to execute the plans that did exist.

The federal response to Katrina in particular raises grave doubts about the viability and effectiveness of the new Department of Homeland Security (DHS), which has submerged FEMA's capacities for swift natural disaster relief response within a larger bureaucratic entity focused on preventing and, to a lesser extent, responding to terrorist attacks. The wisdom of merging terror-

ist attack prevention and natural disaster response functions in a single agency is clearly in question.

► Restore FEMA's status as an independent agency with cabinet rank and ensure that the senior levels of the agency are staffed by persons with relevant experience, and expand independent oversight of the Department of Homeland Security, in particular DHS's disaster planning, response, and management programs.

BUILDING A SECURE, LASTING FUTURE FOR THE GULF STATES— AND THE NATION

No region of our country, not even New York City post 9/11, has been presented with the scale of rebuilding that will be required in Katrina's wake. If reconstructed well, the new city of New Orleans and the surrounding areas could become a model city demonstrating 21st century principles of sustainable design and livable communities. Rebuilding and development plans should be geared not only toward reducing infrastructure, energy, and transportation costs, but also toward protecting and restoring wetlands that protect against tropical storms.

RESTORE NATURAL COASTAL BUFFERS AND BUILD IN A SAFE, SUSTAINABLE WAY

Coastal Wetland Erosion Exacerbates Flooding

Of all the environmental roots to the Katrina tragedy, none is more striking, at least in geographic scale, than the role played by Louisiana's disappearing coastal wetlands and barrier islands. Wetland ecosystems are nature's buffer against catastrophic storm surges. Destroy that buffer and you destroy the first line of defense—not only for New Orleans but also for a host of other American cities. Studies show that as little as one square mile of wetlands can absorb a foot of surge. But the channelization of the Mississippi and nearby waterways, which has kept the wetlands from being replenished, and development have disrupted the ecosystem and led to a widespread wetlands destruction along the coast. As a result, since 1930, almost 2,000 square miles of the Louisiana Delta have

eroded away, and coastal Louisiana continues to disappear—literally—at a rate of 25 to 35 square miles annually. According to preliminary reports, Hurricane Katrina accelerated the destruction of the protective natural fringe, eradicating entire barrier islands and ripping up vast swaths of wetlands.

As Louisiana's wetland and barrier islands eroded away, coastal communities and critical oil and gas infrastructure became increasingly exposed to storm surge, flooding, and wind damage. New Orleans, which has now subsided 10 feet below sea level in some places, became particularly vulnerable, despite a complex system of massive levees and pumps. According to preliminary reports, Hurricane Katrina accelerated wetlands destruction, eradicating entire barrier islands and ripping up vast swaths of wetlands.

The channels that now carry so much of the region's water flow essentially pipe the water and sediments directly into the Gulf, instead of allowing it to disperse naturally to nourish the Delta's wetlands. Starved of sediments, the wetlands erode. Development and pollution, such as that from pipelines and related facilities, has also played a role in the loss of wetlands. During major storms, the channels themselves cause another problem—they funnel the storm surge inland, even into the heart of New Orleans, as is believed to have occurred in the case of Katrina with tragic consequences. Overall, the situation punctuates the astonishing degree to which the Army Corps's prioritization of flood control and inland navigation projects is not risk-based.

Coastal wetlands—vital habitat for oysters and breeding grounds for fish and crustaceans—have been torn apart by wind and water, and contaminated with sewage and chemicals, leaving Louisiana’s \$2.7 billion-a-year commercial fishing industry another potential casualty of Hurricane Katrina. The region’s fishers, shrimpers, and oyster harvesters typically supply the United States with about 30 percent of its seafood.



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Stemming Wetlands Loss

The wetlands of the Delta could be restored to their previous vibrancy, to serve not only as a natural barrier against hurricanes but also as nurseries for the most bountiful fisheries outside of Alaska (providing about 30 percent of the nation’s total catch) and one of the most important wildlife havens in the country. Decisions that will determine the region’s future should be made with deliberation, allow for a full range of ideas and consensus-building, and be determined by the citizens of those regions. NRDC recommends the following actions to ensure sustainable city and suburban development and to restore and protect coastal wetlands:

- ▶ Planners and developers should avoid redevelopment in flood-prone areas and be consistent with long-term wetlands restoration efforts.

