U.S. Government Accountability Office

National Levee Database: Roles and Responsibilities of Army Corps of Engineers and FEMA

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Q&A Report to Congressional Committees
April 24, 2025

Why This Matters

Levees are man-made structures, such as earthen embankments or concrete floodwalls, that play a vital role in reducing the risk of flooding. In the aftermath of destructive levee failures during Hurricanes Katrina and Rita in 2005, the U.S. Army Corps of Engineers established the National Levee Database—the first centralized repository of information on the nation's levees. The Corps was required by the National Levee Safety Act of 2007 to establish the database, which became publicly available in 2011. It is intended to help decision-makers better understand the nation's levees, including their location and condition, according to the database website. Moreover, the database can provide other benefits, such as supporting community preparedness and quantifying the nation's flood exposure.

The Corps hosts the database, which contains information on levees managed by the Corps as well as other entities, such as federal agencies and local governments. In hosting the database, the Corps works in partnership with the Federal Emergency Management Agency (FEMA), which populates and maintains information in the database related to the National Flood Insurance Program (NFIP). This program makes flood insurance available to property and business owners located in communities that participate in the program by adopting minimum floodplain management standards described in FEMA regulations.

The Water Resources Development Act of 2022 includes a provision for us to review the integration and sharing of levee information in the database by the Corps and FEMA (Pub. L. No. 117-263, § 8236(f), 136 Stat. 2395, 3773). Our previous work has addressed various aspects of flood risk management, including Corps benefit and cost studies (GAO-20-43), as well as FEMA's NFIP (GAO-23-105977). This report provides information on how the Corps and FEMA enter, share, and use levee information in the database.

Key Takeaways

- The Corps and FEMA update data in the National Levee Database on an ongoing basis, typically in conjunction with the Corps' scheduled levee inspections and FEMA's efforts to assess and map flood risk.
- Data updates regarding levee conditions may not substantially affect NFIP insurance premiums because (1) the premiums are based on multiple factors, (2) premiums remain in effect until policies are due for renewal, and (3) annual increases are generally limited by statute.

- The Corps does not typically rely on data in the National Levee Database for analyzing the benefits and costs associated with flood risk management projects. The Corps obtains the information it needs from other entities, such as state and local governments, that operate and maintain federally authorized levees.

Background

The Corps is responsible for assessing over 1,600 federally authorized levees nationwide. Federally authorized levees are those that were constructed under congressional authorization.[1] The Corps has full or partial responsibility to operate and maintain approximately 150 of these levees. The remaining 1,450 are operated and maintained by other entities through project agreements with the Corps, with the Corps retaining an oversight role for levee inspections or risk assessments.

In addition to federally authorized levees, there are several thousand known levees that were not constructed under congressional authorization. These include, for example, levees that were locally or privately constructed.

The National Levee Safety Act of 2007 instructed the Corps to establish and maintain a database with an inventory of the nation's levees.[2] The National Levee Database contains extensive information on the 1,600 federally authorized levees as well as varying levels of information on other known levees nationwide. Since the database was first published in 2011, it has evolved considerably—mainly to expand the number of levees included and to add new features. For example, the database has been modified to make it more interactive for public use.

The following Corps guidance documents outline protocols for the Corps and FEMA to enter, ensure the quality of, and share information in the database:

- **2025 Corps engineer circular.** This document establishes the policies for the Corps' levee safety program, including managing and maintaining the National Levee Database, and describes Corps and FEMA activities, roles, and responsibilities for federally authorized levees.[3] It also describes activities nonfederal entities that operate and maintain federally authorized levees conduct or participate in consistent with their project agreements with the Corps.

