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ARMY CORPS OF ENGINEERS

Lake Pontchartrain and Vicinity Hurricane Protection Project

Statement of Anu Mittal, Director
Natural Resources and Environment

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Highlights

Highlights of GAO-05-1050T, a testimony before the Subcommittee on Energy and Water Development, Committee on Appropriations, House of Representatives

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Why GAO Did This Study

The greatest natural threat posed to the New Orleans area is from hurricane-induced storm surges, waves, and rainfalls. A hurricane surge that can inundate coastal lowlands is the most destructive characteristic of hurricanes and accounts for most of the lives lost from hurricanes. Hurricane surge heights along the Gulf and Atlantic coasts can exceed 20 feet. The effects of Hurricane Katrina flooded a large part of New Orleans and breeched the levees that are part of the U.S. Army Corps of Engineers (Corps) Lake Pontchartrain, and Vicinity, Louisiana Hurricane Protection Project. This project, first authorized in 1965, was designed to protect the lowlands in the Lake Pontchartrain tidal basin from flooding by hurricane-induced sea surges and rainfall.
GAO was asked to provide information on (1) the purpose and history of the Lake Pontchartrain, and Vicinity, Louisiana Hurricane Protection Project and (2) funding of the project.

GAO is not making any recommendations in this testimony.

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

What GAO Found

Congress first authorized the Lake Pontchartrain and Vicinity, Louisiana Hurricane Protection Project in the Flood Control Act of 1965. The project was to construct a series of control structures, concrete floodwalls, and levees to provide hurricane protection to areas around Lake Pontchartrain. The project, when designed, was expected to take about 13 years to complete and cost about $85 million. Although federally authorized, it was a joint federal, state, and local effort.

The original project designs were developed based on the equivalent of what is now called a fast-moving Category 3 hurricane that might strike the coastal Louisiana region once in 200-300 years. As GAO reported in 1976 and 1982, since the beginning of the project, the Corps has encountered project delays and cost increases due to design changes caused by technical issues, environmental concerns, legal challenges, and local opposition to portions of the project. As a result, in 1982, project costs had grown to $757 million and the expected completion date had slipped to 2008. None of the changes made to the project, however, are believed to have had any role in the levee breaches recently experienced as the alternative design selected was expected to provide the same level of protection. In fact, Corps officials believe that flooding would have been worse if the original proposed design had been built. When Hurricane Katrina struck, the project, including about 125 miles of levees, was estimated to be from 60-90 percent complete in different areas with an estimated completion date for the whole project of 2015. The floodwalls along the drainage canals that were breached were complete when the hurricane hit.

The current estimated cost of construction for the completed project is $738 million with the federal share being $528 million and the local share $210 million. Federal allocations for the project were $458 million as of the enactment of the fiscal year 2005 federal appropriation. This represents 87 percent of the federal government's responsibility of $528 million with about $70 million remaining to complete the project. Over the last 10 fiscal years (1996-2005), federal appropriations have totaled about $128.6 million and Corps reprogramming actions resulted in another $13 million being made available to the project. During that time, appropriations have generally declined from about $15-20 million annually in the earlier years to about $5-7 million in the last three fiscal years. While this may not be unusual given the state of completion of the project, the Corps' project fact sheet from May 2005 noted that the President's budget request for fiscal years 2005 and 2006, and the appropriated amount for fiscal year 2005 were insufficient to fund new construction contracts. The Corps had also stated that it could spend $20 million in fiscal year 2006 on the project if the funds were available. The Corps noted that several levees had settled and needed to be raised to provide the level of protection intended by the design.

Mr. Chairman and Members of the Subcommittee:

We are pleased to be here today to discuss the U.S. Army Corps of Engineers (Corps) Lake Pontchartrain, and Vicinity, Louisiana Hurricane Protection Project. This project, first authorized in 1965, was designed to protect the lowlands in the Lake Pontchartrain tidal basin within the greater New Orleans metropolitan area from flooding by hurricane-induced sea surges and rainfall. As you know, the effects of Hurricane Katrina breeched the levees that are part of this project and flooded a large part of New Orleans.