Rebuilding processes must be integrated with long-term wetlands protection and restoration needs or the region will cycle back into unsustainability. We should start enforcing the Clean Water Act’s wetlands regulations to make the “no net loss” goal real to protect our homes and families from flooding and contaminated drinking water supplies, as well as the loss of fish, ducks, and other wildlife dependent upon wetland habitat.

- ▶ Federal and state agencies should develop a comprehensive plan to restore Louisiana’s coastal wetlands and barrier islands, and Congress should authorize and fund the plan.

Over the last decade, a coalition of government agencies, academic institutions, and environmental groups have developed the outline of such a comprehensive plan called Coast 2050. Congress and the agencies should also move forward immediately to fund a number of near-term projects about which there is consensus by agencies and environmental groups and that will provide immediate benefits in restoring the barrier islands and coastal wetlands.

- ▶ The rebuilding of flood control systems should ensure that no further damage to coastal wetlands or other environmental harm is caused.

Protecting and restoring the wetlands, which are part of the economic, cultural, ecological, and physical well-being of the region, must be central to Louisiana’s future flood control system. Congress should create an independent science and technology advisory body to oversee both the rebuilding of the flood control system and wetlands restoration efforts. Such expert independent oversight has never been more vital, given the environmental and public safety failure of the Corps existing

levee and canal system, the well-documented lack of scientific justification generally for so many Corps projects, and the need to spend public funds as effectively as possible on rebuilding a sustainable south Louisiana.

► The Army Corps of Engineers should be required, via Executive Order and/or legislation, to prioritize its infrastructure and flood control projects based on genuine risk reduction criteria rather than mere “economic viability” at the margin.

Katrina revealed the astonishing degree to which the Army Corps’ prioritization of flood control and inland navigation projects is *not* risk-based, such that Louisiana could lead the list of states receiving Corps funding in the annual energy and water appropriations bill, but do next to nothing with hundreds of millions of dollars per year to ameliorate its steadily increasing and well-understood vulnerability to a powerful hurricane. Ensuring that the Corps-funded investment priorities faithfully to reflect the most urgent priorities for reducing risks to the public in future disasters must be job one for Congress, the administration, and state and local officials.

Building Healthier, More Sustainable Neighborhoods

For all its charm, New Orleans has long been beset with social, economic, and environmental neglect. Now is the chance to restore the city’s 19th century elegance using the wisdom and technology of the 21st century. That means energy-efficient, weather-resistant housing designed according to voluntary federal standards that save money and improve comfort for people who live there, no matter what their income. And it means family-friendly, mixed-use, mixed-income walkable communities like many affected areas had in earlier days. Planners and developers should take care to avoid unprotected floodplains and areas of the coastline that are fundamentally unstable. This is also an opportunity to relocate dangerous oil and chemical facilities away from residential neighborhoods.

► Engage and empower ordinary citizens to participate in planning and rebuilding efforts. Communities enjoy

more benefits when development planning is inclusive of all citizens. Region-wide planning charrettes, such as the recent “Reality Check” sessions sponsored by the Urban Land Institute in Los Angeles and Washington, D.C., can be powerful tools for sustainable thinking. So can visioning exercises that use computerized imagery to guide citizens through development options at both the neighborhood and regional levels.

► Planners and developers should move hazardous materials storage facilities away from people.

Rebuilding must address planning failures of the past by locating industrial facilities and sites with significant quantities of hazardous materials so that releases are minimized in the event of major storms and/or regional flooding. Industrial facilities that are more likely to experience releases of hazardous substances in the event of flooding should be adequately isolated from residential populations. Robust disaster planning (including release control and containment, decontamination, and evacuation plans) should be put in place, especially for areas where toxics releases are possible in close proximity to residential neighborhoods.

► Planners and developers should build walkable, convenient neighborhoods and emphasize transportation choices.

Planners and developers should follow smart growth principles in rebuilding. Where necessary, remake zoning so that people can live close to jobs and within easy walking distance of neighborhood stores and conveniences. Give priority to restoring, expanding, and enhancing public transit, rail, and other efficient transportation options. Encourage development around transit stops and stations.