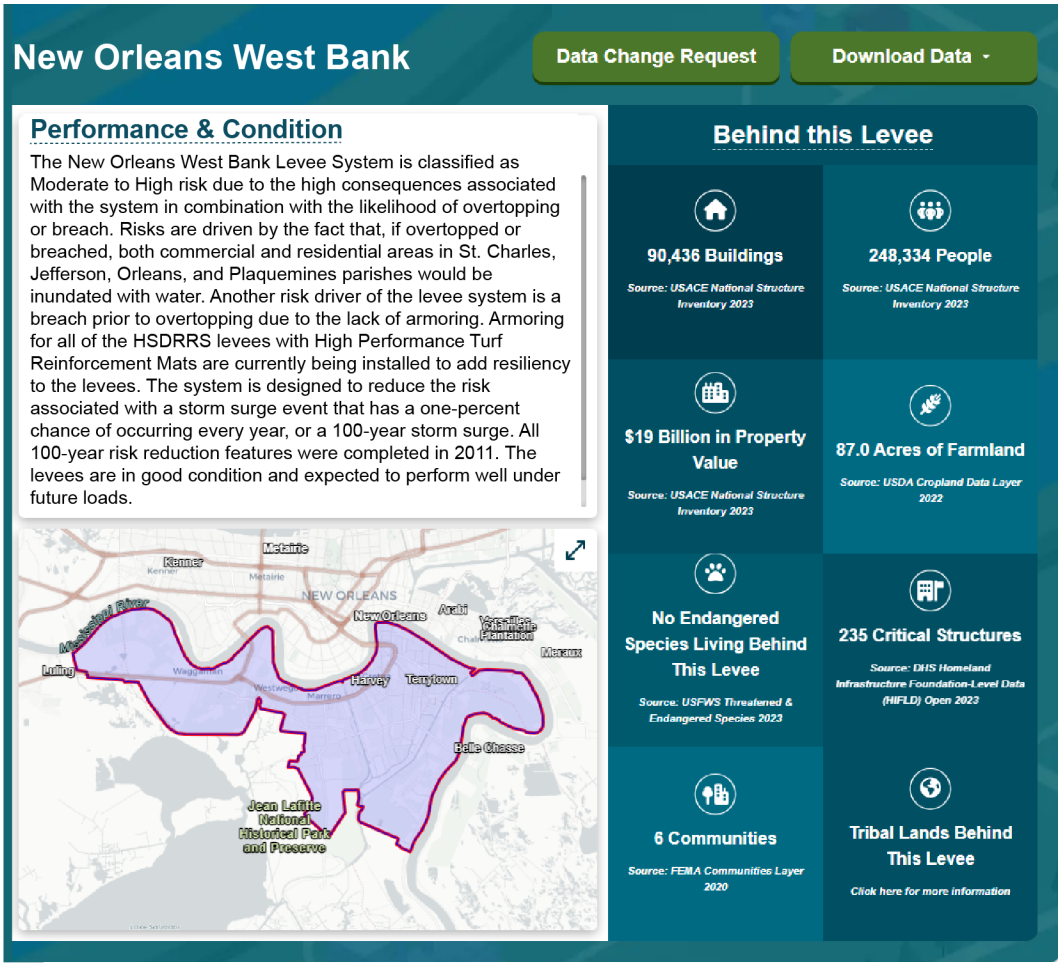
- **2023 National Levee Database business process.** This document outlines a comprehensive business process for data managers to follow to maintain information in the database. It provides process steps, locations for help documentation, and other information on procedures to manage levee data in the database. According to FEMA officials, FEMA uses the Corps' business process document to guide its National Levee Database management efforts.
- **District levee safety program management plans.** The protocols set forth in the engineer circular and business process documents are outlined in program management plans by the Corps' 38 district offices with a levee safety program.[4] Each plan includes a 10-year outlook—a schedule for inspections, site visits, and risk assessment, among other things—that will involve both the Corps and entities that maintain the levees. The program management plans also describe the coordination of roles and responsibilities among Corps district offices and FEMA's 10 regional offices related to the database.

What data does the National Levee Database include?

The National Levee Database generally includes the following information:

- location;
- physical attributes such as height, length, and condition;
- year constructed;
- owner/sponsor;
- entity with oversight responsibility; and
- estimated populations, critical structures, and value of property behind the levee (see fig. 1 for a screenshot from the database with this information).

Figure 1: Screenshot from the U.S. Army Corps of Engineers' National Levee Database



Source: U.S. Army Corps of Engineers. | GAO-25-107340

Note: The New Orleans West Bank Levee System is made up of Mississippi River Levees (MRL) and the Hurricane and Storm Damage Risk Reduction System (HSDRRS). The MRL is locally operated and maintained; however, the Corps has major maintenance responsibility. The HSDRRS is locally operated and maintained.

