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HURRICANE PROTECTION

Statutory and Regulatory Framework for Levee Maintenance and Emergency Response for the Lake Pontchartrain Project

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Highlights of [GAO-06-322T](#), a statement for the record to the Committee on Homeland Security and Governmental Affairs, U.S. Senate

Why GAO Did This Study

The greatest natural threat posed to the New Orleans area is from hurricane-induced storm surges, waves, and rainfalls. To protect the area from this threat, the U.S. Army Corps of Engineers (Corps) was authorized by Congress in 1965 to design and construct a system of levees as part of the Lake Pontchartrain and Vicinity, Louisiana Hurricane Protection Project. Although federally authorized, the project was a joint federal, state, and local effort. For the levees in the project, the Corps was responsible for design and construction, with the federal government paying 70 percent of the costs and state and local interests paying 30 percent.

As requested, GAO is providing information on the (1) level of protection authorized by Congress for the Lake Pontchartrain project; (2) authorities, roles, and responsibilities of the Corps and local sponsors with respect to the operation, maintenance, repair, replacement, and rehabilitation of the levees; (3) procedures in place to ensure that responsible parties maintain the levees in accordance with the authorized protection level; (4) authorities, roles, and responsibilities of the Corps and local parties when levees fail or are damaged; and (5) plans, capabilities, and activities that have been developed by the Corps to ensure an adequate emergency response when levees fail.

GAO is not making any recommendations at this time.

www.gao.gov/cgi-bin/getrpt?GAO-06-322T.

To view the full product, including the scope and methodology, click on the link above. For more information, contact Anu K. Mittal at (202) 512-3841 or mittala@gao.gov.

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What GAO Found

Congress authorized the Lake Pontchartrain project to protect the New Orleans area from flooding caused by storm surge or rainfall associated with a hurricane that had the chance of occurring once in 200 years. This was termed as the “standard project hurricane” and represented the most severe combination of meteorological conditions considered reasonable for the region. As hurricanes are currently characterized, the Corps’ standard project hurricane approximately equals a fast-moving category 3 hurricane, according to the Corps.

Agreements between the Corps and four New Orleans levee districts—the local sponsors for the Lake Pontchartrain project—specify that the local sponsors are responsible for operation, maintenance, repair, replacement, and rehabilitation of the levees after construction of the project, or a project unit, is complete. Pre-Katrina, according to the Corps, most of the levees included in the Lake Pontchartrain project had been completed and turned over to the local sponsors for operations and maintenance. The Corps has authority to repair or rehabilitate completed flood control projects if (1) deficiencies are related to the original construction or (2) damage is caused by a flood and the project is active in the Corps’ Rehabilitation Inspection Program. According to internal Corps regulations, federal funds cannot be used for regular operations and maintenance activities.

Both local sponsors and the Corps are required to conduct regular inspections to ensure that levees are properly maintained. If the Corps finds that local sponsors are not properly maintaining the levees, internal Corps regulations outline a series of steps, such as notifying the governor or taking legal action, that the Corps can take to bring the local sponsor in to compliance. Corps inspection reports for 2001-2004 indicate that the completed portions of the Lake Pontchartrain project were maintained at an acceptable level.

When levees fail or are damaged, the Corps has authority to provide a variety of emergency response actions. Specifically, the Corps is authorized to undertake emergency operations and rehabilitation activities and, if tasked by the Federal Emergency Management Agency, to provide disaster response, recovery, and mitigation assistance to state and local governments, as needed. In addition, a Department of Defense manual assigns responsibilities, prescribes procedures, and provides guidance for responding to hazards. State and local roles and responsibilities when levees fail are similar to the Corps’ responsibilities and are described in federal regulations.

The Corps is authorized to prepare for emergency response when levees fail by undertaking disaster preparedness, advance measures, and hazard mitigation activities. The Corps’ New Orleans district has developed an all hazards emergency response plan for the New Orleans area.

Madam Chairman and Members of the Committee:

As you requested, this statement discusses the legislative and statutory framework governing levee maintenance and emergency response activities for the Lake Pontchartrain and Vicinity, Louisiana Hurricane Protection Project. This project, first authorized in 1965, is a joint federal, state, and local effort designed to protect the lowlands in the Lake Pontchartrain tidal basin within the greater New Orleans area from flooding by hurricane-induced sea surges and rainfall. As you know, the effects of Hurricane Katrina breached some of the approximately 125 miles of levees that are part of this project and flooded a large part of New Orleans. The breaches raised numerous questions about the design, construction, operation, and maintenance of the project levees and flood walls. In addition, the human suffering and loss of life resulting from Hurricane Katrina raised questions about the emergency response activities taken before, during, and after the flooding.

For this statement, we did not assess the extent to which the U.S. Army Corps of Engineers (Corps) and local sponsors have complied with the legislative and regulatory requirements. Some aspects of these assessments will be part of our larger ongoing review of the federal response to the Hurricane Katrina disaster, including the levees, which we plan to report on in 2006. Specifically, this statement discusses the (1) level of protection authorized by Congress for the Lake Pontchartrain project; (2) authorities, roles, and responsibilities of the Corps and local sponsors with respect to the operation, maintenance, repair, replacement, and rehabilitation (OMRR&R) of the levees; (3) procedures required to ensure that responsible parties maintain the levees in accordance with the protection level authorized by Congress; (4) authorities, roles, and responsibilities of the Corps and local parties when levees fail or are damaged; and (5) plans, capabilities, and activities that have been developed by the Corps to ensure an adequate emergency response when levees fail. To conduct this work, we obtained and reviewed applicable laws, regulations, guidance, intergovernmental agreements, and other documents. We interviewed Corps personnel from headquarters, the Mississippi Valley Division, and the New Orleans District to obtain their perspectives on these issues. We performed the work reflected in this statement between October and December 2005 in accordance with generally accepted government auditing standards.