Follow development guidelines, such as the recently published draft Leadership in Energy and Environmental Design (LEED) standards for neighborhood development by the U.S. Green Building Council, NRDC, and the Congress for the New Urbanism. Planners should also take care to preserve the cultural and historic resources that make New Orleans and other Gulf Coast communities special, building in ways that complement the region’s assets.

► Planners and developers should integrate affordable housing into neighborhood development.

Build on the rich tradition of diversity in New Orleans and the Gulf region by ensuring that all income levels enjoy the benefits of lively, mixed-income neighborhoods.

► Planners and developers should take advantage of green building design.

Green building techniques save energy and resources while enhancing livability and reducing operating and maintenance costs. They can also save money for the people who live or work in them. Follow LEED standards when constructing and rehabilitating structures. As tens of thousands of homes, office buildings, stores, and other structures will need to be rebuilt, with hundreds of thousands of appliances, heating and cooling systems, and lighting fixtures, both public and private rebuilding efforts should make New Orleans and the other affected Gulf Coast 'Energy-Star Cities,' cities that are models of energy efficiency and renewable energy.

► Congress should create a sustainable development fund.

Create a special fund to assist developers that practice sustainable development by, for example, placing affordable housing utilizing green building techniques near transit stops, or green commercial buildings in the central business district. Create a windfall profits tax on high-priced gasoline sales to capitalize the fund.

► Congress should boost funding for water and wastewater treatment and direct more of it toward green infrastructure and other integrated, sustainable approaches.

We should stop funding or subsidizing sprawl development, environmentally destructive projects, and other expenditures that trade off long-term environmental and economic sustainability for short-term profits. We should integrate greenways, stream buffers, rain gardens, green roofs, and other types of green infrastructure into development plans to reduce stormwater pollution, flooding, and energy costs.

ENSURE NO COMMUNITY DISPROPORTIONATELY SUFFERS FROM POLLUTION

Environmental injustices have plagued New Orleans and the Gulf Coast region for decades. Studies report that facilities generating toxic wastes in this region are more often located near communities of low income and color than other communities.¹² In ordinary times, it is easy for many to ignore the injustice. But with the poorest neighborhoods of New Orleans drowning in a hazardous sea of fuel, sewage, and chemicals, it's impossible not to notice just which of our citizens are paying the ultimate price.

Environmental Justice Issues Are Rife in New Orleans and Storm-Pounded Areas

Although Hurricane Katrina affected all populations, many of the area's low-lying lands—the hardest hit—are in communities of low income and color. For example, the Lower Ninth Ward was one of the most devastated areas of New Orleans. The ward is 98 percent African-American, and 36 percent of its residents live in poverty. As a whole, the Orleans Parish is 67 percent African-American, 21 percent of the households earn less than \$10,000 a year, and nearly 27,000 families are below the federal poverty level (2000 census data).

There is also a history of inequitable post-hurricane cleanup and recovery efforts. For example, hurricanes Betsy and Camille contributed to the formation of a Superfund site at the Agriculture Street Landfill subdivision in New Orleans. The 190-acre landfill received waste from households, construction debris, ash from municipal waste incinerators, and debris from other hurricanes.

Katrina not only exposed some of the region's environmental injustices, but also intensified them. The following are just three examples of disproportionate suffering resulting from Katrina:

■ Oil refinery and petrochemical spills occurred in areas already experiencing environmental injustices, perhaps making parts of the region uninhabitable for years. This raises questions about how cleanup efforts

Melvin Johnson, whose Desire Street home is under four feet of floodwater from Hurricane Katrina, paddles through his old neighborhood to check on a friend who refused to be evacuated. Many of New Orleans' Lower Ninth Ward residents were determined to stay in their homes no matter the difficulties, including toxic water filled with chemicals, fuels, dead bodies, and fecal matter.



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will be prioritized, what the cleanup standards will be, where contaminated soil and debris will be stored, and who will have to live near or on this new contaminated landfill.