The database also includes information about the FEMA accreditation status for all levees, which helps interested parties know whether flood insurance is required for homes and businesses located near the levee.[5]

In addition to data on individual levees, the database can be queried to provide aggregate data. For example, according to the database website, there are about 25,000 miles of known levees, with an average age of 61 years.

How and when are data entered in the National Levee Database?

The Corps enters most of the data in the National Levee Database, while FEMA enters data related to the NFIP accreditation status for all levees as well as additional data for some non-federally authorized levees. More specifically, Corps data managers at the district level are responsible for entering information for federally authorized levees within their area of responsibility. These data managers enter data on an ongoing basis as new information becomes available. A support team for the database also assists in entering data when requested by Corps district data managers. This team normally assists with entering and validating data for non-federally authorized levees. In addition, FEMA often enters levee data based on information provided to the agency through the routine implementation of FEMA's mapping program, which involves significant engagement with communities and other stakeholders.

Data for newly constructed or modified levees are generally updated once construction or modification has been completed, according to Corps program officials. Other levee data updates usually coincide with scheduled levee inspections and risk assessments, which are generally performed on a 5- to 10-year basis. Inspections and risk assessments are defined by Corps officials as the following:

- A levee inspection is typically a thorough visual examination of a levee, conducted by Corps personnel, to assess a levee's condition, provide recommendations for further action on any potential weaknesses, and ensure the levee is functioning properly to protect against flooding.
- A levee risk assessment is a technical evaluation that looks at how often and how high flood water would be against the levee. The risk assessment also considers how the levee would withstand those high-water events and the potential consequences if flood waters damage the levee or exceed its height.

Corps program officials told us that data can be updated during out-of-cycle inspections and risk assessments as well. Data from inspections are typically uploaded from a mobile device directly into the database, according to Corps officials (see fig.2).

Figure 2: U.S. Army Corps of Engineers Inspector Using a Mobile Device to Record Levee Information

Source: U.S. Army. | GAO-25-107340

While the Corps enters the majority of data in the database, FEMA enters data related to the NFIP accreditation status for all levees, as well as additional data for some non-federally authorized levees. Data managers in FEMA regional offices populate this information in the database. According to FEMA officials, data are updated as new information (e.g., changes in a levee's accreditation status) becomes available.

What quality control measures do the Corps and FEMA report using for these data?

According to Corps officials, the Corps has put in place multiple quality control measures to help ensure the quality of information in the National Levee Database. These measures include restricting editing access through passwords, tracking changes in data fields, and conducting periodic reviews, according to Corps officials. More specifically:

- Corps program officials stated that only the Corps and FEMA have password access to edit data for federally authorized levees. All other users, including the public, are granted view-only access to this information.
- Corps program officials pointed to several tracking tools embedded in the database that send notifications when information for a given levee has been altered. Corps program officials said that a date stamp appears on the summary page for each levee indicating the most recent updates to data for that levee. Moreover, Corps officials said that whenever a data field is modified for a levee, a date stamp is automatically generated on the edit history log in the database. The log ensures that a detailed chronological record is available for all edits made to information in the database. Only data managers or other users with a National Levee Database account can view the log. The edit history log is not accessible by the public.
- Corps officials stated that they review certain data fields multiple times a year to help ensure the accuracy of the data. In particular, the officials said they review some of the most heavily used data fields, considered priority data fields, such as a levee's condition, to help ensure that the information is current. Corps officials said that these reviews normally take place in Corps district offices and that Corps district program managers often coordinate these reviews with entities that maintain levees.

FEMA officials stated that they also check certain priority data fields (e.g., accreditation status) to help ensure the data are accurate. FEMA officials stated that they perform these quality checks on a periodic basis.

How does the Corps share these data with FEMA?

According to Corps program officials, FEMA has complete access to all information in the National Levee Database, not just the data fields that FEMA manages, which, as noted previously, primarily relate to the NFIP and levee accreditation. According to FEMA officials, FEMA uses information from the database beyond the data fields it manages to help calculate insurance premiums for policyholders in NFIP as well as to assess and map flood risk.

