

Introduction

Purpose of this document

The purpose of this application guide is to help users of the US Army Corps of Engineers' (USACE) Levee Screening Tool (LST) apply the various components of the tool in a consistent manner.

Applicability

This document is applicable to all HQUSACE elements, Major Subordinate Commands (MSCs), districts, laboratories, and field operating activities having responsibility for Civil Works projects.

Distribution statement

Approved for public release, distribution is unlimited.

Overview of the National Flood Risk Management Program

The USACE's National Flood Risk Management Program integrates and synchronizes USACE flood risk management programs and activities internally and with counterpart activities of the Department of Homeland Security, Federal Emergency Management Agency (FEMA), other federal agencies, state agencies, and regional and local agencies.

The vision for the program is to lead collaborative, comprehensive, and sustainable national flood risk management activities to protect the public and reduce flood damages in the United States. Specific goals of the program include providing current floodplain information to the public and decision makers, identifying and assessing flood hazards posed by aging flood damage reduction infrastructure, improving public awareness and comprehension of flood hazards and risk, integrating flood damage and flood hazard reduction programs across local, state, and federal agencies, and improving capabilities to deliver and sustain flood damage reduction and flood hazard mitigation services to the nation.

Among the goals of the flood risk management program is to increase appreciation among the public and other stakeholders that levees are but one component of a comprehensive flood risk management strategy for a given location. Flood risk management encompasses flow regulation; river and coastal levee systems; reducing exposure through land use management and evacuation of floodplain residents when there is a threat of inundation; reducing vulnerability by flood proofing and constructing isolating ring levees; and increasing individual and community resiliency through advanced preparation, emergency action planning, purchase of flood insurance, and post-disaster assistance.

Overview of the USACE Levee Safety Program

The USACE Levee Safety Program supports the goals of the National Flood Risk Management Program by working with others to assess, communicate, and manage the risks to people, property, and the environment from inundation that may result from breach or malfunction of components of levee systems.

The Levee Safety Program encompasses several activities, including the inspection of all the levees in the USACE portfolio, as well as their assessment (screening).

Levee Inspection Program

Objectives of USACE levee inspections include:

- Identifying deficiencies or areas that need monitoring or immediate repair.
- Collecting information to make informed decisions about future actions.
- Determining eligibility for federal rehabilitation funding for the levee in accordance with PL 84-99. Levees with an acceptable or minimally acceptable inspection rating are eligible for levee rehabilitation assistance for damages incurred during a flood event.
- Determining if the levee is being properly operated and maintained.
- Determining if the local sponsor is in compliance with the project partnership agreement, if applicable.

The USACE conducts two types of levee inspections—routine inspections and periodic inspections. A routine inspection, also called an annual inspection or continuing eligibility inspection, is performed on an annual basis to ascertain whether the levee system is being properly operated and maintained. A periodic inspection is the next level of inspection and is conducted by a multidisciplinary team led by a professional engineer. It includes a more detailed, comprehensive evaluation of the condition of the levee system and is conducted once every five years. A periodic inspection includes evaluating routine inspection items; verifying proper levee operation and maintenance; evaluating operational adequacy, structural stability, and safety of the system; and comparing current design and construction criteria with those in place when the levee was built. Local sponsors participate on inspection teams and all final inspection results are provided to the local sponsor and to FEMA.

For the Levee Inspection Program, the USACE has developed a single, consistent inspection checklist for use on all the levee systems that USACE inspects. The inspection checklist is incorporated into the Levee Inspection System (LIS) software application. The LIS is a Geographic Information System (GIS)/Global Positioning System (GPS)-based tool that links directly to the National Levee Database (NLD).

The Levee Screening Tool (LST) incorporates and builds upon many elements of the USACE levee inspection checklist, and a levee's inspection rating is an input for the levee screening.

Levee Screening Program

All levees in the USACE portfolio will be screened under this process. This includes federal levees built and maintained by USACE, all federally built and locally maintained levees with an active status, and locally built and locally maintained levees with an active status that participate in the Rehabilitation and Inspection Program. (Levees with active status are those that the USACE has determined have met initial PL 84-99 rehabilitation eligibility criteria and have been rated "acceptable" or "minimally acceptable.")

Decisions for all aspects of the Levee Safety Program are risk-informed. This means that the risk (likelihood and consequence) of inundation of floodplain properties and occupants that may be associated with the presence of a USACE levee system is assessed and used to supplement historic practices of standards-based decisions.

