

H.R. 4650, the National Levee Safety Program Act

Testimony of
Peter Nicholson, Ph.D., P.E., M.ASCE
Associate Professor of Civil and Environmental Engineering and
Graduate Program Chair
University of Hawaii
On behalf of the
AMERICAN SOCIETY OF CIVIL ENGINEERS
Before the
Subcommittee on Water Resources and Environment
Committee on Transportation and Infrastructure
April 6, 2006

Mr. Chairman and Members of the Subcommittee:

Good morning. My name is Peter G. Nicholson, and I am pleased to appear before you today to testify on behalf of the American Society of Civil Engineers¹ (ASCE) as you consider H.R. 4650, the National Levee Safety Program Act—legislation intended to improve the performance of levees throughout the United States.

I am a member of ASCE and the chair of the ASCE Geo-Institute's Committee on Embankments, Dams, and Slopes. In 2005, I assembled an independent team of experts to collect data and make observations necessary to carry out an assessment of the performance of the flood-control levees in New Orleans following Hurricane Katrina.²

¹ ASCE, founded in 1852, is the country's oldest national civil engineering organization. It represents more than 139,000 civil engineers in private practice, government, industry, and academia who are dedicated to the advancement of the science and profession of civil engineering. ASCE is a 501(c) (3) non-profit educational and professional society.

² Hurricane Katrina was a catastrophic storm that made landfall in the Gulf Coast near the Louisiana and Mississippi border with wind speeds near 150 mph. Flooding, not high winds, was the principal cause of damage in New Orleans following the failure of numerous levees in and around the city. For an analysis of the hurricane and its impact on the levee system in New Orleans, see THE AMERICAN SOCIETY OF CIVIL ENGINEERS AND THE NATIONAL SCIENCE FOUNDATION, PRELIMINARY REPORT ON THE PERFORMANCE OF THE NEW ORLEANS LEVEE SYSTEMS IN HURRICANE KATRINA ON AUGUST 29, 2005 (Nov. 2, 2005) at <http://www.asce.org/files/pdf/katrina/teamdatareport1121.pdf> .

As engineers, our paramount concern is for the safety, health, and welfare of the public. We have learned a great deal from the tragedy of New Orleans, lessons that we hope will allow us to prevent future loss of life and property in Louisiana and elsewhere. We support federal, state, and local agency efforts to ensure that all infrastructure systems are (1) robust, i.e., strong enough and reliable enough to do the job; (2) contain redundant systems to prevent total system failure; and (3) are resilient enough to allow them to be quickly repaired when the inevitable failures within large, interdependent systems do occur.

Based on these basic engineering principles and our findings in New Orleans, we believe that Congress should enact H.R. 4650, with some modifications.

I. H.R. 4650, the National Levee Safety Program Act

The bill would require the U.S. Army Corps of Engineers to inspect levees in the United States for the purpose of protecting human life and property. It would require the Corps to check all levees built or maintained by the Corps of Engineers, and it would require federal inspections for any non-federal levee at the request of a state's governor.

Significantly, it would require inspections to determine whether a levee failure would constitute a danger to human life or property. These inspections would take into account a variety of possible failure modes, including disparities in floodwall height or construction materials, overtopping from storm surges, seepage, settlement, piping, sediment, cracking, earth movement, earthquakes, hurricanes, the failure of bulkheads or sheet walls, flashboards, gates or conduits, or "other conditions that exist or may occur in any area in the vicinity of a levee."³

The bill also would require the Corps to submit to Congress on August 1 each year a priority list of all future federally funded flood-damage-mitigation studies to be conducted based upon the levee inspections. The priority list would be based on the potential risk to human life or the environment if the flood-control project is not carried out, the benefits of protecting critical infrastructure and population centers, and federal guidelines relating to levee safety.

It would authorize—but not require—the Corps of Engineers to maintain "and periodically publish" an inventory of all levees in the United States, along with the results of levee inspections.

Other provisions of the bill would:

- Establish a nine-member National Levee Safety Review Board, to be composed of the Secretary of the Army; the Secretary of the Interior; the Administrator of EPA; the Director of FEMA; four representatives from state levee safety agencies appointed by the Secretary of the Army; and one representative from the private

³ A number of these failure mechanisms have been noted in New Orleans. Especially marked was the subsidence of some levees by as much as three feet below their original design levels.

sector with expertise in levee safety appointed by the Secretary of the Army. Authorizes the Secretary of the Army to invite up to three nonvoting members to participate in the Board's activities, including a levee safety expert and a representative from any federal or state agency.