In summary:

- The Lake Pontchartrain project was authorized in 1965 to protect New Orleans and the surrounding area from flooding associated with a “standard project hurricane.” A standard project hurricane was expected to occur once in 200 years and represented the most severe combination of meteorological conditions considered characteristic for the region. When Congress authorized the Lake Pontchartrain project, the current Saffir-Simpson Scale used by the National Weather Service to categorize hurricanes by intensity did not exist. According to the Corps, a standard project hurricane is roughly equivalent to a fast-moving category 3 hurricane on the Saffir-Simpson Scale.
- Agreements between the Corps and local sponsors of the Lake Pontchartrain project specify that, when a project unit is complete, it will be turned over to the local sponsors for operation, maintenance, repair, replacement, and rehabilitation. According to the Corps, prior to Katrina, all but three sections of the project that make up the Lake Pontchartrain project had been completed and turned over to the local sponsors for operation and maintenance.
- The Corps has the authority to repair or rehabilitate a flood control project if (1) deficiencies are identified that are the result of the original construction or (2) damage occurred from a flood and the project is active in the Corps’ Rehabilitation Inspection Program. The Lake Pontchartrain project was active in the Rehabilitation Inspection Program prior to Hurricane Katrina.
- Corps district and division employees are to oversee the OMRR&R activities of the local sponsors through annual inspections. If, in the course of these oversight activities, the Corps finds that a local sponsor is not properly maintaining the levees, Corps regulations outline a series of steps that the Corps can take to bring the local sponsor back into compliance. These steps include notifying the local sponsor or state governor, or initiating legal action against the local sponsor if other steps do not result in compliance. Based on Corps inspection reports from 2001 through 2004, all completed project units of the Lake Pontchartrain project were inspected annually and considered in acceptable condition.
- In the event that levees fail or are damaged, the Corps has authority to provide a variety of emergency response actions. These actions include emergency operations, such as providing personnel and materials needed for flood fighting, and rehabilitation of damaged levees.

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- The Corps is also authorized to take actions in advance of disasters to ensure an adequate emergency response if levees fail. These actions are (1) disaster preparedness, including developing emergency response plans and training personnel to respond to emergencies; (2) advance measures, including providing supplies, equipment, and contracting for the construction of temporary and permanent flood control projects; and (3) hazard mitigation activities, which are intended to help prevent or reduce the possibility of a disaster, or reduce its damaging effects by identifying lessons learned after the event. Although we have not evaluated the Corps' efforts, Corps officials told us that they employed these authorities in preparing for the potential flooding that was predicted from Hurricane Katrina. In addition, after the levees were breached, the Corps used its response and rehabilitation authorities to provide flood-fighting assistance and to begin the repair and restoration of the levees.

Background

Since its founding in 1718, the city of New Orleans and its surrounding areas have been subject to numerous floods from the Mississippi River and hurricanes. The greater New Orleans area, composed of Orleans, Jefferson, St. Charles, St. Bernard, and St. Tammany Parishes, sits in the tidal lowlands of Lake Pontchartrain and is bordered generally on its southern side by the Mississippi River. Lake Pontchartrain, a tidal basin of some 640 square miles, is connected with the Gulf of Mexico through Lake Borgne and the Mississippi Sound.

The greatest natural threat posed to the New Orleans area is from hurricane-induced storm surges, waves, and rainfalls. Because of this threat, a series of control structures, concrete flood walls, and levees was proposed for the area along Lake Pontchartrain in the 1960s. Congress first authorized the construction of the Lake Pontchartrain and Vicinity, Louisiana Hurricane Protection Project in the Flood Control Act of 1965¹ to provide hurricane protection to areas around the lake in Orleans, Jefferson, St. Bernard, and St. Charles Parishes. Although federally authorized, the project was a joint federal, state, and local effort. The Corps was responsible for project design and construction of the approximately 125 miles of levees, with the federal government paying 70 percent of the costs, and state and local interests paying 30 percent. Each of the four parishes protected by the project is associated with a local levee district that is generally composed of state-appointed officials and is

¹Pub. L. No. 89-298, § 204, 79 Stat. 1073, 1077 (1965).

considered a state entity. Specifically, Orleans Parish is associated with the Orleans Levee District, Jefferson Parish is associated with the East Jefferson Levee District, St. Bernard Parish is associated with the Lake Borgne Levee District, and St. Charles Parish is associated with the Pontchartrain Levee District. These levee districts are the local sponsors of the project, and their responsibilities include ensuring the integrity of the levee system in their districts throughout the year.

Level of Protection Authorized by Congress

Congress authorized the Lake Pontchartrain project in 1965, substantially in accordance with a Chief of Engineers report, to protect the areas around the lake from flooding caused by storm surge or rainfall associated with a standard project hurricane. For the coastal region of Louisiana, a standard project hurricane was expected to have a frequency of occurrence of once in about 200 years, and represented the most severe combination of meteorological conditions considered reasonably characteristic for the region. According to the Chief of Engineers report, a standard project hurricane was selected as the design hurricane because of the urban nature of the area.²

When Congress authorized the Lake Pontchartrain project, the 1 through 5 scale—known as the Saffir-Simpson Scale—that is currently used by the National Weather Service to categorize hurricanes from lowest to highest intensity did not yet exist. According to the Corps, the standard project hurricane used for the Lake Pontchartrain project would roughly equal a fast-moving category 3 hurricane on the Saffir-Simpson Scale. In fact, the standard project hurricane for coastal Louisiana approximates the storm surge of a category 3 hurricane, the wind speed of a category 2 hurricane, and the barometric pressure at the center of a category 4 hurricane.³ Table 1 compares the coastal Louisiana standard project hurricane parameters to which the Lake Pontchartrain project was designed with the parameters for category 2, 3, and 4 hurricanes on the Saffir-Simpson Scale.

²H.R. Doc. No. 231, 89th Cong., 1st Sess. (1965).

