

National Levee Safety Guidelines

Best Practices for Managing Levees in an Uncertain Future

November 8, 2023



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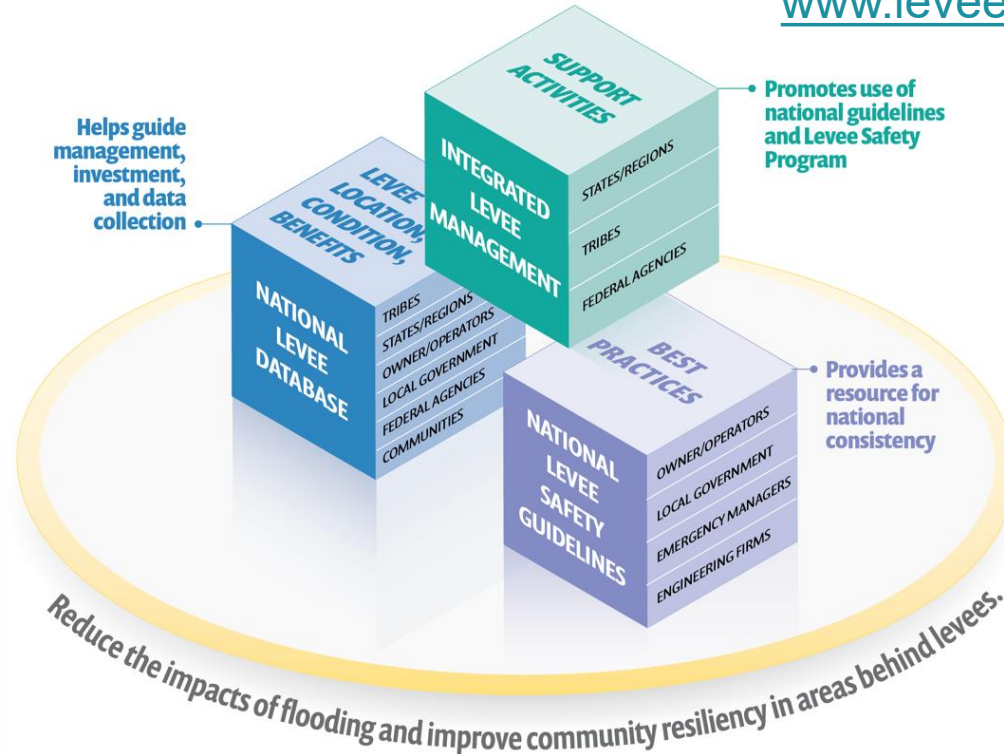
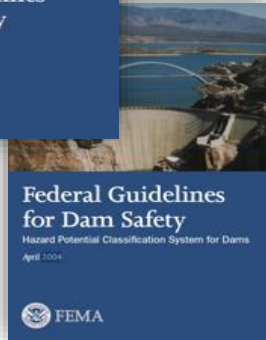
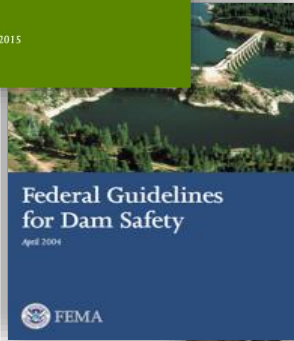
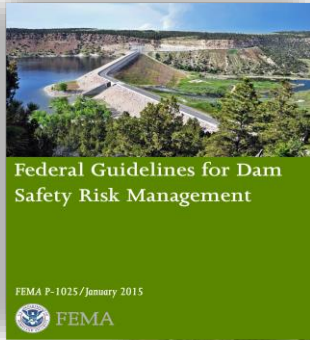
*USACE Levee Safety Center, National
Levee Safety Guidelines Lead*

On behalf of:

National Levee Safety Program (33 USC Ch. 46)

Main Components

www.leveesafety.org



National Levee Database

San Mateo County Levee 35

Date Last Updated 05 / 10 / 2023 Info Map DATA CHANGE REQUEST ? DOWNLOAD DATA ?

Location Menlo Park, San Mateo County, California USACE Districts San Francisco FEMA Regions 9

SUMMARY SYSTEM SEGMENTS RISK FEATURES PROFILE FEMA - NFIP/FIRM ATTACHMENTS

Levee System Overview

VIEW

No Data Entered

Levee Performance and Potential Lost Benefits

VIEW

Risk Not Screened

What is Behind the Levee?

