

CRS Report for Congress

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Hurricane-Damaged Drinking Water and Wastewater Facilities: Impacts, Needs, and Response

Claudia Copeland
Specialist in Resources and Environmental Policy
Resources, Science, and Industry Division

Summary

Throughout the Gulf Coast region, Hurricane Katrina's high winds and water damaged a wide range of public service facilities, including drinking water supply and treatment and sewage treatment plants, and restoring those facilities is part of the overall cleanup and restoration process. This report describes information that has been gathered about impacts of the August 29 hurricane on drinking water and wastewater treatment facilities and on ongoing efforts to assess damages and needs to repair and reconstruct damaged systems. Facility restorations may take many months, and costs of needed repairs are unknown for now. To meet those needs, affected communities are likely to rely heavily on federal assistance in emergency appropriations acts, as well as traditional water infrastructure programs, principally those administered by the Environmental Protection Agency (EPA) and the U.S. Department of Agriculture. The Senate has passed a bill intended to streamline delivery of funds through existing EPA programs to repair storm-damaged sewage treatment and drinking water plants (S. 1709). Also, legislation has been introduced that would provide hurricane assistance to Louisiana, including \$5 billion for water infrastructure projects (S. 1765/S. 1766, H.R. 3958). This report will be updated as events warrant.

Water Infrastructure Facilities Affected by Hurricane Katrina

Damages at many water infrastructure facilities as a result of Hurricane Katrina included loss of electric power to pump, process, and treat raw water supply and wastewater. Initially following the storm, some plants were able to operate temporarily on backup generators, so long as fuel was available. In addition, flooding disabled services in a number of locations, including New Orleans. Overall, a large number of systems were affected. For example, within a few days after the hurricane, the Environmental Protection Agency (EPA) estimated that more than 1,220 drinking water systems (many of them very small, in terms of customers served) and more than 200 wastewater treatment facilities in Louisiana, Mississippi, and Alabama had been affected.

As electric power was restored, many of the affected systems have been able to restore needed services (especially facilities in Alabama, which was not in the center of the storm's path). Two weeks after Hurricane Katrina, EPA reported that about 30% of the affected drinking water and 40% of the affected wastewater facilities were again operating. However, many of the inoperable drinking water and wastewater plants serve large numbers of customers. In Biloxi, for example, officials were unable to re-pressurize the drinking water system because of broken and inaccessible water mains and valves. One-third of the sewage treatment facilities in Harrison County, Mississippi (serving Biloxi, Gulfport, Long Beach, and Pass Christian) were destroyed or very severely damaged. Similarly, drinking water and sewage service for more than a million customers in New Orleans (discussed below) was severely disrupted.

EPA reported that by October 10 — and following a second hurricane, Hurricane Rita, that hit Texas and parts of Louisiana on September 24 — more than 85% of drinking water and 95% of wastewater treatment facilities in the region were operational.¹ However, as of that date, 131 drinking water systems (67 in Louisiana and 64 in Mississippi) were operating on a boil water notice pending test results to ensure that the water has been restored to standards safe for public consumption, and 175 others (142 in Louisiana and 33 in Mississippi) serving about 200,000 consumers were either inoperable or their status was unknown. All drinking water facilities in Alabama were reported to be operational. In Texas, 45% of drinking water facilities were operational two weeks after Hurricane Rita, and the remainder were operating on a boil water notice, were not operating, or were still being investigated.

Also as of October 10, 22 sewage treatment plants in Louisiana serving more than half a million customers were not operational or were reported to be experiencing operational difficulties. Wastewater plants in Mississippi and Alabama were operational. In Texas, 84% of wastewater treatment plants were operational. Staff of EPA's Water Program are preparing to assess all drinking water and wastewater plants in the region, including more than 900 facilities in Louisiana and Mississippi that are located in areas that were unaffected by Hurricane Katrina.

For damaged facilities, steps involved in restoring service include drying out and cleaning engines and pumps; testing and repairing waterlogged electrical systems; testing for toxic chemicals and harmful bacteria that may have infiltrated pipes and plants; restoring pressure (drinking water distribution systems); activating disinfection units; restoring bacteria needed to treat wastes (wastewater plants); and cleaning, repairing, and flushing distribution and sewer lines.

Impacts of Hurricane Katrina on New Orleans's water system were particularly severe. Some parts of the city did not experience interrupted service, while other parts where water was available were advised that it should only be used for flushing toilets and fighting fires. But in the central portion of the city, in addition to electric power impairments, extensive damage occurred to the water infrastructure from flooding of treatment plants, drinking water distribution lines, collector and interceptor sewers, and

¹ Detailed information, updated often, is available on EPA's Web site at: [<http://www.epa.gov/katrina/activities.html>].

the water system's powerplant.² Even after restoration of electricity, cleanup and recovery at flooded water and sewage treatment plants is likely to take considerable time. The largest of the city's two drinking water plants, located where the worst flooding took place, was completely underwater for nearly two weeks. It was repaired sufficiently to provide flow (i.e., for fire fighting), but may not be providing potable water for weeks, officials say.