³Barometric pressure is a key indicator of a hurricane's intensity. The lower a hurricane's barometric pressure, the greater the wind speed and, therefore, the storm surge.

Table 1: Comparison of Standard Project Hurricane Parameters for Coastal Louisiana with Category 2, 3, and 4 Hurricane Parameters

	Standard project hurricane for coastal Louisiana	Saffir-Simpson category 2 hurricane	Saffir-Simpson category 3 hurricane	Saffir-Simpson category 4 hurricane
Central pressure ^a	27.6 Hg	28.50–28.91 Hg	27.91–8.47 Hg	27.17–27.88 Hg
Wind speed ^b	100 mph	96–110 mph	111–130 mph	131–155 mph
Radius of maximum winds ^c	30 miles	N/A	N/A	N/A
Average forward speed ^c	6 knots	N/A	N/A	N/A
Storm surge	11.2–13 feet ^d	6–8 feet	9–12 feet	13–18 feet

Source: GAO analysis of Corps and National Oceanic and Atmospheric Administration data.

Notes: The shaded areas indicate those parameters on the Saffir-Simpson Scale that are most closely aligned with those for the standard project hurricane.

^aCentral pressure is measured in inches of mercury (Hg) or millibars.

^bWind speed for the standard project hurricane was measured as the maximum 5-minute average wind speed. The Saffir-Simpson Scale uses the maximum 1-minute average wind speed, a lower threshold.

^cThe Corps estimated the radius of maximum winds and the average forward speed for a standard project hurricane, and the Saffir-Simpson Scale does not take either of these parameters into account.

^dThe standard project hurricane calculated maximum surge heights for different geographic areas within the Lake Pontchartrain area. The maximum surge height for the South Shore of Lake Pontchartrain—where the 17th Street, London, and Industrial Canals are located—was estimated at 11.2 feet.

At landfall, which was approximately 60 miles southeast of New Orleans, Hurricane Katrina had a central pressure of 27.17 Hg and a wind speed of 140 mph. Wind speeds in New Orleans, which was west of the eye of Hurricane Katrina, reached just over 100 mph. According to the National Oceanic and Atmospheric Administration’s National Climatic Data Center, data on other Hurricane Katrina parameters are not readily available for several reasons, including the destruction of certain buildings and monitoring equipment and would have been used to measure storm surge.

Authorities, Roles, and Responsibilities for Operating and Maintaining the Levees

Consistent with federal law, agreements between the Corps and local sponsors of the Lake Pontchartrain project specify that local sponsors are responsible for operation, maintenance, repair, replacement, and rehabilitation of the levees when the construction of the project, or a project unit, is complete.⁴ However, the Corps has authority to (1) repair the project if deficiencies are the result of the original construction⁵ and (2) rehabilitate the project, if damage resulted from a flood and the project is active in the Corps' Rehabilitation Inspection Program.⁶ Corps district and division employees are to oversee OMRR&R activities performed by the local sponsors on an annual basis.

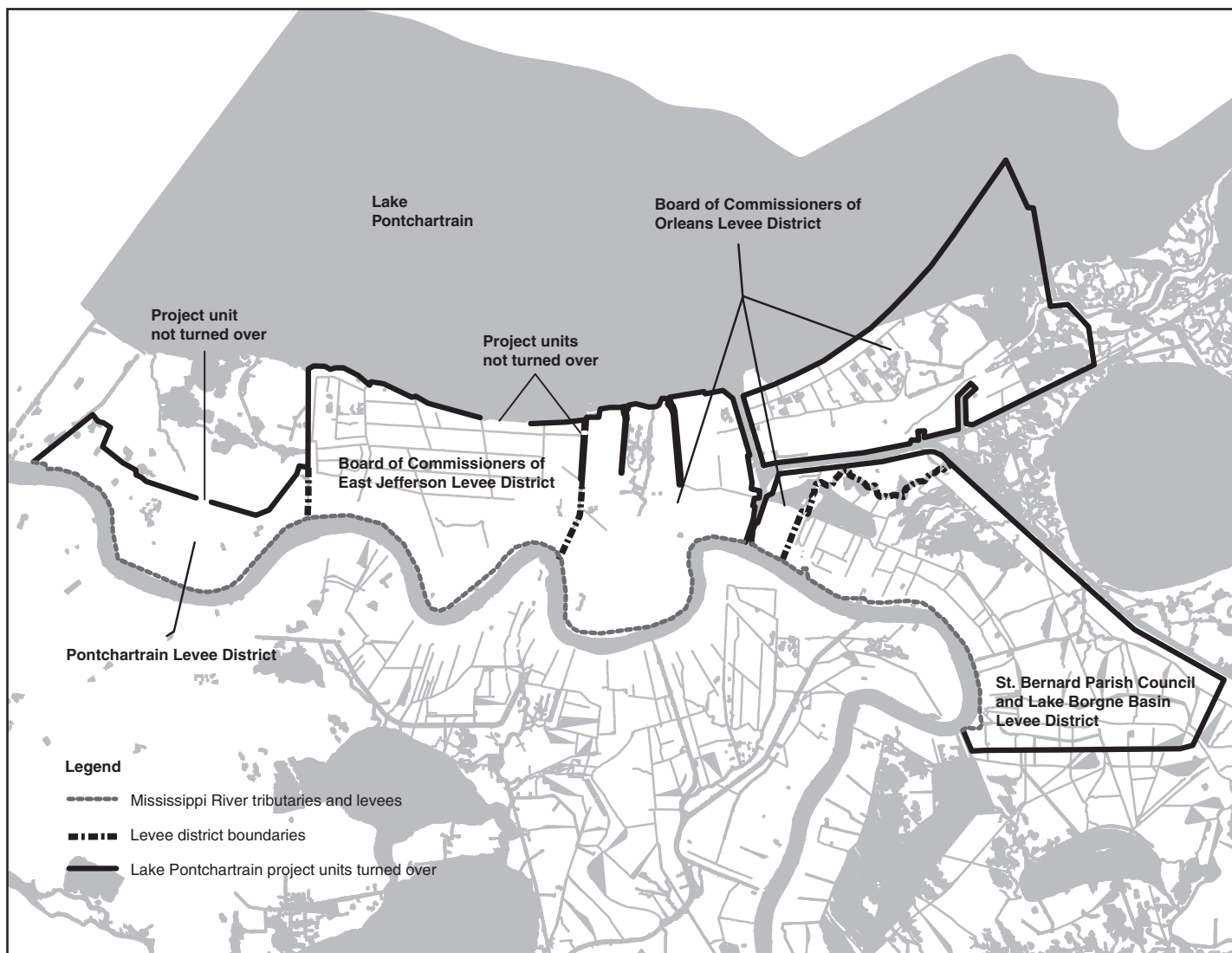
Once construction of Lake Pontchartrain project units were completed, the Corps was to transfer these project units to the local sponsors for OMRR&R. These sponsors include the Orleans, East Jefferson, Lake Borgne, and Pontchartrain levee districts. Although the Corps has not yet provided us with dates on when the project units for the Lake Pontchartrain project were completed, after Hurricane Katrina, the Corps' New Orleans District and the Department of Defense's Task Force Guardian determined, based on three criteria, that almost the entire Lake Pontchartrain hurricane project had been turned over to local sponsors for ongoing OMRR&R responsibilities. The criteria used to make this determination were (1) if the project unit was completed in accordance with the designed level of protection specified in the project decision document, (2) if the project unit was being operated and maintained by the local sponsor, and (3) if the project unit had passed the annual Inspection of Completed Works in accordance with Corps regulations. Based on this evaluation, the task force determined that only three project units—a bridge over the 17th Street canal, a project unit in Jefferson Parish, and a project unit in St. Charles Parish—had not yet been completed and turned over to the local sponsors. Figure 1 shows the three project units that have not been completed and turned over to the local sponsors.