How does FEMA use these data to calculate flood insurance premiums?

FEMA uses data from the National Levee Database to develop a levee rating factor to calculate premiums for NFIP. However, data updates regarding levee

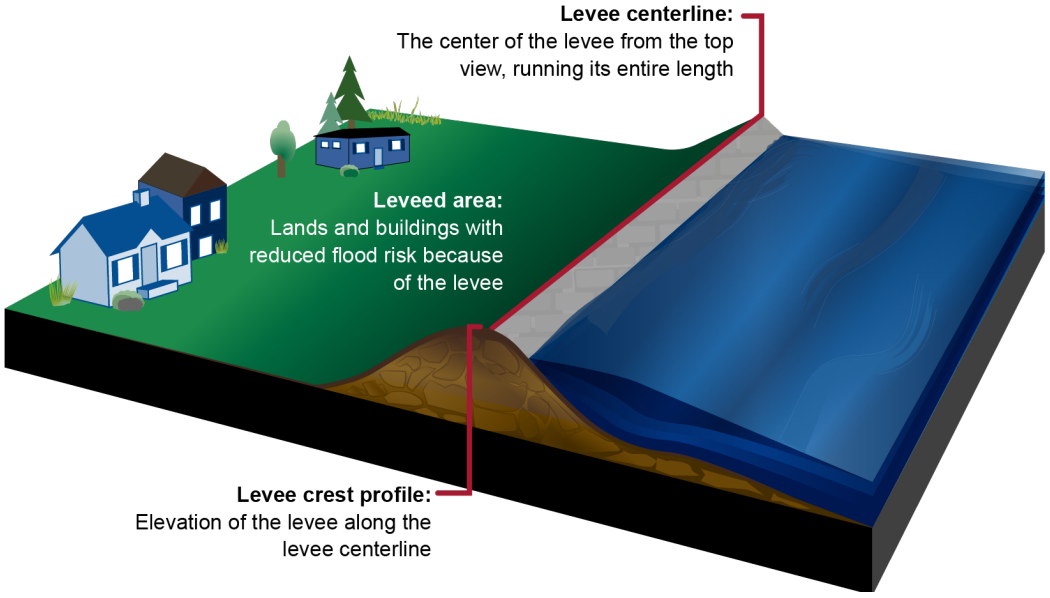
conditions may not substantially affect NFIP insurance premiums, in part because the premiums are based on multiple factors besides the levee rating factor.

In developing the levee rating factor, FEMA uses the following key data elements from the database:

- **levee centerline**, a line that delineates the center of the levee from the top view and runs its entire length;
- **levee crest profile**, a line that represents the side view of the levee and shows the varying elevations along the levee centerline;
- **leveed area**, the lands and buildings with reduced flood risk because of the levee; and
- **levee overtopping frequency**, the likelihood that floodwaters will exceed the height of the levee, allowing them to flow over the top of it.

According to Corps officials, these data elements are from priority data fields reviewed regularly as part of the Corps' data quality control measures described above. Figure 3 illustrates the physical characteristics of levee elements that the Corps includes in the database.

Figure 3: Physical Characteristics Included in the National Levee Database FEMA Uses to Calculate NFIP Premiums



Source: GAO analysis of U.S. Army Corps of Engineers and Federal Emergency Management Agency documentation; GAO (illustration) | GAO 25-107340

Note: The Federal Emergency Management Agency (FEMA) also uses levee overtopping frequency, another key data element from the database, to calculate premiums for the National Flood Insurance Program (NFIP). This element is not depicted because it is not a physical characteristic.