For flooded areas, sewage treatment often is the last thing back on line, because plants are at the lowest point of the city and thus under the deepest water. New Orleans's two wastewater treatment plants were damaged: the larger facility, which serves 1.2 million customers, was flooded; the smaller facility, located on the west bank of the Mississippi River, experienced extensive wind damage. The city's public works officials reportedly believe that much of the sewer system has probably been damaged, and cracks will need to be fixed by tearing up roads (although road repairs already may be required, as part of the overall cleanup effort), a potentially lengthy repair process.

Damage and Needs Assessments

Under authority of the National Response Plan,³ EPA and the U.S. Army Corps of Engineers staff are conducting assessments of water infrastructure systems, assisting state and local government personnel to evaluate damages. Efforts to assess facilities continue throughout the region to determine their operating status, including needs to repair or rebuild.

EPA cautions that evaluations are ongoing, and the status of many facilities is unclear (especially small systems), even more than six weeks after Hurricane Katrina. Facilities determined to be operational may not be providing the required level of treatment (for example, some wastewater treatment plants in Alabama and Mississippi are operating at limited capacity or are providing only primary treatment of sewage, not full secondary or better, as required by law and to meet water quality standards). Many of these facilities may still require repair or reconstruction. Facility restorations, full or partial, may take many months, and costs of needed repairs are unknown. On September 23, the American Water Works Association (AWWA) issued a very preliminary estimate that \$2.25 billion will be needed to repair or replace drinking water infrastructure at public water systems that were damaged by Hurricane Katrina. The estimated total is

² Much of the New Orleans water infrastructure was built more than 75 years ago. Even before the hurricane, the Sewerage and Water Board, which is responsible for providing drinking water, sewage treatment, and drainage services to more than one million customers, had a \$1 billion capital improvement program to address long-term maintenance and repair needs, including compliance with a 1998 court-ordered sewer system consent decree

³ Section 502(6) of the Homeland Security Act of 2002 (P.L. 107-296, codified predominantly at 6 U.S.C. §§101-557) authorized the Secretary of Homeland Security to consolidate federal government emergency response plans into a single, coordinated National Response Plan (NRP), the framework to coordinate activities of the federal government with those of state, local, and tribal governments and the private sector. It is organized by 15 Emergency Support Functions, such as public works and engineering, public health, and oil and hazardous materials response, each with a designated coordinator, primary agencies, and support agencies. The text of the NRP is available at: [<http://www.dhs.gov/interweb/assetlibrary/NRPbaseplan.pdf>].

comprised of \$650 million for 885 systems serving fewer than 10,000 persons and mostly using groundwater for their supply, plus \$1.6 billion for 47 systems serving more than 10,000 persons. The estimates were presented with significant caveats, however, because of the limited information available on the extent of actual damage. The incomplete information necessitated AWWA's analysts having to make a large number of assumptions about the severity of damage and repair and replacement needs.⁴

Estimates of needs for reconstructing sewage treatment facilities throughout the region have not been issued. Early in September, Louisiana officials reportedly developed some very preliminary assessments of funding needs and said in a draft report that the state will need \$35 billion to restore the wastewater treatment infrastructure, based on a broad assumption that 50% of the existing treatment plants and 20% of the existing sewage collection systems will need to be rebuilt.⁵

Meeting Needs for Repair and Reconstruction

As previously noted, assessments of needed water infrastructure repairs and associated cost estimates are incomplete for now, but could be substantial for systems that were directly affected. How those communities will pay for repairs represents a challenge to public officials at all levels of government. The 109th Congress has begun to consider how to assist their activities.

At the same time, repairing storm-damaged facilities is the most recent, but not the only, funding needed by water infrastructure systems in the Gulf Coast and elsewhere. Throughout the United States, wastewater and drinking water utilities face significant investment needs to meet the treatment and performance requirements of the Clean Water Act (CWA) and the Safe Drinking Water Act (SDWA). According to the most recent estimates by EPA and states, the nation's public water and wastewater treatment systems need more than \$460 billion over the next 20 years to construct and upgrade facilities in order to comply with those laws and to provide safe and healthy water.⁶ The federal government is unlikely to provide 100% of that amount, and policymakers already are debating how to meet those existing needs, which of course do not reflect additional costs to reconstruct hurricane-damaged structures.