⁴33 U.S.C. § 2213(j).

⁵Corps Regulation No. ER 1165-2-119.

⁶Corps Regulation No. ER 500-1-1.

Figure 1: Status of Completion and Turnover for Project Units in the Lake Pontchartrain and Vicinity Project



Sources: GAO; U.S. Army Corps of Engineers.

While the assurances signed by local sponsors do not define project completion, internal Corps regulations provide that completed projects or completed project units will normally be turned over when all construction, cleanup work, and testing of mechanical, electrical, and other equipment are complete and the project is in proper condition for

the assumption of operation and maintenance by the local sponsors.⁷ Transfer is to be accomplished through a formal notice from the Corps to the local sponsor that includes a transfer date determined by the Corps' district engineers. According to Corps officials, the formal notice generally is in the form of a letter to the local sponsor.

According to internal Corps regulations, upon transfer of a completed project to the local sponsors, the Corps may no longer expend federal funds on construction or project improvements.⁸ If the Corps determines that unsatisfactory conditions have developed as a result of the original levee construction, the Corps may undertake corrective action.⁹ For example, a Corps district official responsible for operations and maintenance oversight told us that if settlement of a completed levee occurs, this is not considered a design or construction flaw. Instead, this is considered a condition that should be addressed by the local sponsors as part of their normal operations and maintenance responsibilities.

Local sponsors' responsibilities for OMRR&R of the completed portions of the Lake Pontchartrain project were established through local assurances signed by the levee districts and the Corps. For the Lake Pontchartrain hurricane project as constructed, these assurances were signed, and subsequently accepted by the federal government for the Orleans Levee District on June 21, 1985; the Pontchartrain Levee District on August 7, 1987; the East Jefferson Levee District on December 21, 1987; and the Lake Borgne Basin Levee District on December 7, 1977. The formal assurances commit the local sponsors to, among other things, operate and maintain all features of the project in accordance with Corps regulations. Also, in accordance with internal Corps regulations, the Corps is required to provide local sponsors with an operations and maintenance manual at the time of, or at the earliest practicable date after, the transfer of OMRR&R responsibilities from the Corps to local sponsors for a completed project or project unit. The manual is intended to assist the responsible local authorities in carrying out their operation and maintenance obligations. According to Corps officials, the OMRR&R responsibilities for levees are straightforward, and the manual that the Corps provides local sponsors is a one-page document that outlines the requirements as described by

⁷Corps Regulation No. ER 1150-2-301.

⁸Corps Regulation No. ER 1150-2-301.

⁹Corps Regulation No. ER 1165-2-119.

federal regulations.¹⁰ Specifically, federal regulations require local sponsors to ensure that the structure is operating as intended and to continuously patrol the structure during flood periods to ensure that no conditions exist that might endanger the structure and to take immediate steps to control any condition that might endanger it. For maintenance, the regulations require local sponsors to ensure at all times that the structure is serviceable in times of flood. The regulations also require periodic inspections and maintenance measures, including the following:

- promoting the growth of sod, including routine mowing of the grass and weeds;
- exterminating burrowing animals;
- removing drift material or wild growth from the levee (such as brush and trees); and
- repairing any damage to the levee caused by erosion.

Repair, replacement, and rehabilitation are also considered part of the local sponsors' maintenance responsibilities, as outlined in internal Corps regulations. Repair refers to routine activities that maintain the project in well-kept condition; replacement refers to replacing worn-out elements; and rehabilitation refers to activities necessary to bring a deteriorated project back to its original condition. According to internal Corps' regulations, local sponsors' maintenance is considered to be deficient when these requirements have not fulfilled.¹¹

Corps employees are to oversee local sponsors' OMRR&R activities to ensure compliance and project integrity. Corps employees are required to work directly with local sponsors to conduct annual compliance inspections; review local sponsors' semiannual compliance reports; and respond to engineering concerns, maintenance questions, and reports of problems. A Corps district official responsible for operations and maintenance oversight told us that generally the Lake Pontchartrain project's local sponsors have performed their operations and maintenance

¹⁰33 C.F.R. § 208.10. According to Corps officials, the Corps has provided local sponsors with specific operations and maintenance manuals for the Bienvenue and Dupre floodgate structures in the Lake Pontchartrain project.