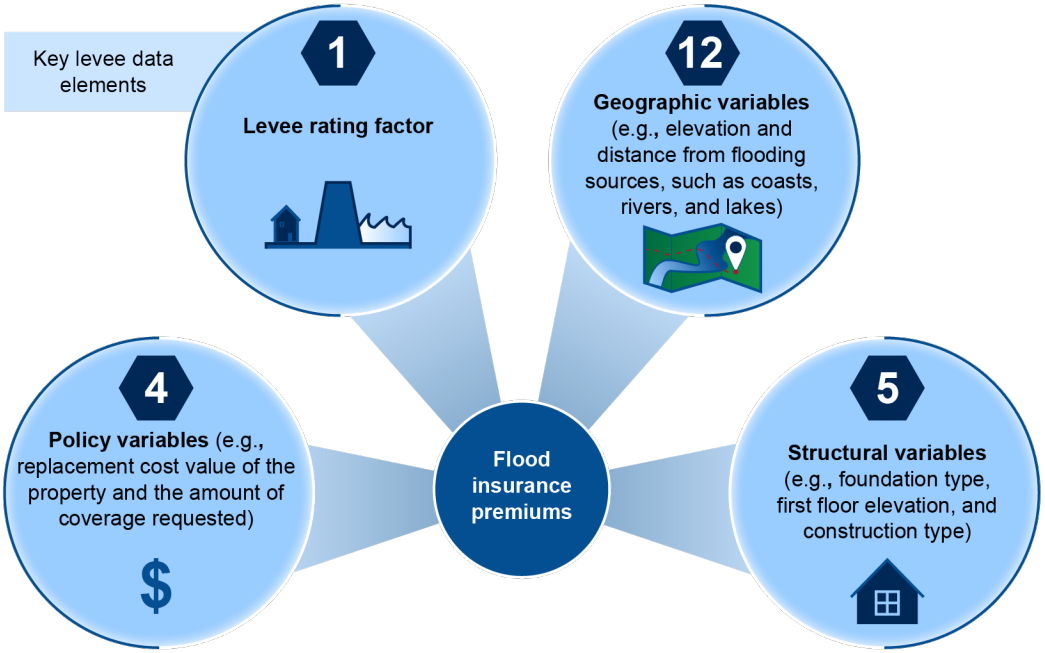
In developing the levee rating factor, FEMA also uses information on levee performance, which is the likelihood that a levee will be breached under various flood scenarios. This information, which FEMA requests annually from the Corps, is primarily from the Corps' Levee Screening Tool, a web-based tool the Corps uses to assess risk associated with levees.

The levee rating factor is one of 22 factors that FEMA uses in calculating NFIP premiums in leveed areas.[6] As shown in figure 4, other factors include

geographic variables, structural variables, and policy variables. According to FEMA officials, because there are so many factors involved in calculating the premiums in leveed areas, levee data alone may not significantly affect the premiums.

Furthermore, any revisions to NFIP premiums resulting from new levee data would occur during a policy's future renewal period rather than in the current policy period, and premium increases are generally limited by statute.[7] Thus, policyholders typically would not see immediate changes in their premiums as the result of updates to levee data in the database, and any increases they do see would generally be limited each year.

Figure 4: Factors FEMA Uses to Calculate National Flood Insurance Program Premiums in Leveed Areas



Source: GAO analysis of Federal Emergency Management Agency documentation; GAO (icons) | GAO 25-107340

Note: The numbers represent the number of factors per category for the 22 factors that the Federal Emergency Management Agency (FEMA) uses in calculating NFIP premiums in leveed areas, according to FEMA officials.

To what extent does the Corps use these data to analyze the benefits and costs of flood risk management activities?

In studying the potential benefits and costs of flood risk management projects—such as levees, floodwalls, or building relocation—to inform decision-makers about potential economic effects, the Corps does not typically rely on data in the National Levee Database. According to Corps officials, there are two primary reasons why the Corps does not do so. First, to ensure that it has the most recent and relevant information on levees, the Corps obtains any data it requires for benefit-cost analyses from other entities, such as state and local governments that maintain or operate federally authorized levees. However, in rare cases, the Corps may use the database as a supporting source to confirm a levee's location, according to Corps officials. Second, because not all flood risk management projects involve levees, information from the database may not always be applicable.

Agency Comments

We provided a draft of this report to the Department of Defense, which includes the Corps, and the Department of Homeland Security, which includes FEMA, for

their review and comment. These agencies provided technical comments, which we incorporated as appropriate.