Population	Buildings	Property Value
6,916	3	\$13.2M


Structure and Features

VIEW

Total Miles	Length of Embankment (miles)
6.66 Miles	6.66
Length of Floodwall (miles)	Year Constructed
0	No Data Entered
Maximum Height	Number of Closure Structures
0	No Data Entered

Key Documents

VIEW

Levee System Summary 

FEMA - NFIP/FIRM Information

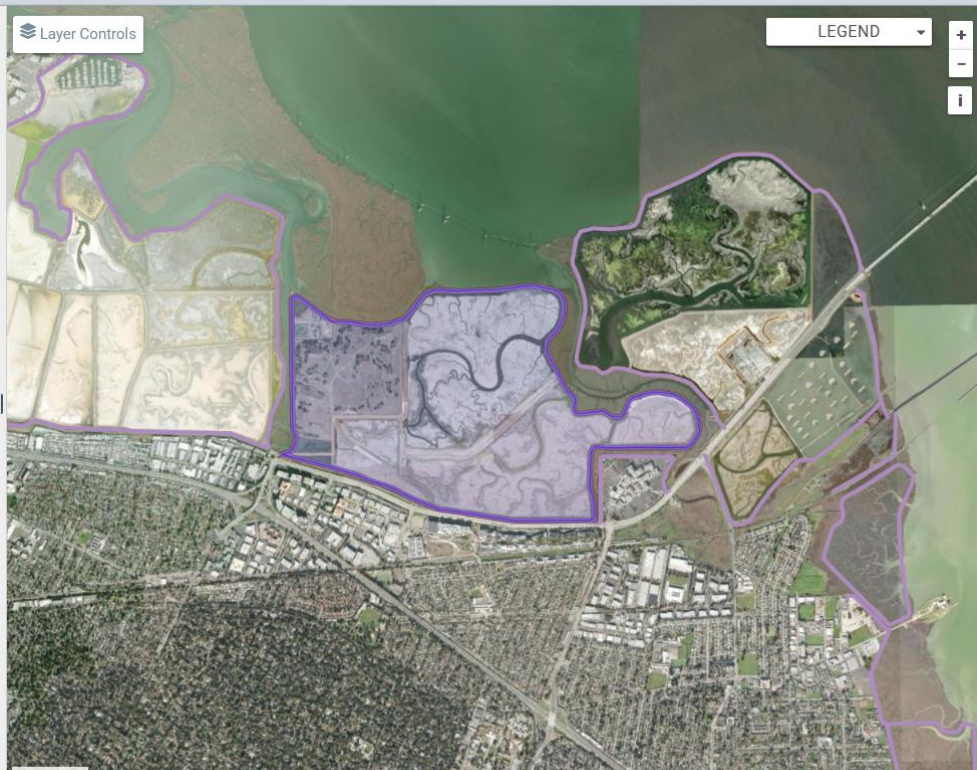
VIEW

FIRM Status
Non-Accredited Levee System

USACE Rehabilitation Status

VIEW

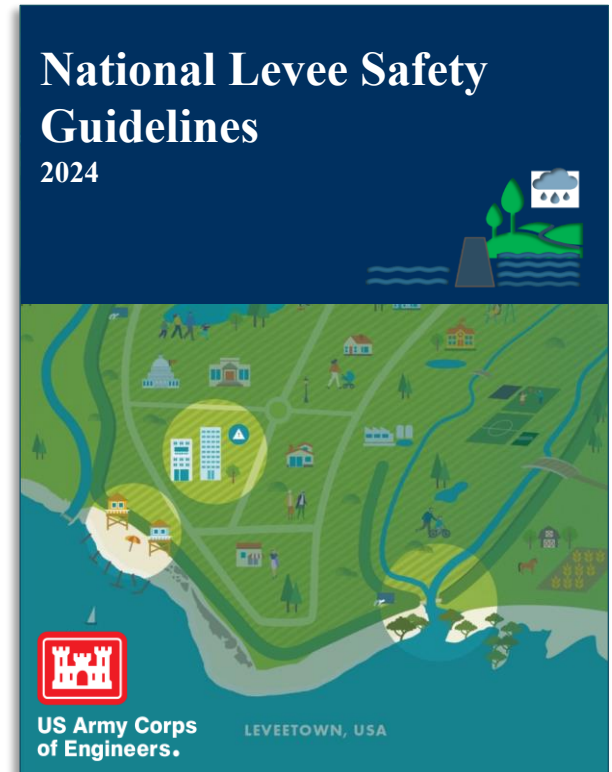
Status
Major Rehabilitation



National Levee Safety Guidelines

GOAL - serve as a national resource of voluntary, best practices to help achieve **nationwide consistency in improving the reliability of levees and resiliency of communities** behind levees throughout the United States.