In my testimony, I will discuss (1) the purpose and history of the project and (2) funding of the project. To conduct this work, we reviewed GAO's past reports on the Lake Pontchartrain and Vicinity, Louisiana Hurricane Protection Project and on the Corps' flood control efforts in general.[1] We interviewed Corps personnel responsible for the Lake Pontchartrain project to obtain information on the Corps funding of the project and its current status. We did the work reflected in this statement during September 2005 in accordance with generally accepted government auditing standards.

In summary, the Lake Pontchartrain hurricane project was designed to protect areas around the lake from flooding caused by a storm surge or rainfall associated with a standard project hurricane, which is roughly the same as what is now classified as a fast moving Category 3 hurricane. The project, when designed in the mid-1960s, was expected to take about 13 years to complete and cost about $85 million. Over the years, the project has undergone some significant design changes as a result of a successful court challenge, local opposition to certain aspects of the proposed design, and changed Corps thinking about the most cost-effective approach. None of these changes, however, are believed to have had any role in the levee breaches recently experienced as the alternative design selected was expected to provide the same level of protection. In fact, Corps staff believes that flooding would have been worse if the original proposed design had been built. As of early 2005, the project was not expected to be completed until 2015—nearly 50 years after it was first

[1]GAO, *Cost, Schedule, And Performance Problems Of The Lake Pontchartrain And Vicinity, Louisiana, Hurricane Protection Project*, GAO/PSAD-76-161 (Washington, D.C.: Aug. 31, 1976) and GAO, *Improved Planning Needed By The Corps Of Engineers To Resolve Environmental, Technical, And Financial Issues On The Lake Pontchartrain Hurricane Protection Project*, GAO/MASAD-82-39 (Washington, D.C.: Aug. 17, 1982).

authorized—and cost about $738 million, much of the cost increase is due to inflation over the years and changes to the scope and design of the project. In recent years, questions have been raised about the ability of the project to protect the New Orleans area from hurricanes greater than Category 3. This issue was only beginning to be studied by the Corps when Hurricane Katrina hit the area in August 2005.

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 metropolitan 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 is a tidal basin about 640 square miles in area that connects with the Gulf of Mexico through Lake Borgne and the Mississippi Sound.

While the area has historically experienced many river floods, a series of levees and other flood control structures built over the years were expected to greatly reduce that threat. The greatest natural threat posed to the New Orleans area continues to be from hurricane-induced storm surges, waves, and rainfalls. Several hurricanes have struck the area over the years including Hurricane Betsy in 1965, Hurricane Camille in 1969, and Hurricane Lili in 2002. The hurricane surge that can inundate coastal lowlands is the most destructive characteristic of hurricanes and accounts for most of the lives lost from hurricanes. Hurricane surge heights along the Gulf and Atlantic coasts can range up to 20 feet or more and there is growing concern that continuing losses of coastal wetlands and settlement of land in New Orleans has made the area more vulnerable to such storms. Because of such threats, a series of control structures, concrete floodwalls, and levees, was proposed for the area along Lake Pontchartrain in the 1960s.