Over the years, Congress has authorized a number of programs to assist local communities in addressing water supply, drinking water, and wastewater treatment problems. These programs generally are intended to aid communities in constructing facilities to comply with federal drinking water regulations and clean water rules to prevent the discharge of harmful levels of sewage wastes into surface waters. They have

⁴ American Water Works Association. "Restoring Public Water Supply Systems in the Aftermath of Hurricane Katrina: A Preliminary Cost Estimate." Sept. 23, 2005.

⁵ Daily Environment Report. "Louisiana Estimates Environmental Cleanup for Katrina Damage Could Cost \$61.5 Billion." No. 178, Sept. 15, 2005, p. A-13.

⁶ U.S. Environmental Protection Agency. *Clean Watersheds Needs Survey 2000 Report to Congress*. August 2003. EPA 832-03-001; *Drinking Water Infrastructure Needs Survey and Assessment, Third Report to Congress*. June 2005. EPA 816-R-04-001. For additional information, see CRS Report RL31116, *Water Infrastructure Needs and Investment: Review and Analysis of Key Issues*, by Claudia Copeland and Mary Tiemann.

different types of financing mechanisms (some provide grants, others authorize loans), various administering agencies, and other differences, such as eligible community size.⁷ These programs comprise the traditional sources of federal assistance that communities use to meet their water infrastructure needs.

Congress also has authorized a number of programs that can provide *emergency* assistance to repair and restore drinking water, wastewater, and related water infrastructure systems and facilities. These include programs administered by the Federal Emergency Management Agency (FEMA), EPA, the Corps of Engineers, and the U.S. Department of Agriculture.⁸ Responding to the 2005 hurricane disasters, the 109th Congress has already provided more than \$62 billion in emergency assistance in P.L. 109-61 and P.L. 109-62. Approximately \$7.8 billion of that amount is targeted for infrastructure repair, but it is not limited to drinking water and wastewater facilities.⁹

Congress additionally may consider other legislation to specifically aid in repairing and rebuilding storm-damaged structures. For example, S. 1765/S. 1766 and H.R. 3958, the Louisiana Katrina Reconstruction Act, seeks \$1.035 billion in appropriations for EPA to provide infrastructure assistance in Louisiana, plus \$4 billion directly to the state of Louisiana for repair, reconstruction, and improvement of storm-affected wastewater and drinking water infrastructure systems. If no additional targeted appropriations are provided for facilities in the Gulf Coast states, as proposed in that legislation, the affected communities are likely to rely heavily on combined resources of federal emergency appropriations and funding under the traditional water infrastructure aid programs, especially those administered nationally by the Department of Agriculture (loan and grant programs for water and waste disposal projects in communities of less than 10,000 persons) and by EPA. Under EPA's programs, authorized in the CWA and the SDWA, federal grants of appropriated funds are used to capitalize state revolving fund (SRF) programs. States, in turn, make loans from the SRFs to local communities for needed drinking water and wastewater projects.

Other legislation introduced in response to Hurricane Katrina includes changes to EPA-administered funding programs, but not additional appropriations. On September 27, the Senate passed S. 1709, the Gulf Coast Emergency Water Infrastructure Assistance Act. It would modify the revolving loan provisions of the Clean Water Act to provide favorable treatment (such as forgiveness of loan principal and extended repayment) for sewage treatment repair or rebuilding projects in Alabama, Mississippi and Louisiana. The Safe Drinking Water Act already includes similar provisions that are not restricted to emergency conditions. S. 1709 would permit those states for two years to provide assistance for wastewater and drinking water projects not included on a state's Intended Use Plan, since many of the systems affected by Hurricane Katrina are believed to not be included in the plans which generally are required before a project can be funded under either the CWA or SDWA. It also would authorize EPA to test private drinking water

⁷ For additional information, see CRS Report RL30478, *Federally Supported Water Supply and Wastewater Treatment Programs*.

⁸ For a review of federal emergency assistance programs, see CRS Report RS22248, *Federal Disaster and Emergency Assistance for Water Infrastructure Facilities and Supplies*, by Claudia Copeland, Mary Tiemann, and Nicole T. Carter.

⁹ U.S. Congress. Senate Budget Committee. "Informed Budgeteer, No. 5." Sept. 12, 2005.

wells affected by Hurricane Katrina for contamination. Privately owned wells that provide drinking water are regulated by states, not EPA, and in most states, owners of private wells are responsible for testing.

In the immediate aftermath of Hurricane Katrina, and subsequently after Hurricane Rita, much attention has been focused on assistance for individual victims and management of the overall response effort. As that effort proceeds and assessments of impacts and needs are refined, Congress may consider other policy options and issues, including with regard to water infrastructure systems.