- Scalable and adaptable to local conditions

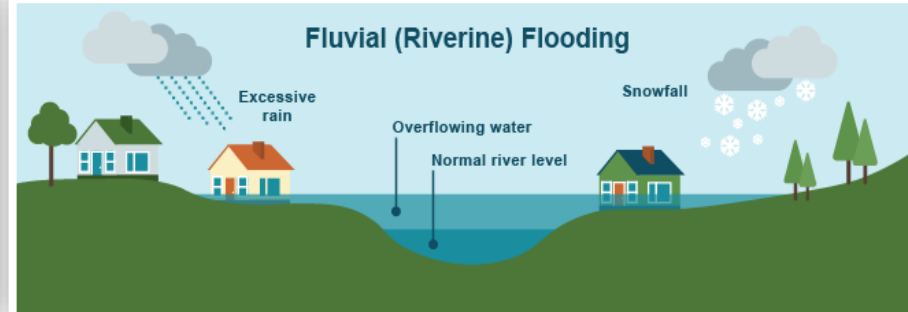


National Scope: Suite of Risks, Levee Types

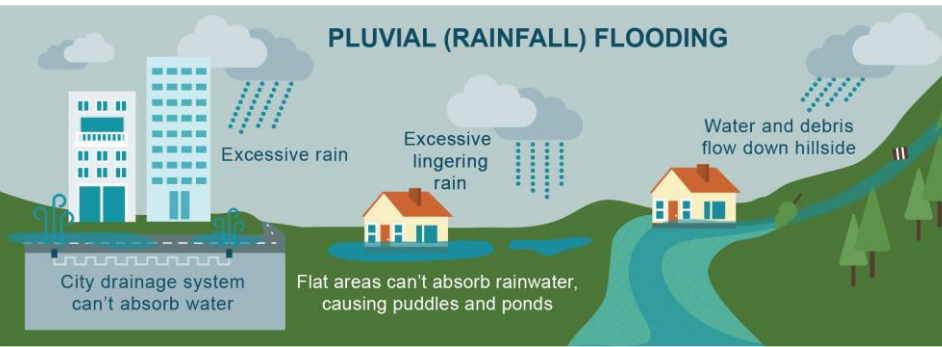
Coastal Flooding



Fluvial (Riverine) Flooding



PLUVIAL (RAINFALL) FLOODING



National Levee Safety Guidelines

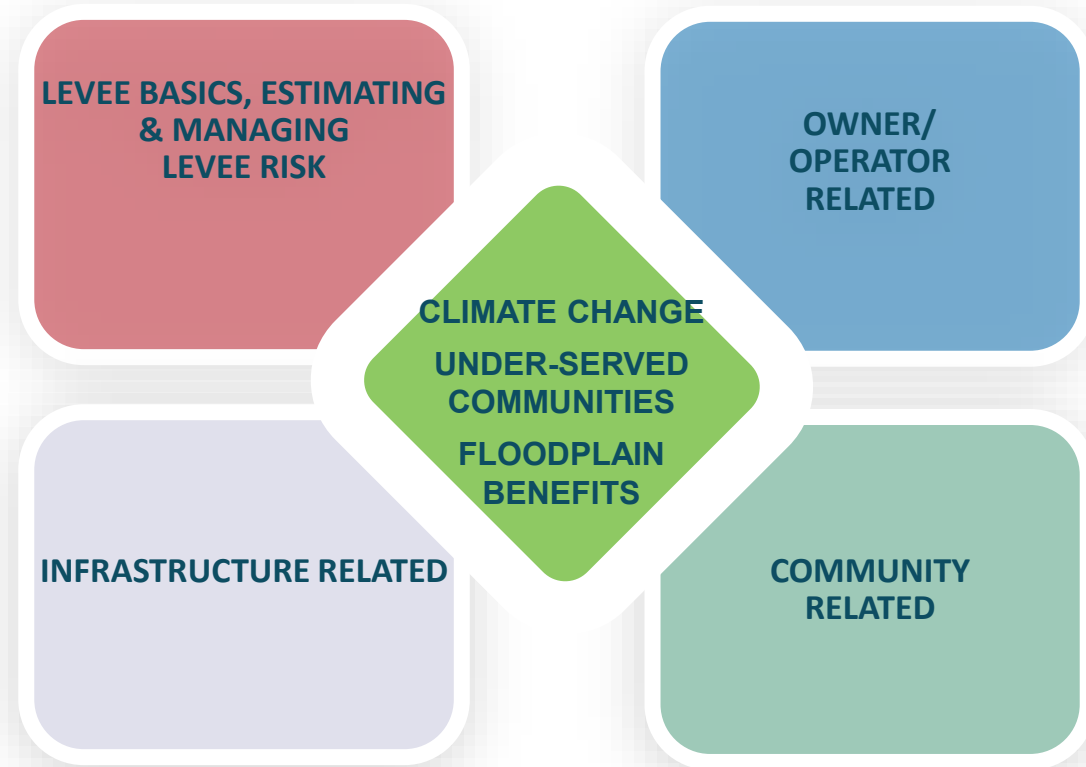
Team Composition

- Private sector author teams (12 authors)
 - Multi-disciplinary technical Subject Matter Experts
- Comprehensive Literature Review
 - 1,500 documents
- 12 Chapters plus cross-cutting content