The program uses a portfolio risk management process to prioritize nationally each levee system for action to reduce risk. The headquarters of the USACE manages the risk assessment and prioritization of risk management actions for the portfolio of levees; levee safety risk management actions are executed at the local district level. Figure 1 is a diagram of the USACE levee portfolio management process.

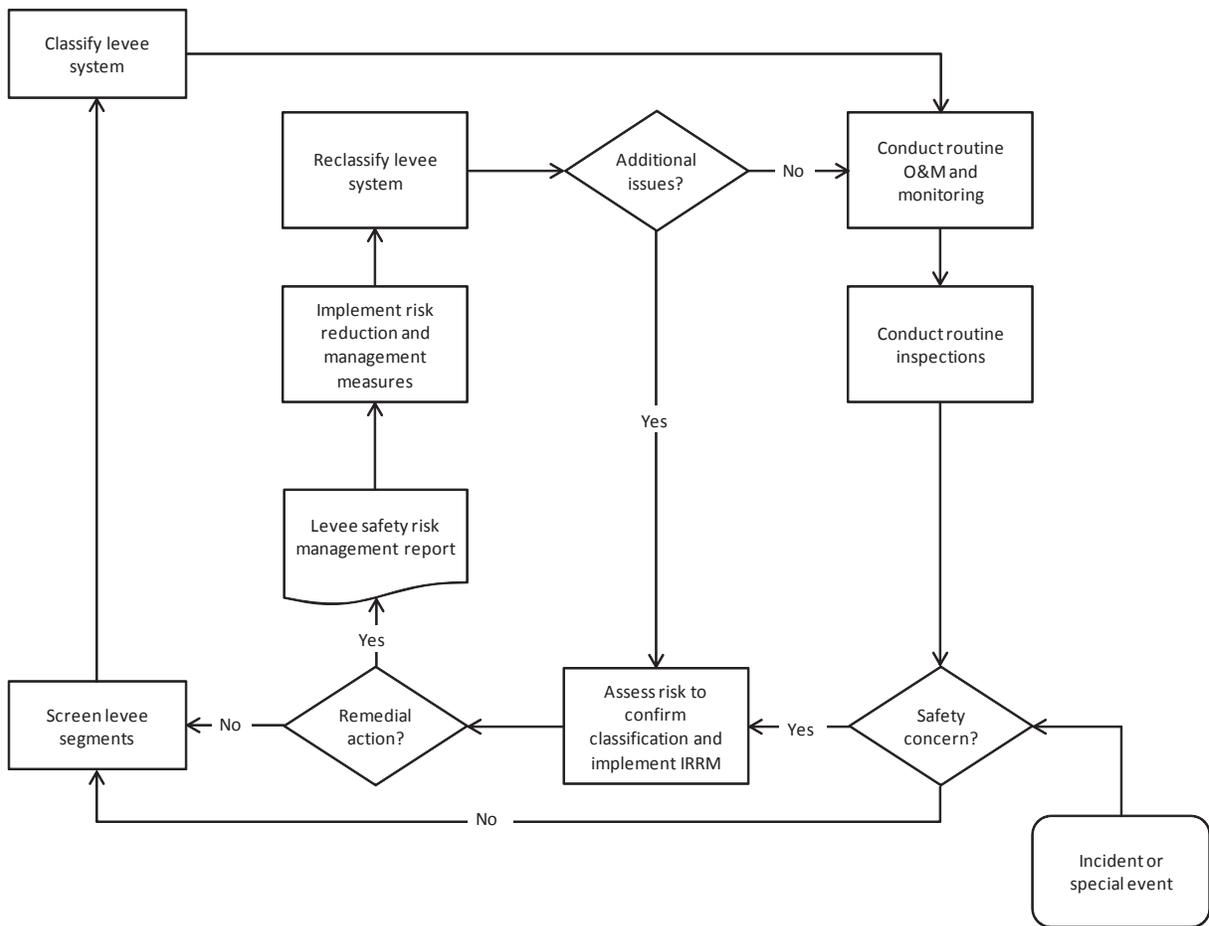


Figure 1. USACE levee portfolio management process

Under the principles of shared risk, shared responsibility, shared accountability, and shared solutions, the USACE levee safety program works with stakeholders to recommend actions to assure that the inundation risk associated with the presence of a levee system are tolerable. Community officials and floodplain occupants make decisions based in part on their understanding of the inundation risk associated with the presence of the levee system. By considering the entire inventory of levee systems and associated floodplains, those levee systems with the highest risk can be identified and risk management measures implemented in such a manner that the overall risk can be reduced efficiently across the USACE portfolio of levee systems. For this reason, it is imperative that this inundation risk is assessed and clearly communicated to responsible officials and the public.