■ The hurricane hit at least three Superfund sites that are located near low-income communities of color in New Orleans: Bayou Bonfouca, Madisonville Creosote Works, and Agriculture Street Landfill, which remains underwater. It is unclear whether the flooding disturbed toxic chemicals at these sites, and if so, to what extent.

■ People who did not own vehicles, mostly low-income residents, were less likely to evacuate the region before the storm hit. In fact, many low-income communities lacked any substantial emergency preparedness plans in the event of an accident, or in this case, a natural disaster.

Environmental injustices have plagued New Orleans and the Gulf Coast region for decades.¹³ The New Orleans area is also home to Louisiana's infamous "cancer alley," a region stretching 85 miles up the Mississippi River to Baton Rouge, along which more than 140 oil refineries and petrochemical plants produce a quarter of the nation's petrochemicals.¹⁴ In

fact, more than 50 percent of all Louisiana residents who live within 3 miles of a refinery are African-American—just one more reason why Louisiana, and the greater New Orleans area in particular, has historically been recognized as one of the worst perpetrators of environmental injustices in the region.

With the poorest neighborhoods of New Orleans flooded in a hazardous sea of fuel, sewage, and chemicals, environmental justice leaders throughout the country are viewing the catastrophe as an opportunity to bring environmental justice to the forefront of the nation's attention. Will cleanup and rebuilding funds be distributed equitably among the region's diverse communities? Will areas previously populated by low-income people of color be rebuilt and gentrified so they are no longer affordable? If so, will these displaced communities have to live close to newly created toxic sites?

Reducing Environmental Injustices

To ensure that no new environmental injustices are created, and to avoid exacerbating current environmental injustices, NRDC recommends the following:

► There is an ongoing fear that some of the hard-hit areas will be rebuilt and redeveloped so that low-income

communities of color who previously lived there will be pushed out in favor of new, more profitable development. Local government's exercise of eminent domain powers should not be used to take properties in low-income communities of color for public uses.

► FEMA and the Department of Homeland Security should reaffirm their commitment to their environmental justice requirements under Executive Order 12,898, and they should immediately create new disaster preparedness models that address the needs and realities of low-income persons in every community. Appropriations bills proposed for Katrina relief efforts should contain a provision that prohibits the use of federal funds to contravene or delay the implementation of the Executive Order's requirements.

► The EPA should ensure environmental clean ups are conducted equitably across all communities, environmental cleanup resources are distributed equitably, and that the highest levels of environmentally protective cleanup standards are implemented in all communities.

► The EPA and FEMA should ensure that cleanup and rebuilding efforts are community-driven, with representation from stakeholders that reflect the racial and economic diversity of the region, and that adequate affordable (low-income) housing is integrated in the rebuilding process.

► President Bush should reinstate the wage requirements of the Davis-Bacon Act to ensure that working people desperately trying to rebuild their lives and their communities are paid the federally required prevailing wage. The act requires a minimum pay scale for workers on federal contracts by requiring contractors to pay the average pay in the region. The president waived the act's requirements citing an "emergency situation."

► Rebuilding efforts should increase the availability and accessibility of public transportation, especially in low-income areas where people are less likely to own vehicles.

PROTECT AMERICAN CONSUMERS FROM DISASTER-RELATED ENERGY PRICE SPIKES

Our oil-addicted economy is just too vulnerable to supply disruptions, as anyone who filled up their gas tank the week after Katrina hit discovered. Drilling for more oil off our beaches or in rare, protected wilderness, as many in Congress are now suggesting, is not the answer. It is this old way of thinking that makes America so vulnerable to natural disasters—and other disasters. The solution is to reduce our appetite for oil by improving the fuel economy of our vehicles (which consume 40 percent of our oil) and by relying on smarter, cleaner, and renewable ways to power our economy.