How GAO Did This Study

To identify protocols and processes for entering and sharing data in the National Levee Database, we reviewed and analyzed relevant laws as well as Corps and FEMA guidance and policies related to the database and the sharing of data from the database. While we did not undertake a full data reliability assessment of the database because we do not directly report on data from the database in this report, we did conduct analyses of the database, its data dictionary, Engineer Circular 1165-2-218, and other guidance documents to discern the types of data being entered in the database and the processes involved with entering such data.

We also reviewed and analyzed FEMA documentation, as well as related laws and regulations, to identify what information from the database that FEMA uses in its calculation of NFIP premiums and to ascertain how those data elements are used in setting and revising these premiums. We analyzed Corps guidance and policies regarding benefit-cost analyses to determine whether the Corps uses information from the database to inform the analyses it conducts associated with flood risk management projects. We interviewed Corps and FEMA headquarters officials regarding the use of the database, including data entry and information sharing in the database.

We conducted this performance audit from January 2024 to April 2025 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

List of Addressees

The Honorable Shelley Moore Capito
Chairman
The Honorable Sheldon Whitehouse
Ranking Member
Committee on Environment and Public Works
United States Senate

The Honorable Sam Graves
Chairman
The Honorable Rick Larsen
Ranking Member
Committee on Transportation and Infrastructure
House of Representatives

We are sending copies of this report to the appropriate congressional committees, the Secretary of Defense, the Assistant Secretary of the Army for Civil Works, the Chief of Engineers and Commanding General of the U.S. Army Corps of Engineers, and the Secretary of Homeland Security as well as other interested parties. In addition, the report is available at no charge on the GAO website at https://www.gao.gov.

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Endnotes

[1]Of the 1,600 federally authorized levees, approximately 150 are either Corps-constructed and operated or levees that Congress has directed the Corps to operate and maintain. The remaining 1,450 federally authorized levees have generally been planned, designed, and constructed by the Corps and another cost-sharing entity, and are then operated and maintained by the cost-sharing entity. Examples of these entities include levee districts; water management districts; and tribal, state, city, and county governments. Federally authorized levees also include levees that were not designed or constructed by the Corps but were incorporated into a federal project by specific congressional action and that continue to be operated and maintained by a cost-sharing entity. The Corps is responsible for assessing these federally authorized levees to ensure they continue to provide their intended benefits.

[2]Pub. L. No. 110-114, § 9004(a), 121 Stat. 1041, 1290 (codified as amended at 33 U.S.C. § 3303(a)).

[3]An updated version of Engineer Circular 1165-2-218 was published on March 5, 2025. It supersedes the version dated April 22, 2021, which expired on March 31, 2023. According to Corps officials, the most recent version of the circular did not materially change information-sharing protocols between the Corps and FEMA.

[4]The Corps is organized geographically into eight divisions in the United States and 41 subordinate districts throughout the United States, Asia, and Europe. The districts oversee project offices throughout the world. The Engineer Circular applies to 38 of these 41 subordinate districts, those that have civil works and levee safety programs. The Japan and Europe districts only have military programs, and the Charleston District does not have levees. Divisions and districts are defined by watershed boundaries, not by states.

[5]An accredited levee system is a system that FEMA has determined meets the requirements in 44 C.F.R. § 65.10 and that FEMA has recognized on a Flood Insurance Rate Map (FIRM) as reducing the flood hazards posed by a base (1 percent -annual-chance) flood. This includes the requirement that the levee owner has adopted an operations and maintenance plan and provided it to FEMA. The area landward of an accredited levee system is shown as Zone X (shaded) on the FIRM except for areas of residual flooding, such as ponding areas, which are shown as a Special Flood Hazard Area. Areas mapped as Zone X (shaded) behind accredited levee systems are not subject to mandatory flood insurance purchase and floodplain management requirements, but flood insurance is still encouraged in these areas.

[6]The levee rating factor is only developed for buildings in leveed areas and is therefore not included in the NFIP premium calculations for buildings located in nonleveed areas that may also qualify for flood insurance.

[7]Per 42 U.S.C. § 4015(e), annual premium increases for most policyholders are limited to 18 percent. For additional information, see GAO-23-105977.