¹¹Corps Regulation No. ER 1130-2-530.

responsibilities as required and have been responsive to the Corps' concerns. Because the New Orleans district is part of the Mississippi Valley Division of the Corps, the division also has responsibility for managing and overseeing the periodic inspections conducted by district engineers; reviewing and approving district engineers' inspection reports; maintaining a database of information on inspections and remedial measures taken; and receiving annual OMRR&R summary reports from the districts under its command, aggregating these reports, and sending them to Corps headquarters.

Federally authorized flood control projects, such as the Lake Pontchartrain project, are eligible for 100 percent federal rehabilitation if damaged by a flood as long as these projects are active in the Corps' Rehabilitation Inspection Program (rehabilitation program).¹² To maintain active status in this program, the Lake Pontchartrain project's levees are required to pass an annual OMRR&R inspection conducted jointly by the Corps, the local sponsor, the state Department of Transportation and Development, and other stakeholders, as appropriate.¹³ According to the Corps' inspection reports from 2001 through 2004, all completed project units of the Lake Pontchartrain project were inspected each year and had received an acceptable rating.

Procedures to Ensure That Levees Are Properly Maintained

Both local sponsors and the Corps are required to conduct oversight activities to ensure that levees are properly maintained. If, in the course of these oversight activities, the Corps finds that the local sponsors are not properly maintaining the levees, internal Corps regulations outline a series of steps that the Corps can take until the local sponsor comes into compliance.

Local Sponsors' Oversight Activities

Federal regulations require that local levee districts are to appoint a permanent committee, headed by a superintendent, that will be responsible for all levee operation and maintenance activities and

¹²Locally authorized flood control projects can also participate in the rehabilitation program. If active, locally authorized projects are damaged in a flood emergency, the cost of rehabilitation is shared between the local authority and the federal government—20 percent and 80 percent, respectively. 33 C.F.R. § 203.82(f).

¹³For projects other than levees that have mechanical or electrical parts, such as locks, floodgates, drainage structures, and pumping stations, periodic engineering inspections are also performed.

inspections of federally constructed flood control projects.¹⁴ The superintendent of the levee district is responsible for performing periodic inspections of the levee to ensure that routine maintenance responsibilities have been effectively completed and that no hazards to the levee exist. Typically, these inspections take place prior to the flood or hurricane season, immediately following a high-water period, and at other intermediate periods throughout the year. During an inspection, the superintendent is required to examine and be certain, among other things, that

- drainage systems are in good working condition and not becoming clogged;
- no unusual settlement or material loss of grade or levee cross section has taken place;
- cattle guards and gates are in good condition;
- the protective walls surrounding the levee have not been washed out or removed;
- the levee crown is shaped to drain readily;
- no unauthorized vehicular traffic or cattle grazing has occurred;
- no water seepage or saturated areas are occurring; and
- levee access roads are being properly maintained.

If, during these inspections, the superintendent discovers any levee portion to be in substandard condition, it is the levee district's responsibility to take immediate actions to correct the inadequacy. The superintendent is required to submit a report twice a year to the Corps District Engineer covering inspection, maintenance, and operation activities of the levee district. At this time, we have not examined the extent to which these steps were taken by the local sponsors, and the Corps has not provided us any documentation of such activities.

¹⁴33 C.F.R. § 208.10(a)(2).

The Corps' Oversight Activities

The Corps is responsible for overseeing the OMRR&R activities of the Lake Pontchartrain project's local sponsors through an annual compliance inspection program—known as the Inspection of Completed Works program—and reviewing the local sponsors' semiannual reports on OMRR&R activities submitted to the district office. According to internal Corps regulations, the primary purposes of the Inspection of Completed Works program are to prevent loss of life and catastrophic damages, preserve the value of the federal investment, and encourage local sponsors to bear responsibility for their own protection. According to Corps officials, for the Lake Pontchartrain project, the New Orleans District typically completes this annual compliance inspection prior to the hurricane season, in mid-May to early-June of each year. Our review of Corps inspection reports for 2001 through 2004 indicate that while inspections of the Lake Pontchartrain hurricane protection levees in the Orleans and St. Bernard Parishes were generally conducted in May of each year, the inspections of the levees in Jefferson and St. Charles Parishes were generally conducted in the September to November timeframe.¹⁵ According to the Corps, these inspections are to cover the following items:

- level of protection,
- erosion control,
- slope stability,
- animal control,
- unwanted vegetative growth,
- concrete surfaces, and
- structural foundations.

Based on the results of these inspections, the district and division are to characterize the inspected units on a scale from 1 to 3, where 1 means that the project units have been maintained in accordance with the agreement between the Corps and the local sponsors and are expected to perform as

¹⁵ According to Corps officials, the majority of the protection in the Jefferson and St. Charles Parishes is flood protection along the Mississippi River as opposed to hurricane protection. Therefore, inspections are done prior to the high-water period on the Mississippi River.

designed, and 3 means that the project units have maintenance deficiencies such that the project would probably fail during floods of project design or lesser magnitudes. Within 120 days of an inspection, the district is expected to prepare an inspection report and provide it to its commanding unit. For example, the New Orleans District should prepare an inspection report for the Lake Pontchartrain project and forward it to the Mississippi Valley Division for review and approval. Reports that indicate maintenance deficiencies are also to be submitted annually to headquarters. All of the completed units of the Lake Pontchartrain hurricane levees passed with an acceptable rating for the period 2001 through 2004.