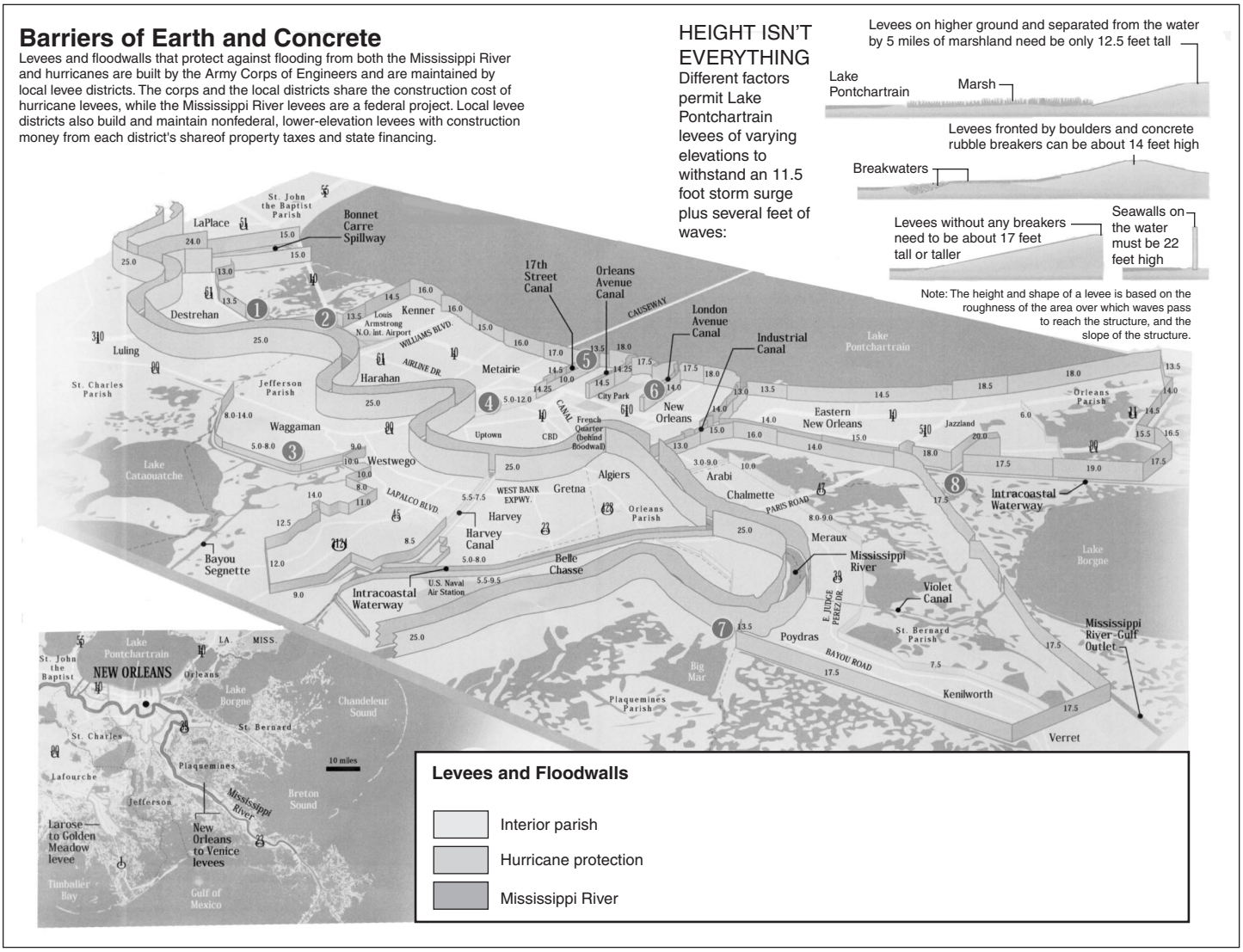
Purpose and History of Lake Pontchartrain and Vicinity Flood Control Project

Congress first authorized construction of the Lake Pontchartrain and Vicinity, Louisiana Hurricane Protection Project in the Flood Control Act of 1965[2] to provide hurricane protection to areas around the lake in the parishes of Orleans, Jefferson, St. Bernard, and St. Charles. Although federally authorized, it was a joint federal, state, and local effort with the federal government paying 70 percent of the costs and the state and local interests paying 30 percent. The Corps was responsible for project design and construction and local interests were responsible for maintenance of levees and flood controls. The original project design, known as the barrier plan, included a series of levees along the lakefront, concrete floodwalls along the Inner Harbor Navigation Canal, and control structures, including barriers and flood control gates located at the Rigolets and Chef Menteur Pass areas. These structures were intended to prevent storm surges from entering Lake Pontchartrain and overflowing the levees along the lakefront. The original lakefront levees were planned to be from 9.3 feet to 13.5 feet high depending on the topography of the area directly in front of the levees.