National Levee Safety Guidelines

General Topics

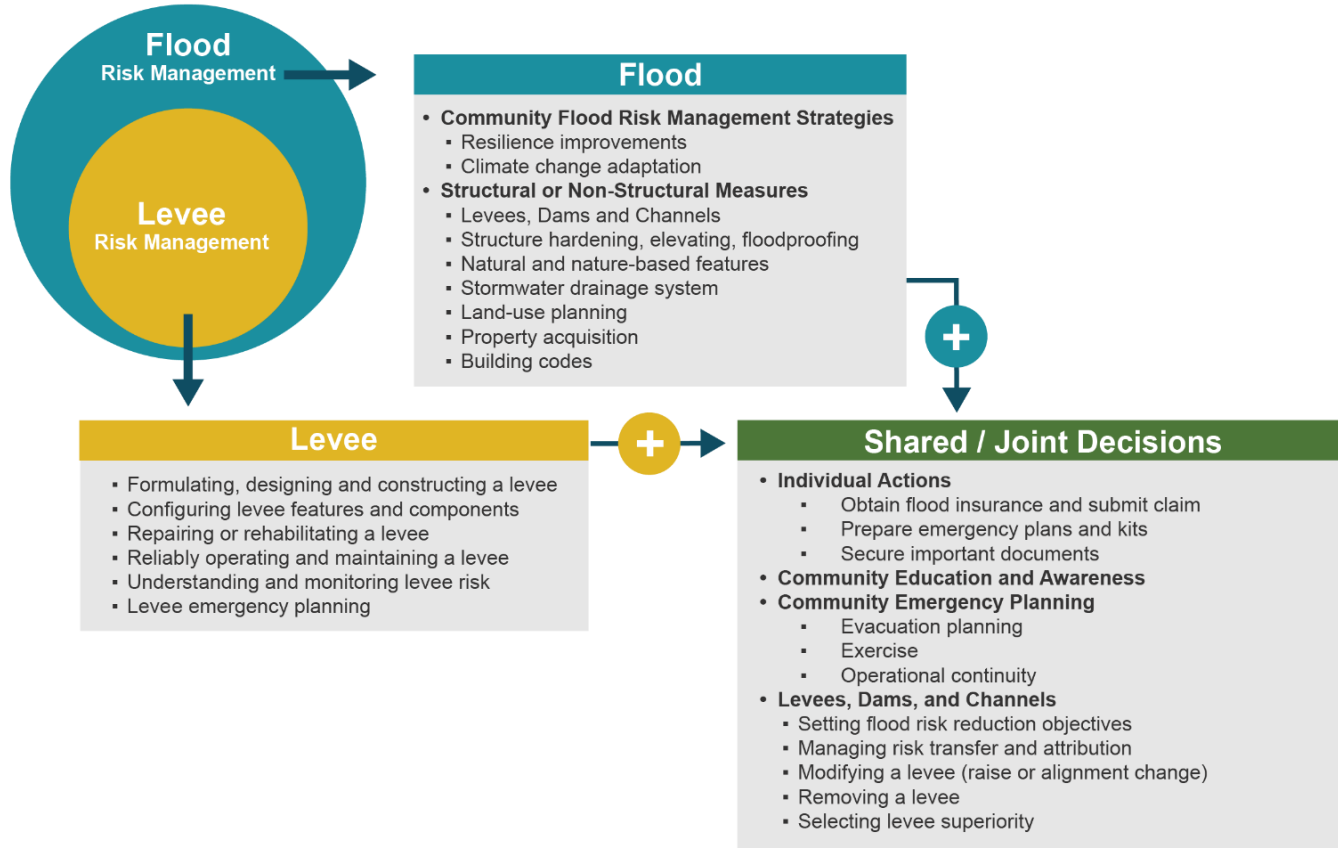


National Levee Safety Guidelines

Guiding Principles

- **Guiding principles** for developing best practices:
 - Life safety is the most important consideration
 - Levee safety is a shared responsibility
 - Levees should exist in balance with social, environmental, cultural, and economic interests within the floodplain
 - Levee risk should not contribute significantly to the overall flood risk
 - Transparent, proactive, and continuous communication and engagement is essential

Key Concept: Levee Risk as a component of Flood Risk



National Levee Safety Guidelines

Key Concept: Risk-Informed Decision-Making



HAZARDS

What are the hazards and how likely are they to occur?

PERFORMANCE

How will the levee perform in the face of these hazards?

CONSEQUENCE

