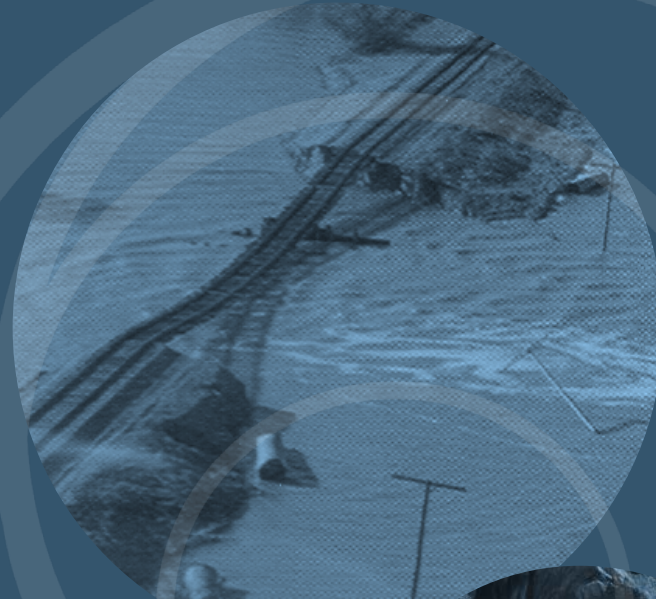


Integrating Dam & Levee Safety and Community Resilience

Community Resilience ≡

The ability of a community to withstand shocks to its infrastructure.



Historical Background



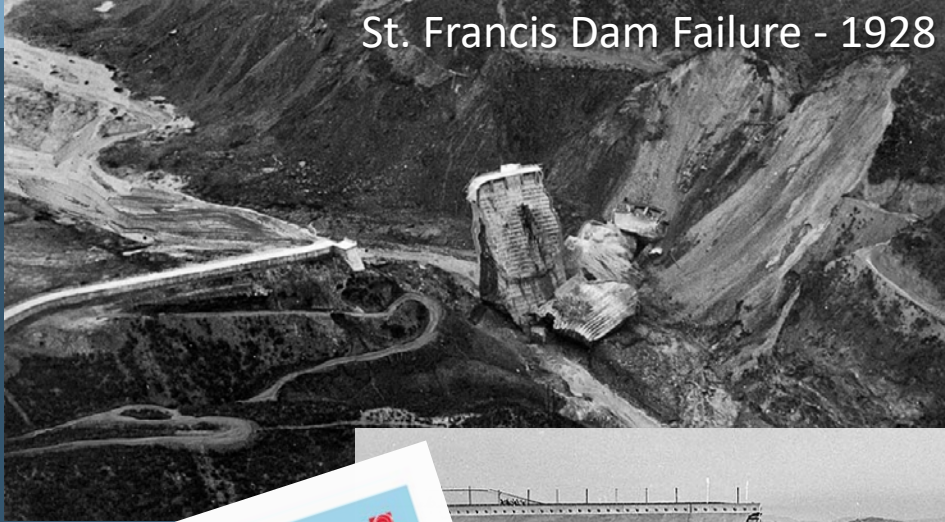
Dam Safety in the USA

- 85,000 State Jurisdictional Dams
- Some State Dam Safety Programs are nearly 100 years old
- Most State Dam Safety Programs are chartered and authorized by state laws and regulations
- Most State Dam Safety Programs are responsible to “Prevent loss of life and property as a result of dam failure”