Oil Markets Were Tight Before Katrina

Long before Katrina struck, the entire global oil supply chain, from wellhead to gas tank, was stretched to its absolute limit by rising global demand for fuel. Prices were at levels not seen since the oil embargoes of the 1970s. By temporarily knocking out about 10 percent of U.S. refining capacity and nearly all Gulf oil production, Katrina drove up the prices for both refined gasoline and (more briefly) unrefined petroleum throughout the global marketplace.¹⁵ Consumer frustration quickly mounted, and economists now predict that the Katrina-spurred price spikes are likely to decrease third-quarter U.S. gross domestic product growth by nearly 1 percent.¹⁶

In the middle to long run, Katrina will mostly affect gasoline, rather than oil markets. Average prices for regular gas nationwide jumped about 40 cents because of legitimate supply issues, but also because of a reluctance by retailers to lower prices as quickly as they raise them. Oil markets, on the other hand, calmed as it became clear that most offshore drilling platforms survived intact and the federal government agreed to release oil from the Strategic Petroleum Reserve. Crude prices briefly touched \$70 per barrel before receding to about \$65 per barrel.¹⁷

But the fundamental tension between supply and demand has not gone away. Since 1990, U.S. oil demand has soared 23 percent to about 21 millions

Hurricane Katrina pounded an area vital to America's oil and gas industry at a time when soaring global demand and low inventory levels had already sent oil and gas prices to record levels. Here, motorists push their car to conserve fuel while waiting in line for gasoline on Interstate 10 in Biloxi, Mississippi.



JOE SKIPPER/REUTERS/CORBIS

barrels per day. One reason is average fuel efficiency of new vehicles dropped to 21 miles per gallon in 2005, after having increased dramatically from 13 to 22 miles per gallon between 1975 and 1987.¹⁸ Longer commutes and more cars exacerbate the problem; U.S. vehicle miles traveled have tripled since 1970 to approximately 3 trillion miles per year.¹⁹

And yet we are passing up one opportunity after another to fix the problem. Both the energy and transportation bills passed this summer by Congress—after years of debate—do little to reduce energy demand. In fact, provisions in both bills could actually increase our oil dependence. And just last month, the Bush administration issued complex new fuel economy standards for pickups, sport utility vehicles, and minivans that scarcely budge their poor mileage performance.

A Cleaner, More Effective Path to Economic Security

America simply cannot drill its way out of the problem. To reduce the growing economic and security risks of our oil dependence, we need to make a national commitment to reduce oil dependence, through conservation measures and through investments that increase our efficiency and diversify our fuel sources.

► Congress should make a national commitment to save 2.5 million barrels per day by 2015, and 10 million barrels per day by 2025.

Such a measure passed the Senate twice during the 2003 and 2005 energy bill debate. Both bills included a requirement that the administration save 1 million barrels of oil a day 10 years hence. But both times it was later removed. Congress should set the bar higher and meet this savings commitment by enacting efficiency standards for heavy trucks, tires, and motor oil, and by commercialization incentives for advanced biofuels that can displace gasoline in our cars and trucks as well as additional transit investments and incentives for transit-oriented development. By adopting such a package, Congress will put America on the path to oil independence.

► Congress should encourage growth in the biofuels industry.

Biofuels, ethanol, and other fuels derived from plant material and animal waste have tremendous potential to reduce our oil demand. Produced across the country, biofuels could allow for a much greater geographic diversity of production facilities. Ethanol derived primarily from corn kernels already reduces our gasoline demand by about 2 percent, and

advanced technologies that can make use of crop residues and specialty crops, such as switchgrass and willow and poplar trees, could contribute the equivalent of nearly 8 million barrels of oil per day by 2050 from existing cropland without interfering with food production.²⁰

► Congress should raise fuel economy standards to 40 miles per gallon for light trucks and cars.

Raising fuel economy is cleaner, cheaper, and more effective than building new refineries. A new global-size refinery producing 250,000 barrels of gasoline per day (1 percent of daily demand) would take at least a decade to build and cost about \$4 billion.

Just boosting fuel economy performance standards for light trucks by one mile per gallon per year for five years—would yield savings of 600,000 barrels per day in 2016. This would be more than twice as much as the president's most recent proposal.