This project plan was selected over another alternative, known as the high-level plan, which excluded the barriers and flood control gates at the Rigolets and Chef Menteur Pass complexes and instead employed higher levees ranging from 16 feet to 18.5 feet high along the lakefront to prevent storm surges from inundating the protected areas. In the 1960s, the barrier plan was favored because it was believed to be less expensive and quicker to construct. As explained later in my statement, this decision was reversed in the mid-1980s. The cost estimate for the original project was $85 million (in 1961 dollars) and the estimated completion date was 1978.

[2]Pub. L. No. 89-298, § 204, 79 Stat. 1073, 1077.

Figure 1: Flood Protection Control Levees In and Around New Orleans, LA.



Source: Staff graphic by Emmett Mayer III/emayer@timespicayune.com.

The original project designs were developed to combat a hurricane that might strike the coastal Louisiana region once in 200-300 years. The basis for this was the standard project hurricane developed by the Corps with the assistance of the United States Weather Bureau (now the National Weather Service). The model was intended to represent the most severe meteorological conditions considered reasonably characteristic for that region. The model projected a storm roughly equivalent to a fast-moving

Category 3 hurricane. A Category 3 hurricane has winds of 111-130 miles per hour and can be expected to cause some structural damage from winds and flooding near the coast from the storm surge and inland from rains.

Even before construction began on the project, it became evident that some changes to the project plan were needed. Based on updated Weather Bureau data on the severity of hurricanes, the Corps determined that the levees along the three main drainage canals, that drain water from New Orleans into Lake Pontchartrain, would need to be raised to protect against storm surges from the lake. The need for this additional work became apparent when Hurricane Betsy flooded portions of the city in September 1965.

During the first 17 years of construction on the barrier plan, the Corps continued to face project delays and cost increases due to design changes caused by technical issues, environmental concerns, legal challenges, and local opposition to various aspects of the project. For example, foundation problems were encountered during construction of levees and floodwalls which increased construction time; delays were also encountered in obtaining rights-of-ways from local interests who did not agree with all portions of the plan. By 1981, cost estimates had grown to $757 million for the barrier plan, not including the cost of any needed work along the drainage canals, and project completion had slipped to 2008. At that time, about $171 million had been made available to the project and the project was considered about 50 percent complete, mostly for the lakefront levees which were at least partially constructed in all areas and capable of providing some flood protection although from a smaller hurricane than that envisioned in the plan.

More importantly, during the 1970s, some features of the barrier plan were facing significant opposition from environmentalists and local groups who were concerned about environmental damages to the lake as well as inadequate protection from some aspects of the project. The threat of litigation by environmentalists delayed the project and local opposition to building the control complexes at Rigolets and Chef Menteur had the potential to seriously reduce the overall protection provided by the project. This opposition culminated in a December 1977 court decision[3] that enjoined the Corps from constructing the barrier complexes, and

[3]*Save Our Wetlands v. Rush*, Civ. A. No. 75-3710 (E.D. La. Dec. 30, 1977).

certain other parts of the project until a revised environmental impact statement was prepared and accepted. After the court order, the Corps decided to change course and completed a project reevaluation report and prepared a draft revised Environmental Impact Statement in the mid-1980s that recommended abandoning the barrier plan and shifting to the high-level plan originally considered in the early 1960s. Local sponsors executed new agreements to assure their share of the non-federal contribution to the revised project. These changes are not believed to have had any role in the levee breaches recently experienced as the high-level design selected was expected to provide the same level of protection as the original barrier design. In fact, Corps staff believe that flooding would have been worse if the original proposed design had been built because the storm surge would likely have gone over the top of the barrier and floodgates, flooded Lake Pontchartain, and gone over the original lower levees planned for the lakefront area as part of the barrier plan.[4] As of 2005, the project as constructed or being constructed included about 125 miles of levees and the following major features:

- New levee north of Highway U.S. 61 from the Bonnet Carré Spillway East Guide Levee to the Jefferson-St. Charles Parish boundary
- Floodwall along the Jefferson-St. Charles Parish boundary
- Enlarged levee along the Jefferson Parish lakefront
- Enlarged levee along the Orleans Parish lakefront
- Levees, floodwalls, and flood proofed bridges along the 17th Street, Orleans Avenue and London Avenue drainage canals
- Levees from the New Orleans lakefront to the Gulf Intracoastal Waterway
- Enlarged levees along the Gulf Intracoastal Waterway and the Mississippi River-Gulf Outlet
- New levee around the Chalmette area.