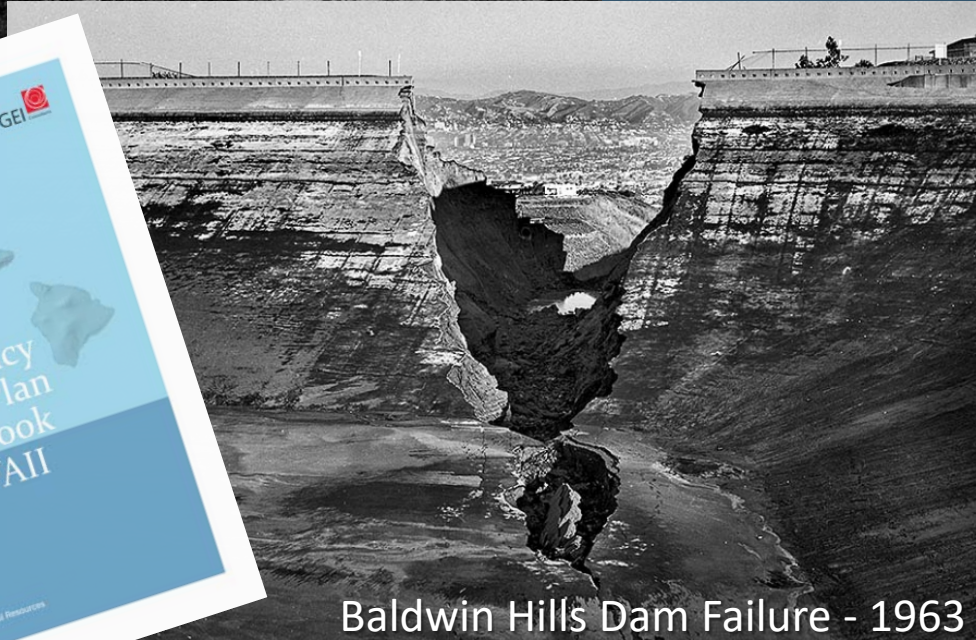
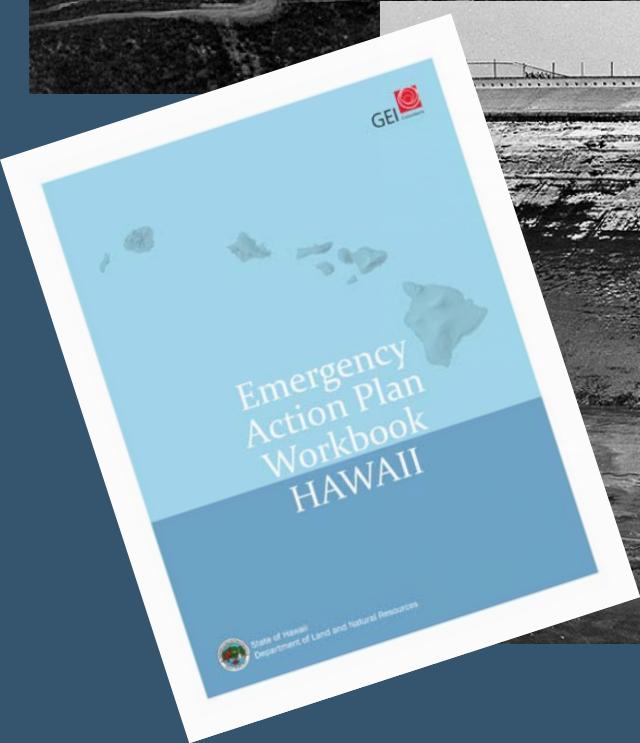
Historical Background



St. Francis Dam Failure - 1928



- Dam Failure is often defined as the uncontrolled release of reservoir contents.
- Most dam safety programs did not originally include “Emergency Action Planning” and many today still do not have that authority. (Resiliency is not often authorized or part of tradition)



Baldwin Hills Dam Failure - 1963

Historical Background



“The traditionally engineering – oriented dam safety community, however, has not considered cumulative effects beyond geotechnical or hydrologic issues of dam safety and risk management”

What Will it Take?



Paradigm
Shift

New
Authorizing
Legislation

Change
Management

Reorientation from
Deterministic to Risk-
Based Approach

Engagement and Support
from a Much Larger
Community:

- Local government
- Planning agencies
- Elected officials
- The public

Case Study

Levee Safety – New Opportunities



- Long history of USA levee failures
- Estimated that there are more than 100,000 miles of non-federal levees in the USA
- Levee safety programs are fewer and less well defined than State Dam Safety programs
- Levees are typically designed to lower standards and failures are much more common
- Hurricane Katrina – Recent defining event