By raising fuel economy performance to 40 mpg for light trucks and cars, it would save more than 2 million barrels per day by 2016, the equivalent of eight new large refineries, saving consumers about \$61 billion each year at the pump (assuming a price of \$2.00 per gallon). Because fuel efficiency gains could start to save gasoline before 2016, this strategy would save about 3 billion barrels of gasoline by the time a new refinery could be put into operation. Higher efficiency would eliminate more than 1 million tons of smog-forming and global warming pollution.²¹

CURB GLOBAL WARMING OR FACE EVER MORE INTENSE NATURAL DISASTERS

While no single hurricane can be directly linked to global warming, climate scientists have shown that global warming is raising sea levels and making hurricanes more powerful. In the short term, we should consider global warming pollution issues in decisions on how to rebuild New Orleans and other coastal areas damaged by storms.

But we must start curbing the pollution that causes global warming in order to protect the cities of the

Gulf Coast—and regions all over the globe—from ever increasing dangers.

Global Warming Can Lead to Stronger Hurricanes

Although we cannot prove whether global warming played a role in any particular storm, scientists tell us the odds of stronger hurricanes are increasing as global warming increases ocean temperatures. In fact, two new studies published in *Nature* and *Science* show that hurricanes have become stronger over the past 30 years, with longer durations and stronger winds. Global warming is also causing sea levels to rise. And once global warming pollutants are in the air, their effects on ocean temperatures and sea-level rise are locked in for centuries.

Sea level in the New Orleans region is expected to rise two to five feet in the region by 2100 due to the combined effect of rising waters and the region's continuing subsidence. With no action to curb global warming, hurricanes will be far more destructive and coastal areas far more vulnerable, and the longer we fail to act, the worse the risk of another Katrina becomes.

While no one can undo the ocean warming, and sea-level rise already in the pipeline, our policy choices now will affect how much additional danger is built into the system.

Recommendations for Curbing Global Warming

An adequate response to the Katrina disaster requires immediate relief for its victims and a well-designed rebuilding effort. But it also requires action to prevent a more dangerous climate, driven by global warming. And the prospect of stronger hurricanes has to be considered in the rebuilding plans for New Orleans and the other Gulf Coast communities devastated by Katrina.

► The president and Congress should act now to adopt mandatory limits that slow, stop, and reverse the growth of emissions of carbon dioxide and other global warming pollutants.

Scientists warn of extreme dangers if global average temperatures are allowed to increase by more than

Global warming raises ocean temperatures, and warmer ocean temperatures fuel more powerful storms. Already, water surface temperatures in North America have been significantly above average for a decade. If we do nothing to curb global warming, future hurricanes could hit harder, causing even greater damage than Katrina did to vulnerable oil and transportation infrastructure, such as it did to Mississippi State Highway 90, to homes and businesses—and to human life.



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3.6 degrees Fahrenheit (2 degrees Celsius). Preventing even higher temperatures requires stopping U.S. emissions growth within the next 5 to 10 years and cutting emissions by more than half over the next 50 years, in concert with appropriate action by other countries. Well-designed legislation can meet this environmental objective while reducing U.S. oil dependence and maintaining coal production, and without putting additional pressure on natural gas demand. Global warming legislation can also help the economy transition to new energy technologies, while assisting workers and communities and protecting consumers from energy cost shocks.

NRDC favors a market-based, cap-and-trade program modeled on the highly successful program to control acid rain. Trading of emissions allowances is a proven method to minimize costs and give industry maximum flexibility. With equitable allocation allowances, key industries can be protected, consumer costs held in check, incentives created to speed the deployment of new technologies, and

funds made available to help with post-Katrina restoration and rebuilding.

Carbon emissions cap-and-trade legislation can be structured to give incentives for clean technology, as well as to support adaptation measures (i.e., wetlands restoration) and disaster planning.

► New Orleans and other damaged Gulf Coast communities should be rebuilt with full attention to the future hazards of global warming.

Given stronger storms, sea-level rise, and continued subsidence, New Orleans will not be safe even with levees reconstructed to withstand a category 4 storm. Infrastructure and buildings should be constructed to cope with the combined hazards of sea-level rise and stronger hurricanes. Wetlands restoration plans must take into account sea-level rise, which is expected to submerge 70 percent of existing wetlands by 2100. For the same reason, communities like Gulf Port and Biloxi must consider even greater wind and storm surge risks in rebuilding the coastal areas wiped out by Katrina.

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