Overview of the USACE levee screening process

The USACE levee screening process identifies and evaluates, at a high level, the safety issues of levees and assesses the inundation risk. The goal of levee screening is to obtain an initial classification of risk and prioritize risk management activities. These activities include interim risk reduction measures, permanent risk reduction measures, and more robust risk assessments.

In a levee assessment, screeners use existing information to make judgments about the ability of the levee to perform as intended. Existing information might include reports from routine inspections and periodic inspections, design analyses, design or as-built drawings, observed performance during flood events, and national datasets such as the national elevation dataset and the FEMA HAZUS database.

This information is reviewed by a team of screeners comprising qualified levee safety professionals. Specific qualifications needed may vary from one levee to another, but expertise typically required includes hydrology, hydraulics, geotechnical engineering, structural engineering, and consequences. Members of the screening team use the LST to characterize and document their understanding of the levee and arrive at a quantitative assessment of the risk.

The levee screening inputs and outputs, along with other available information, are checked for quality and consistency by an independent review team. When the review is completed, the review team develops a preliminary recommendation for classification.

The screening information and classification recommendation are submitted to a group of senior level decision makers that develop a formal recommendation for classification. The USACE Levee Safety Officer then renders a decision on the classification for the levee.

Levees within the USACE portfolio are screened by segment. Segments are typically defined according to which entity is responsible for operating and maintaining a portion of the levee system.

The classification for the levee system is obtained by adopting the worst classification for any segment within the system as the classification for the overall system.

Overview of the USACE Levee Screening Tool

The LST is a Web-based tool that facilitates the collection, organization, evaluation, and reporting of information about the general condition and associated risks of levees in the US. With the tool, users combine routine inspection information (from the NLD and elsewhere) with existing, readily-available hazard (loading) and

performance information, along with engineering judgment, to describe the ability of a levee system to perform as intended and the potential consequences of failure.

The reports that analysts produce with the LST are used to prioritize which systems are to be looked at in greater detail, and to determine whether funding repair or improvement is the most efficient use of funds from an overall risk reduction perspective. Levees identified as higher risk through this screening process are targeted for interim risk reduction measures and receive priority for implementing more robust risk assessments. Levee screening results are communicated to owners, stakeholders, and the public for prioritization and action.

Levee Safety Action Classification

After the levee system has been screened and a risk index determined, it is classified according to the USACE Levee Safety Action Classification (LSAC) system. The LSAC system is used to guide decisions in the portfolio management process. All levee systems are assigned an LSAC informed by the most recent risk assessment available. Initially, LSAC assignments will be informed by screening-level assessments, but as the process advances, more rigorous risk assessments will be conducted on selected systems and the LSAC for those systems will be updated accordingly. The LSAC of a levee system may change as a levee system is modified or more refined information becomes available that affects any of the risk determinants.

The five classes used in the USACE levee safety portfolio risk management process are:

Class I – Extremely high risk warranting “urgent and compelling” actions to reduce risk.

Class II – Very high risk warranting “urgent” actions to reduce risk.

Class III – Moderate to high risk warranting “high priority” actions to reduce risk.

Class IV – Low to moderate risk warranting “priority” actions to reduce risk.

Class V – Very low risk considered tolerable, requiring only that “normal” levee safety activities continue.

More information on the LSAC system and its role in the portfolio management process is provided in Attachment 2 to the *Levee Screening Tool Application Guide*.

A note on terminology

Hydrologic and hydraulic terms

The text in this document uses the following terminology wherever appropriate:

- “Function” or “relationship” instead of “curve.”
- “Probability” instead of “frequency.”
- “Discharge” instead of “flow.”

For example, a flow-frequency curve is referred to herein as a discharge-probability function.

The term “water surface elevation” is used instead of “stage” to indicate a vertical distance to a selected vertical datum. The LST uses the Corps standard, which is the

North American Vertical Datum of 1988 (NAVD88). "Elevation" is to be distinguished from depth at a site measured relative to a local site datum.

Note that while this document aims for consistency in its use of terms, the LST user will see the terms curve, frequency, stage, and flow on some of the LST pages (and the text reflects what is on the page when referring to particular LST features).

Levee system

Some of the questions that an LST user must answer refer to the "levee system." As used in the LST, a levee system comprises the levee and floodwall components and other features that collectively exclude flood water from the associated floodplain.

Highway and railroad embankments or other non-levee features that act to exclude flood water from the floodplain are considered to be part of a levee system for evaluation purposes and are to be evaluated with the same criteria and processes as structures and features specifically planned and constructed as components of the flood risk reduction system.