If a project receives a rating of 3 as a result of an inspection, internal Corps regulations¹⁶ outline a progression of steps that the Corps can take to ensure that local sponsors fulfill their OMRR&R responsibilities and bring the levees back up to the designed level of protection. The steps are as follows:

- Notify the sponsor orally of the deficiencies.
- Notify the sponsor in writing.
- Write a letter to the governor and the appropriate state agencies—which, in the case of the Lake Pontchartrain project, is the Department of Transportation and Development in Louisiana—to enlist state participation to resolve the problem.
- Notify the Federal Emergency Management Agency (FEMA) of the condition of the project.
- If acceptable actions are not taken by the nonfederal sponsor, take actions to remove the project from eligibility for federal emergency rehabilitation.
- Initiate legal action against the local sponsor to enforce OMRR&R obligations as outlined in local assurances.
- Transmit a report to the Congress recommending authorization of a new sponsor or reauthorization of the project along with measures to eliminate hazards.

¹⁶Corps Regulation No. ER 1130-2-530.

Although not documented in the annual inspection reports, according to Corps officials, almost all past Lake Pontchartrain project deficiencies have been resolved upon oral notification of the local levee district. The official responsible for the Inspection of Completed Works program in New Orleans only could recall one or two instances when the Corps wrote a letter to a local sponsor requesting that the sponsor commit resources to repair a deficiency, which resulted in full compliance by the local sponsor. Internal Corps regulations specifically prohibit the use of federal funds to correct problems caused by a lack of adequate local maintenance.

Authorities, Roles, and Responsibilities When Levees Fail

The Corps has authority to provide a variety of emergency response actions when levees fail or are damaged. Section 5 of the Flood Control Act of 1941, as amended, commonly referred to as Public Law 84-99, authorizes the Corps to conduct emergency operations and rehabilitation activities when levees fail or are damaged.¹⁷ In addition, under the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended, the Corps and other federal agencies may be tasked by FEMA to provide disaster response, recovery, and mitigation assistance to state and local governments.¹⁸ Furthermore, a Department of Defense Manual for Civil Emergencies assigns responsibilities, prescribes procedures, and provides guidance by which the Department of Defense responds to all hazards in accordance with the Stafford Act.¹⁹ Although we have not evaluated the Corps' efforts, Corps officials told us that after the levees were breached the Corps used its response and rehabilitation authorities to provide flood-fighting assistance and to begin the repair and restoration of the levees. State and local roles and responsibilities when levees fail are similar to the Corps' responsibilities and are also described in federal regulations.²⁰

Public Law 84-99

Public Law 84-99 authorizes the Corps to conduct emergency operations and rehabilitation activities when levees fail or are damaged during storms

¹⁷33 U.S.C. § 701n. The Corps' administrative policies, guidance, and operating procedures for natural disaster preparedness, response, and recovery activities are set out in 33 C.F.R. part 203.

¹⁸42 U.S.C. § 5121 *et seq.*

¹⁹DOD 3025.1-M (June 1994).

²⁰33 C.F.R. § 203.14.

or other events. Federal regulations specify that assistance is limited to providing emergency assistance to save lives and protect property, such as public facilities/services and residential, commercial, or industrial developments.²¹ This emergency assistance may be provided during and following a flood or coastal storm. However, under federal regulations, nonfederal interests must fully utilize their own resources, including manpower, supplies, equipment, and funds before Corps assistance may be provided.²² The National Guard, as part of the state's resources when it is under state control, must be fully utilized as part of the nonfederal response. According to federal regulations, the Corps is not to use funds to reimburse local authorities for the costs of these emergency activities.²³

To implement flood response operation authorities under Public Law 84-99, internal Corps regulations specify that Corps district commanders must issue a Declaration of Emergency. The Declaration of Emergency may initially be verbal, but must be made in writing and reported in the district's situation report within 24 hours. Authority to issue a Declaration of Emergency has been delegated to deputy district engineers and includes all supervisors in the chain of command, from the district commander to the chief of emergency management.

Emergency operations include flood response and postflood response activities.

- *Flood response* includes activities such as flood fighting and rescue operations. These activities include providing technical assistance, such as review and recommendations in support of state and local efforts and help determining feasible solutions to uncommon situations, and direct assistance by
 - issuing supplies;
 - conducting rescue operations;
 - directing flood-fighting operations; and

²¹33 C.F.R. § 203.32. The regulations also specify that the Corps is not authorized to provide assistance to individual homeowners and businesses.

²²33 C.F.R. § 203.14.

²³33 C.F.R. § 203.32.

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- contingency contracting for emergency operations.

Corps assistance during flood-fighting operations is to be temporary to meet the immediate threat and to supplement state and local efforts. This assistance is not intended to provide permanent solutions to flood problems and should be terminated when the emergency is over—for example, when flood waters have receded sufficiently.

- *Postflood response* includes emergency debris removal, temporary restoration of critical transportation routes and public services and utilities, and after action review and reporting.

Rehabilitation activities include the repair and restoration of eligible flood control projects and federally constructed hurricane or shore protection projects. Rehabilitation assistance is limited to federal and nonfederal flood control works that are in active status—those found to be properly maintained during inspections—in the Corps’ Rehabilitation Inspection Program at the time of the hurricane, storm, or flood event.²⁴

Rehabilitation assistance is limited to repair or restoration of a flood control work to its predisaster condition and level of protection (e.g., the actual elevation of the levee, allowing for normal settlement).²⁵ Any damage to federally constructed levees are repaired with 100 percent of the cost borne by the federal government; and damage to nonfederally constructed levees are repaired with 80 percent of the cost borne by the federal government and 20 percent by the local sponsor.²⁶ Because the Lake Pontchartrain project is federally constructed and was active in the Corps’ Rehabilitation Inspection Program, the Corps is authorized to rehabilitate any levees that failed or were damaged as a result of Hurricane Katrina, using this authority. Additionally, in the aftermath of Hurricane Katrina, the Assistant Secretary of the Army for Civil Works agreed to rehabilitate all of the damaged Lake Pontchartrain and other hurricane and flood control structures in the New Orleans area without any local

²⁴33 C.F.R. § 203.41.