Who and what are in harm's way?
How susceptible to harm are they?
How much harm is caused?



COMPONENTS OF RISK

Risk = f (Hazard, Performance, Consequence)



Reduce Hazards

Flood Hazards

- Create Room for the River
- Conjunctive Use

Non Flood Hazards

- Underground power lines
- Prepare to mitigate slide risks after wildfire

Partner for regional weather solutions

Improve Performance

Traditional structural solutions

- Strengthen, widen, or raise
- Consider additive levees designed to be raised as conditions change
- Adjust O&M to new conditions

Add Nature Based Solutions

- Wetland & floodplain restoration
- Horizontal green levees
- Beach replenishment

Reduce Consequences

Living with floods

- Elevating structures
- Flood-proofing buildings

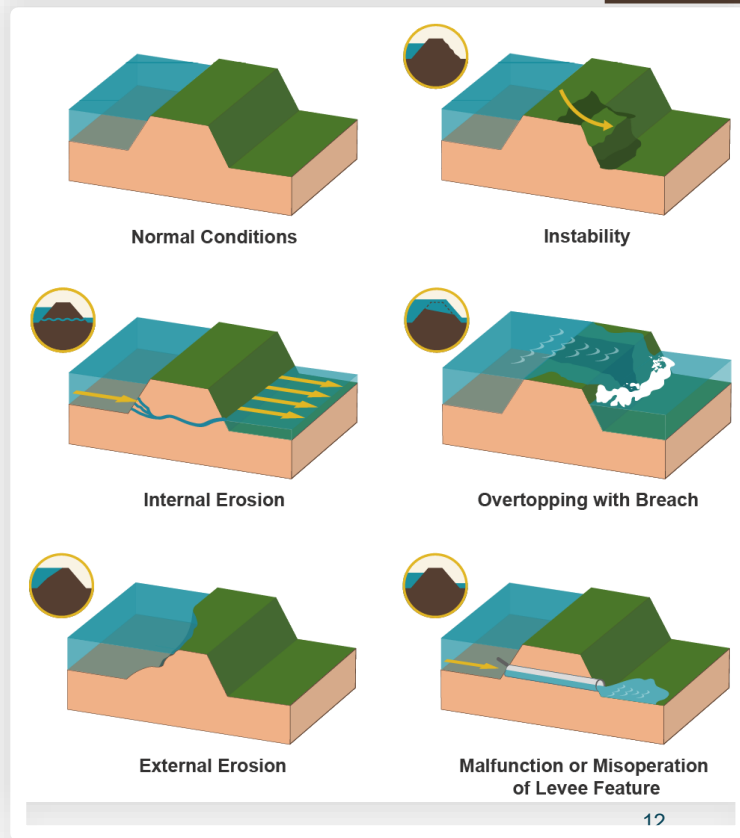
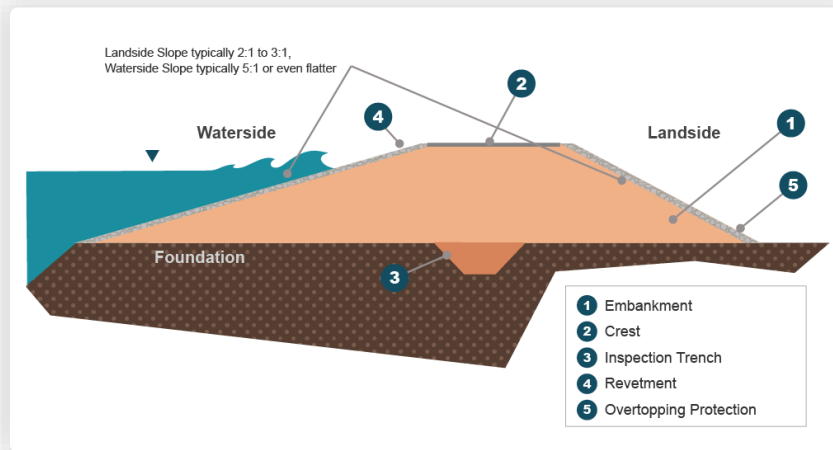
Behavioral Solutions