- Establish an Interagency Committee on Levee Safety, to be composed of the Secretary of the Army, the Secretary of Agriculture, the Secretary of the Interior, and the Director of FEMA, which would “support the establishment and maintenance of effective federal programs, policies, and guidelines to enhance levee safety for the protection of human life and property through coordination and information exchange among federal agencies concerning the implementation of federal guidelines relating to levee safety.”
- Direct the Secretary of the Army to establish a national levee safety program. The program would be required have seven specific tasks, including the encouragement of the use of “acceptable engineering policies and procedures for levee site investigation, design, construction, operation, and maintenance, and emergency preparedness”; the development of technologically and economically feasible programs for hazard reduction; the creation of effective state levee safety programs; and the promotion of methods to provide technical assistance to the safety of nonfederal levees.
- Require the Corps, in consultation with the National Levee Safety Review Board, to establish federal guidelines for levee safety and direct the Corps to use “activities and practices” in use by the states, local governments, and the private sector in the development of the guidelines.
- Command the Corps to administer a program to assist states in creating and implementing levee safety programs. To qualify for federal aid, the state must have a Corps-sanctioned levee safety program in place that approves plans and specification for the construction or removal of levees; performs periodic inspections, requires inspections every five years for levees that may pose “a significant threat to human life and public property” in the event of a failure; requires all state inspections to be carried out by a licensed Professional Engineer; and provides money to assure timely repairs to these levees.
- Require the Corps to fund research into improved methods of rapidly building, repairing, and inspecting levees; the development of safety-monitoring equipment; the development of information systems to manage safety programs; and other policies aimed at “improvements to levee safety engineering, security, and management.”

II. ASCE Policy Recommendations for H.R. 4650

We have several specific amendments to recommend to the Subcommittee.

Levee Inventory—The bill authorizes the Corps to maintain an inventory of levees at its discretion. The inventory should be compulsory. The Corps needs to account for every federal, state, local, and privately owned levee in the country. Without such an all-inclusive catalog, we run the risk of missing potentially life-threatening conditions at levees that are not accounted for by the government. The National Inventory of Dams, a data base of all dams in the United States maintained by the Corps, includes state and local government dams and privately owned dams as well. The levee system requires a correspondingly complete survey.

Levee Inspections—The bill would require the Corps to carry out a one-time inspection of every federally funded levee. The bill should be amended to require periodic levee inspections, as well as the identification and inspection of larger, interdependent flood- and storm-protection systems within which the federal levees function.

The bill does require states to carry out levee inspections at least once every five years for the levees posing the greatest danger to human life in order to receive assistance to support their levee programs. This provision is too limited. Every levee—whether owned by federal, state, or local agencies or by private citizens—that would pose a significant threat to human life and property in case of failure should be inventoried and inspected.⁴ In addition, the law should contain a procedure for conducting more detailed and frequent safety inspections at the Corps’ discretion.

Peer Reviews—ASCE strongly supports the use of independent project peer reviews for every new civil works project or significant modification to an existing system whenever any one of four key principles is implicated. Sound engineering principles require independent peer reviews by outside experts (1) when performance is critical to the public health, safety and welfare; (2) when reliability of performance under emergency conditions is critical; (3) when using innovative materials or techniques; or (4) when the project design is lacking in redundancy,⁵ or the project has a unique construction sequencing or a short or overlapping design construction schedule. An independent project peer review should occur throughout the design process if any of these four principles applies to the levee project.

H.R. 4650 should be amended to require the Corps to establish independent peer reviews of all federally funded levee projects. Additionally, the Corps needs to ensure that independent peer reviews are conducted for every environmentally and economically significant levee project.

⁴ This category would consist of levees deemed to pose a “high hazard” in the event of a failure, a category that is comparable to the requirements for high-hazard dams under the National Dam Safety Act, 33 U.S.C. § 467 *et seq.*

⁵ In engineering, “redundancy” refers to built-in failure-resistant systems to guard against the total design or operational failure of a civil works infrastructure project.

Vulnerability to Attacks—America’s civil works infrastructure remains vulnerable to man-made attacks. H.R. 4650 should be amended to require the Corps to carry out a vulnerability risk assessment to determine which of America’s major levees are susceptible to destruction by terrorists.

Because the precise scope of the nation’s levee system is not known at this time, the Corps at a minimum should conduct an assessment of the vulnerability of each U.S. levee in urban areas to penetration by terrorists and criminals or terrorist attack in order to determine the potential threats to the levees protecting the greatest number of people. In carrying out assessments, the Corps needs to categorize the threat level of each major levee system as “high,” “medium,” “low.” In addition, the Corps should set priorities based on the threat level and the vulnerability of each major levee system.

Appropriations— The bill authorizes Congress to appropriate \$60 million (\$10 million a year for the fiscal years 2007, 2008, 2009, 2010, 2011, and 2012) to carry out the Act, to be available until expended.

The appropriation level should be increased by \$60 million (to \$120 million over six years). We recommend a separate authorization of \$20 million in fiscal years 2007, 2008, and 2009 to conduct the national levee inventory required under section 4. This would be in addition to the \$10 million authorized in the original bill for other levee programs in the first three years. (The Bush administration has asked for \$20 million for the levee inventory for one year in its FY 2007 budget request for the Corps.)

Moreover, ASCE believes the bill should be amended to authorize annual appropriations for the creation and maintenance of the levee safety program within the Corps of Engineers. We urge the Subcommittee to provide \$7 million annually for state assistance to implement levee safety programs, \$1 million annually for the maintenance of the national levee inventory, \$1 million annually for the bill’s research program on levee safety, and \$1 million annually for levee safety training programs.

Thus, the funding authorizations should amount to \$30 million annually in FY 2007-2009 (\$90 million in the first three years) and \$10 million annually in FY 2010-2012 (\$30 million in the last three years).

Thank you, Mr. Chairman. That concludes my testimony. I would be pleased to answer any questions that your or the members of the Subcommittee may have.

#