²⁵Corps Regulation No. ER 500-1-1.

²⁶Corps Regulation No. ER 500-1-1.

cost share, under emergency authority provided in statute.²⁷ Further, the federal government will fund the acquisition of lands, easements, rights-of-way, and disposal or borrow areas not owned or under control of the nonfederal sponsor, as well as the performance of relocations, that are needed for the rehabilitation and that are normally local responsibilities. The Corps estimates that funding these activities for the Lake Pontchartrain project will cost the federal government an additional \$10 million and over \$248 million in total for all damaged levee systems in the New Orleans area.

Stafford Act

The Stafford Act, as amended, authorizes federal agencies, including the Corps, to take emergency response actions when the President has issued a major disaster declaration. Under the act, a presidential declaration may be made after receiving a request from the governor of the affected state.²⁸ FEMA, within the Department of Homeland Security, is responsible for administering the major provisions of the Stafford Act. Actions taken under this authority include disaster response, recovery, and mitigation assistance to supplement state and local efforts.

To meet its obligations for emergency response, the Department of Homeland Security developed a National Response Plan, which describes the roles and responsibilities of various federal agencies.²⁹ Within the National Response Plan, the Department of Defense has responsibility for Emergency Support Function #3—Public Works and Engineering. The plan designates the Corps as the operating agent for this function, to include planning, preparedness, and response, with assistance to be provided by other branches of the Department of Defense, as needed.

The National Response Plan lists the following activities for the Corps:

²⁷33 U.S.C. § 701n. According to the Corps, local sponsors requested that the Corps undertake this work at full federal expense due to the unprecedented damage and impacts to local governments and the inability of the local sponsors to finance their share of the costs. According to the Corps, the Assistant Secretary of the Army for Civil Works approved the request with the concurrence of the Office of Management and Budget and notified the House and Senate Appropriations Subcommittees on Energy and Water Development.

²⁸42 U.S.C. § 5170.

²⁹The Department of Homeland Security developed the National Response Plan in response to a presidential directive, HSPD-5.

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- coordination and support of infrastructure risk and vulnerability assessments;
 - participation in preincident activities, such as prepositioning assessment teams and contractors;
 - participation in postincident assessments of public works and infrastructure to help determine critical needs and potential work loads;
 - implementation of structural and nonstructural mitigation measures to minimize adverse effects or fully protect resources prior to an incident;
 - execution of emergency contracting support for life-saving and life-sustaining services, to include providing potable water, ice, emergency power, and other emergency commodities and services;
 - providing assistance in monitoring and stabilizing damaged structures, and demolishing structures designated as immediate hazards to public health and safety, and providing structural specialist expertise to support inspection of mass care facilities and urban search and rescue operations;
 - providing emergency repair of damaged infrastructure and critical public facilities, and supporting the restoration of critical navigation, flood control, and other water infrastructure systems;
 - managing, monitoring, and providing technical advice in the clearance, removal, and disposal of debris from public property and the re-establishment of ground and water routes into impacted areas; and
 - implementing and managing FEMA's Public Assistance Program and other recovery programs involving federal, state, and tribal officials, including efforts to permanently repair, replace, or relocate damaged or destroyed public facilities and infrastructure.

**Department of Defense
Manual for Civil
Emergencies**

A Department of Defense Manual For Civil Emergencies assigns responsibilities, prescribes procedures, and provides guidance by which the Department of Defense responds to all hazards in accordance with the Stafford Act. The policy states that commanders may conduct disaster relief operations when a serious emergency or disaster is so imminent that waiting for instructions from higher authority would preclude effective response. According to the policy, commanders may do what is required and justified to save human life, prevent immediate human suffering, or lessen major property damage or destruction. Action taken in accordance

with the policy is limited to 10 days. A Corps commander providing assistance to civil authorities under this guidance is not required to obtain an agreement for reimbursement from the requesting agency before providing assistance.

Planned Emergency Response Activities

The Corps is authorized by Public Law 84-99 to prepare for emergency response when levees fail by undertaking disaster preparedness, advance measures, and hazard mitigation activities. Although we have not evaluated the Corps' efforts, Corps officials told us that they took action in advance of Hurricane Katrina to prepare for the potential flooding that was predicted. As part of this effort, according to Corps officials, the Corps' New Orleans district used a draft hurricane preparedness plan for the New Orleans area.

Disaster Preparedness

Corps division and district commanders are responsible for providing immediate and effective response and assistance prior to, during, and after emergencies and disasters. Although we have not reviewed the extent to which the Corps undertook these initiatives during the Katrina disaster, the Corps is responsible for the following:

1. *Creating an emergency management organization.* Division and district commanders are expected to provide adequate staffing for a readiness/emergency management organization to accomplish the preparedness mission. In addition, divisions and districts should have teams readily available to provide assistance under the Corps' authorities for flood emergencies and other natural disasters; execute responsibilities and missions under the Stafford Act and the National Response Plan; staff a Crisis Management Team, consisting of an Emergency Manager and senior representatives from technical and functional areas to provide guidance and direction during emergency situations; and staff a Crisis Action Team, consisting of the personnel necessary to operate an emergency operations center.
2. *Establishing and maintaining plans and procedures.* Corps headquarters, divisions, and districts are expected to prepare and maintain plans for emergencies and disasters, establishing an alternate emergency operations center, and reconstituting the district. These operation plans should cover emergency/disaster assistance procedures under all applicable authorities and potential mission assignments. Each division and district should have, at a minimum, an operation plan that provides procedures for generic disasters within the division and district. The plan should include general topics, such

as activating, staffing, and operating the emergency operations center; reporting requirements; notification and alert rosters; and organizing for response to disasters. The plan should also have one or more appendixes that specifically address the disasters most likely to impact the division and district. Operation plans are reviewed and updated annually to reflect administrative changes. The division/district's generic or principal disaster operation plan is supposed to be reviewed, revised, and republished biennially.