- Acquisition/Relocation
- Managed Retreat
- Conjunctive Use

From the Basics: Understanding Levee Fundamentals



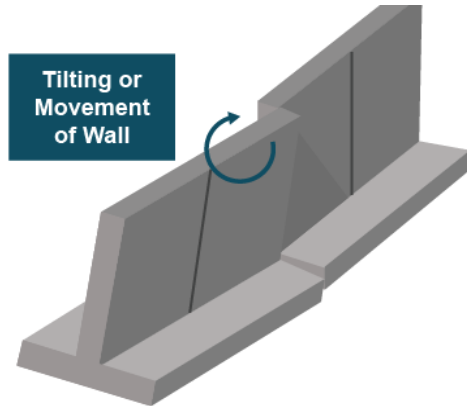
- Levee Basics
 - Levee Function
 - Levee Form
 - Levee Features
- Potential Failure Modes



To Rapidly Changing Conditions: Ex. Wind & Debris Flow Impacts



- Changing wind types & locations
- Understanding impacts:
 - Blocked drainage
 - Inoperable gates
 - Impact damage to walls, instruments
 - Power & communication outages



Damage from Hillary, Rancho Mirage. Aug 21, 2023.
David Swanson/ AFP/Getty Images

Aug. 21 | Rancho M...
A worker, from the...
surveyed the debris...
Club.

Ch. 4: Estimating Levee Risk

Ch. 5: Managing Levee Risk

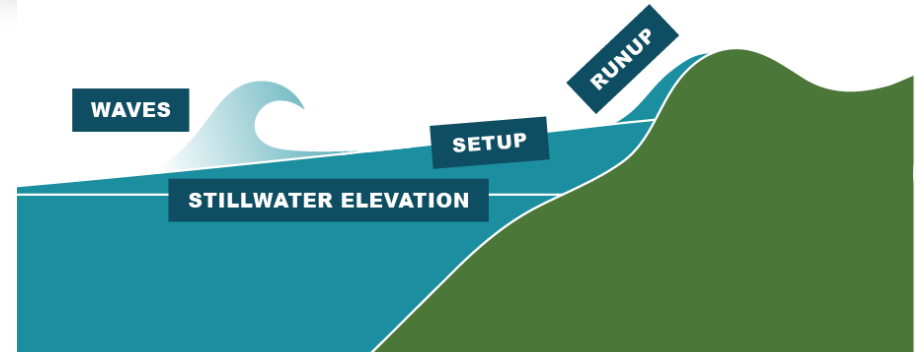
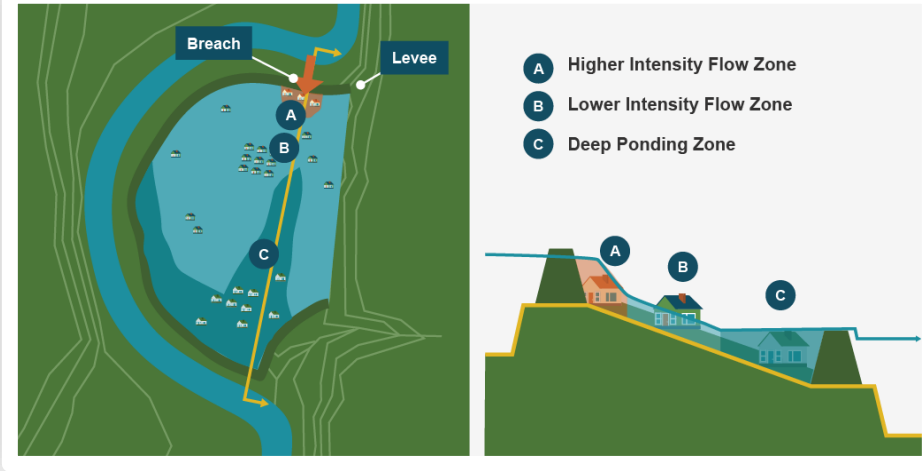