The project also includes a mitigation dike on the west shore of Lake Pontchartrain.

[4]The lakefront levees in the original barrier plan were 9.5 feet to 13.5 feet high compared to the 16 feet to 18.5 feet high levees built along the lakefront as part of the high-level plan.

The current estimated cost of construction for the completed project is $738 million with the federal share being $528 million and the local share $210 million. The estimated completion date as of May 2005 for the whole project was 2015. The project was estimated to be from 60-90 percent complete in different areas. The work in Orleans Parish was estimated to be 90 percent complete with some work remaining for bridge replacement along the Orleans Avenue and London Avenue drainage canals. The floodwalls along the canals, where the recent breaches occurred, were complete. Jefferson Parish work was estimated to be 70 percent complete with work continuing on flood proofing the Hammond Highway bridge over 17th Street and two lakefront levee enlargements. Estimated completion for that work was 2010. In the Chalmette area work was estimated to be 90 percent complete with some levee enlargement work and floodwall work remaining. In St. Charles Parish work was 60 percent complete with some gaps still remaining in the levees. Closure of these gaps was scheduled by September 2005.

Recent Funding History for the Project

Federal allocations for the project totaled $458 million as of the enactment of the fiscal year 2005 federal appropriation. This represents 87 percent of the Federal government's responsibility of $528 million with about $70 million remaining to complete the project in 2015. Over the last 10 fiscal years (1996-2005), federal appropriations have totaled about $128.6 million and Corps reprogramming actions resulted in another $13 million being made available to the project. During that time, appropriations have generally declined from about $15-20 million annually in the earlier years to about $5-7 million in the last three fiscal years. While this may not be unusual given the state of completion of the project, the Corps' project fact sheet from May 2005 noted that the President's Budget request for fiscal years 2005 and 2006 and the appropriated amount for fiscal year 2005 were insufficient to fund new construction contracts. Among the construction efforts that could not be funded, according to the Corps, were the following:

- Levee enlargements in all four parishes
- Pumping station flood protection in Orleans Parish
- Floodgates and a floodwall in St. Charles Parish
- Bridge replacement in Orleans Parish.

The Corps had also stated that it could spend $20 million in fiscal year 2006 on the project if the funds were available. The Corps noted that several levees had settled and needed to be raised to provide the design-level of protection. For the last few years, the project generally received the amount of funds appropriated to it and was not adversely affected by any Corps reprogramming actions.

In recent years, questions have been raised about the ability of the project to withstand larger hurricanes than it was designed for, such as a Category 4 or 5, or even a slow-moving Category 3 hurricane that lingered over the area and produced higher levels of rainfall. Along this line, the Corps completed in 2002 a reconnaissance or pre-feasibility study on whether to strengthen hurricane protection along the Louisiana coast. A full feasibility study was estimated to take at least five years to complete and cost about $8 million. In March 2005, the Corps reported that it was allocating $79,000 to complete a management plan for the feasibility study and a cost-share agreement with local sponsors. The President's fiscal year 2006 budget request did not include any funds for the feasibility project.

In closing, the Lake Pontchartrain hurricane project has been under construction for nearly 40 years, much longer than originally envisioned and at much greater cost, although much of that can be attributed to inflation over these years, and the project is still not complete. Whether the state of completion of the project played a role in the flooding of New Orleans in the wake of Hurricane Katrina in August 2005 is still to be determined as are issues related to whether a project designed to protect against Category 4 or 5 hurricanes would or could have prevented this catastrophe.

Mr. Chairman, this concludes my prepared testimony. We would be happy to respond to any questions that you or Members of the Subcommittee may have.

GAO Contact and Staff Acknowledgments

For further information on this testimony, please contact Anu Mittal at (202) 512-3841 or mittala@gao.gov. Individuals making contributions to this testimony included Ed Zadjura, Ken Lightner, Omari Norman, John Delicath, and Patrick Castellano

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