3. *Training personnel for response.* Divisions and districts are expected to ensure that personnel who are assigned emergency assistance responsibilities have been properly trained.
4. *Conducting exercises.* Exercises are to be conducted at least once every two years, consistent with available funding. This requirement may be waived if an actual emergency response was conducted during the two-year period that was of sufficient magnitude to have adequately trained emergency team members and other personnel.
5. *Establishing adequate command and control facilities.* Divisions, districts, and other Corps groups should provide a dedicated facility for an emergency operations center that will be able to provide command and control for emergency/disaster response and recovery activities.
6. *Maintaining supplies, tools, and equipment.* Divisions and districts are expected to maintain equipment and supplies that can be readily available for use by the emergency operations center, disaster field offices, disaster field teams, planning response teams, and similar entities. Equipment should be stockpiled for use during emergency operations and exercises.
7. *Managing inspections of flood control projects.* The Corps is responsible for ensuring that the levees are properly maintained to perform as designed during flood events.

Advance Measures

The Corps may take advance measures prior to a flooding event to protect against loss of life and significant damages to urban areas and public facilities.³⁰ In the case of imminent danger of levee failure or overtopping,

³⁰Corps Regulation Nos. ER 500-1-1 and EP 500-1-1.

the Corps can also take corrective actions to ensure the stability, integrity, and safety of the levee.³¹ Advance measures include the following:

1. *Technical assistance*: providing technical review, advice, and recommendations to state and local agencies before an anticipated flood event. For example, the Corps may provide personnel to inspect existing flood control works to identify potential problems and solutions, evaluate conditions to determine the requirements for additional flood control protection, and recommend the most expedient construction methods; provide hydraulic, hydrologic, and geotechnical analysis; and provide information readily available at Corps districts to local entities for use in the preparation of local evacuation and contingency flood plans.
2. *Direct assistance*: providing supplies, equipment, and contracting for the construction of temporary and permanent flood control projects. Examples of emergency contracting work include the construction of temporary levees; the repair, strengthening, or temporary raising of levees or other flood control works; shore protection projects; and removal of stream obstructions, including channel dredging of federal projects to restore the design flow.

Advance measures taken by the Corps are intended to supplement ongoing or planned state and local efforts, and are designed to deal with a specific threat. To implement advanced measures, the governor should make a written request to the Corps. The local sponsor for the advance measure assistance must agree to execute a cooperative agreement and, at no cost to the Corps, when the operation is over, remove all temporary work constructed by the Corps or agree to upgrade the work to standards acceptable to the Corps. In addition, the local sponsor is responsible for providing traditional items of local cooperation, such as lands, easements, rights-of-way, and disposal areas necessary for the work. Advance measures assistance is temporary and must be terminated no later than when the flood threat ends.

Hazard Mitigation

Hazard mitigation activities are intended to help prevent or reduce the possibility of a disaster or reduce its damaging effects. The Corps is required to participate on a FEMA-led hazard mitigation team to identify postdisaster mitigation opportunities and establish a framework for

³¹Corps Regulation Nos. ER 500-1-1 and EP 500-1-1.

recovery. According to the Corps' hazard mitigation policy, division commanders are to appoint primary and alternate representatives to serve on the hazard mitigation team; establish procedures for quick and effective response to the requirements of the team; ensure essential information and data necessary to assess mitigation opportunities are available or capable of being obtained quickly; ensure division hazard mitigation team representatives are trained in flood hazard mitigation concepts and techniques; and provide reports to FEMA and Corps headquarters. Recommendations of the hazard mitigation team are intended to reduce or avoid federal expenditures resulting from flood situations.³²

New Orleans District's Hurricane Preparedness Plan

The Corps' New Orleans District has a draft hurricane preparedness plan that defines the district's role and responsibilities in the event of an emergency due to a hurricane.³³ The plan outlines the essential functions of the district before, during, and after a hurricane. These functions include pre-event planning, organization, response, and recovery in order to minimize the potential hazards to life and property. As part of this plan, the district defines emergency organizational staffing to support emergency operations. Selected personnel are assigned to specific teams or offices that, in the event of a disaster, are to provide the necessary liaison with federal, state, or local emergency management agencies; make decisions relative to Corps' capabilities and assignments; perform preliminary damage assessments; or accomplish specific missions. According to the plan, a New Orleans District Emergency Operations Center should be staffed to respond to an emergency, and the center is to become the focal point for collecting data, analyzing situations, allocating resources, furnishing reports to higher headquarters, and providing overall management and control of all district activities. With the activation of the emergency operations center, a crisis management team becomes responsible for coordinating and directing district activities in the crisis situation. A crisis action team is responsible for executing the activities as directed by the crisis management team. According to the plan, if a slow-moving category 3 or higher hurricane is approaching the area, the team should be activated and deployed at the direction of the commander. The

³²Corps Regulation No. ER 500-1-1.

³³The district's hurricane preparedness plan is in draft form. According Corps officials, however, the draft plan was used to prepare and respond to Hurricane Katrina. Corps District Regulation No. DR 500-1-3.

plan does not contain any specific guidance on how the district would respond to a levee failure.

In closing, Madam Chairman, the legislative and regulatory framework guiding the operations and maintenance of the levees divides this responsibility among a number of partners, depending upon specific circumstances. Similarly, the responsibilities for emergency preparedness and response are dependent on a variety of laws and regulations. As a result, the regulatory framework for these activities is complex and oftentimes unclear. Whether these responsibilities were appropriately fulfilled or played a role in the flooding of New Orleans in the wake of Hurricane Katrina in August 2005 is still to be determined.

GAO Contact and Staff Acknowledgments

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