Estimating Levee Risk

- Risk Concepts
- Risk Assessment Overview
- Estimating Hazard, Performance and Consequence
- Calculating Levee Risk
- Risk Portrayal and Communication Aids
- Risk Characterization

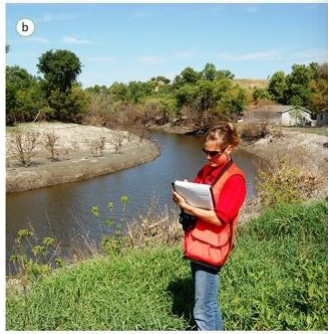
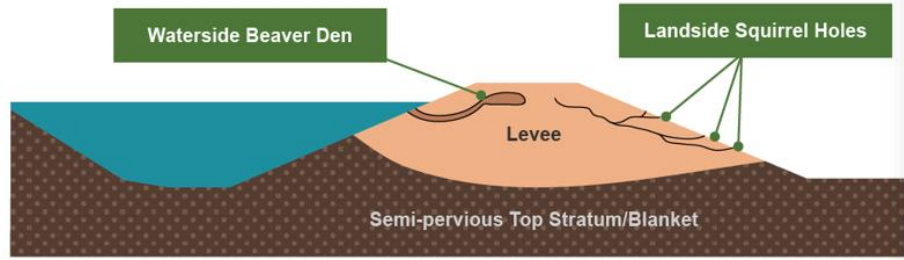
Managing Levee Risk

- Levee Risk Management Overview
- Levee Risk Management Responsibilities
- Risk Management in the Levee Lifecycle



Ch. 9: Operating and Maintaining a Levee

Ch. 10: Managing Levee Emergencies



COLLABORATION
Levee owner/operators, emergency management agencies, and other stakeholders work together to manage levee emergencies.



PREPAREDNESS
Understanding:

- Risks and vulnerabilities
- Roles and responsibilities
- Actions to reduce likelihood or impacts of emergencies



RESPONSE
Activating plans to:

- Communicate issues
- Leverage existing capabilities and resources
- Identify and classify issues
- Effectively respond to emergencies



RECOVERY
Evaluating conditions to:

- Restore infrastructure and services to community
- Refine preparedness
- Increase resiliency of infrastructure and community

Reexamining Emergency Response Plans – Chapter 10

10



Managing
Levee
Emergencies

Emergency response capacity may need to be **larger** and more **redundant**.

Why?

- A. Weather prevents access - flood response delays
- B. First responders may be overwhelmed
- C. Larger, widespread events may prevent outside assistance
- D. Communication may be spotty to nonexistent



Highway 1, Monterey County, Jan 2023. Caltrans/ Heath Johnston

National Levee Safety Guidelines Public Review and Stakeholder Engagement

- Draft release (Planned Nov. 1, 2023)
 - Full draft in pdf format (Approx. 600 pages)
 - Review period – 120 days (through end of Feb. '24)
- Stakeholder engagement (Planned late '23 – early '24)
 - Targeted outreach for under-represented audiences
 - Invitational focus groups
 - Topic &/or audience based
 - Virtual &/or in-person