Case Study

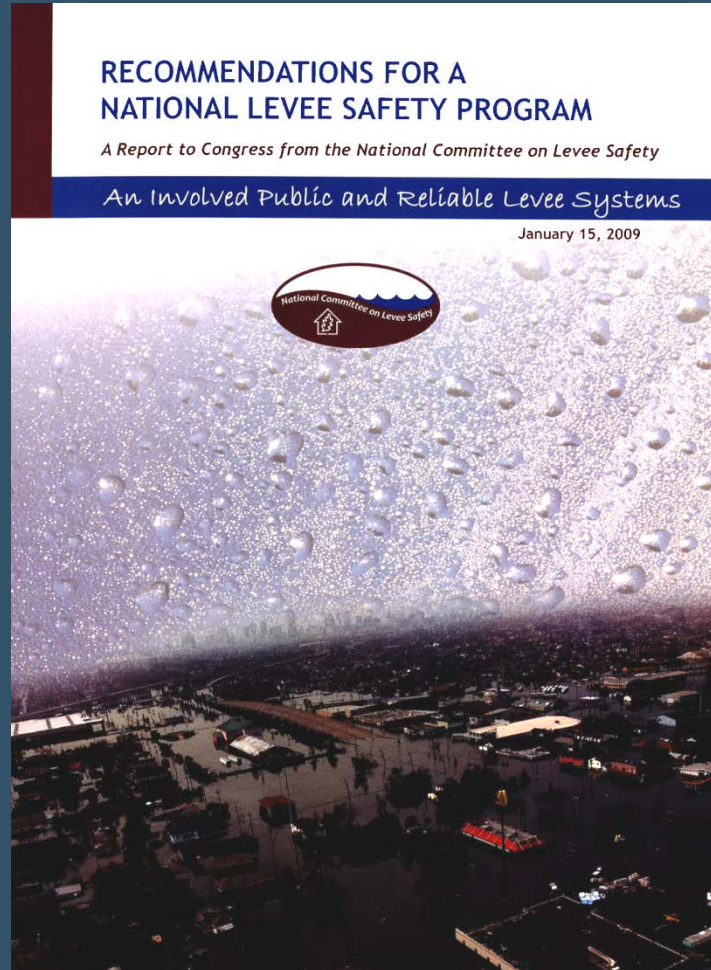
Levee Safety – New Opportunities



National Levee Safety Act of 2007

- Formation of National Committee on Levee Safety, Fall 2008
- Publication of Strategic Plan, January 2009 to OMB (report draft never went final)

Recommendation for a National Levee Safety Program (NCLS)



- Creation of New Federal Leadership
- Creation of State Levee Safety Programs
- Development of Tolerable Risk Guidelines
- Requirement of Mandatory Flood Insurance
- Improved communication and collaboration among federal government levee agencies
- Funding for levee remediation and improvement projects

Overall Outcome



- NCLS was extended to 2013 and advocated for acceptance and implementation.
- National Levee Safety Act was authorized in WRRDA 2014 but not funded.

Holistic Systematic Approaches - Needs



- Statutory definition and broadening of dam safety and levee safety programs
- Implement well documented risk-based design criteria
 - Link design performance to pre-event planning, communication and response: For Example...

Holistic Systematic Approaches - Needs



What does resilience look like?

1:25
Year
Event

- Failure not expected
- Pre-flood communication/warning plan
- Evacuation routes readied
- Etc.

1:100
Year
Event

- Failure expected
- Flood warning plan issued
- Evacuation executed
- Etc.

Holistic Systematic Approaches - Needs



- Land-use planning
 - Engineering community provides information does not control
 - Components that do not commonly exist
 - Disciplined zoning activities
 - Flood Control requirement set in law
 - Integrated flood control systems
 - Highly protected areas
 - Planned floodways
 - Flood easements

Communication and Engagement - Needs



- Commitment by participating agencies
- Common understanding of roles and responsibilities
 - Dam and Levee Safety Officials
 - Owners
 - Emergency Response Officials
 - Law Enforcement
 - Public
- Well **practiced** Emergency Action Plans



Oroville Dam Spillway Incident February 7, 2017

Response and Recovery

Response



Initial Response Activities



- Set up Incident Command structure
- Cleared vegetation below Emergency Spillway
- Fortified terrain downstream of Emergency Spillway
- Managed reservoir to avoid spilling over Emergency Spillway

Continuing Response Activities

(During and After Emergency Spillway Operation)



- Evacuation of 180,000 downstream residents
- Increased armoring downstream of Emergency Spillway
- Relocation of high-voltage power lines
- Dredging river of 1,000,000 cy of debris



Armoring of Emergency Spillway



Dredging the River



Recovery



Recovery Objectives



2017 Project Objectives:

(to be Accomplished by November 1, 2017)

- Gated Spillway Restored and Operated to Prevent Discharges on Emergency Spillway
- Maximize Reliable Capacity of Upper Chute of Gated Spillway
- Restore at least Moderate Capacity of Lower Chute of Gated Spillway
- Build at least Minimum Capacity of Emergency Spillway

Spillways Flow Objectives



Design Objectives
for November 1,
2017

2017 Spillway Reconstruction