*Stay informed....opt-in to
the list serve at
www.leveesafety.org*

Multiple Ways to Provide Feedback Coming Soon

**WEBSITE
FORMS**
www.levesafety.org



EMAIL
hq-
levesafety@usace.army.mil



FEDERAL REGISTER
www.federalregister.gov
Docket Number: COE-2021-0007

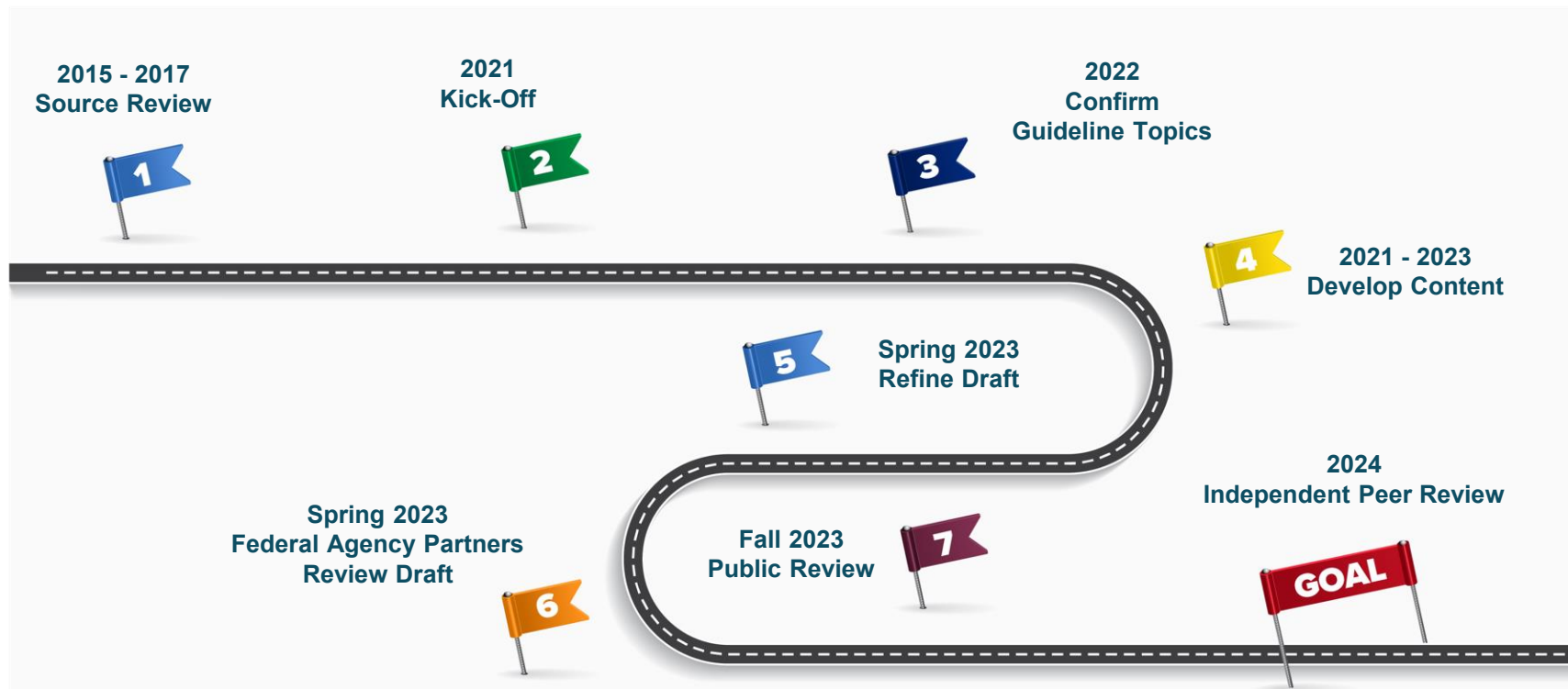














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Stay informed....opt-in to the list serve at
www.levesafety.org

National Levee Safety Guidelines *Development Timeline*



CH 1 	CH 2 	CH 3 	CH 4 
Managing Flood Risk	Understanding Levee Fundamentals	Engaging Communities	Estimating Levee Risk
CH 5 	CH 6 	CH 7 	CH 8 
Managing Levee Risk	Formulating a Levee Project	Designing a Levee	Constructing a Levee
CH 9 	CH 10 	CH 11 	CH 12 
Operating & Maintaining a Levee	Managing Levee Emergencies	Reconnecting the Floodplain	Enhancing Community Resilience