Levees: PL84-99 and the NFIP

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Omaha District

US Army Corps of Engineers
BUILDING STRONG®

Objectives and Overview

- **Objectives:**
  - **Identify overlaps between Federal Programs**
  - **Identify programmatic difference between federal programs**
  - **Understand the history of programs**

- **Overview**
  - **NFIP**
    - **Basics**
    - **History**
    - **Why 100-yr**
  - **PL84-99 and Levee Safety Program**
    - **History**
  - **Compare and Contrast Programs**

Basics of the NFIP

- 3 Parts
  - Risk Identification - Flood Insurance Rate Maps
    - FHBM – FIRM – DFIRM – NFHL-RiskMap
    - msc.fema.gov
  - Floodplain Management - Minimum building standards
    - Homes must be located outside the floodway
    - Homes must be elevated above the BFE
    - Construction in the Floodplain must received a permit
    - Mandatory purchase of homes in SFHA which have a federally backed loan
    - etc
  - Flood Insurance
    - Subsidized Rates ~20%
    - Unsubsidized Rates
      - Actuarial rates are based upon the depth of flooding from the Base Flood on the Flood Insurance Rate Map (FIRM)

- NFIP is a public program (it operates differently than an insurance company)
  - includes public policy components
  - Subsidized vs. Actuarial premiums – establishing a financially stable program has proven difficult (2004, 2012)
  - Post funded losses vs. prefunded losses
  - Map Adoption

History of the NFIP

- 1917 & 1936 Flood Control Act
- 1929 Private Insurance industry abandons coverage
- 1956 Federal Flood Insurance Act - Unfunded and ceased to exist
- 1968 National Flood Insurance Act
  - Created the NFIP and the Federal Insurance Administration
  - **Established the 100-yr as the "standard"**
- 1973 Flood Disaster Protection Act
  - **Mandatory Purchase Requirement**
- 1975 Recognized need for a policy on treatment of levees in the NFIP
  - Examples of levee construction solely for the purpose of removing the Mandatory Purchase requirement
  - Concerns that citizens were being asked to pay for insurance as well as maintain a levee
- 1982 A Levee Polity for the NFIP (national academy press)
- 1986 **44CFR65.10 – codifies standards for levee certification**
- 1982 CBRA 1994 CRS 2004 FIRA
- 1997 USACE began use of risk and uncertainty
- 2003 – 2008 MapMod – large effort to update FEMA maps
  - 2005 PM 34 – Interim Guidance on Levee Mapping
  - 2007 PM 43 – PAL – Provisionally Accredited Levees
  - 2008 FHWA memo regarding use of embankments for flood protection
  - 2009 PM51 – guidance for mapping non-levee embankments
- 2012 Biggert-Watters (aka BW12)
  - Move toward Actuarial Rates
- 2013 **LAMP** Levee Analysis and Mapping Procedures for Non-Accredited Levees
- 2014 Homeowner Flood Insurance Affordability Act (HFIA)
  - Delays and slows the increase in insurance premiums as a part of BW12

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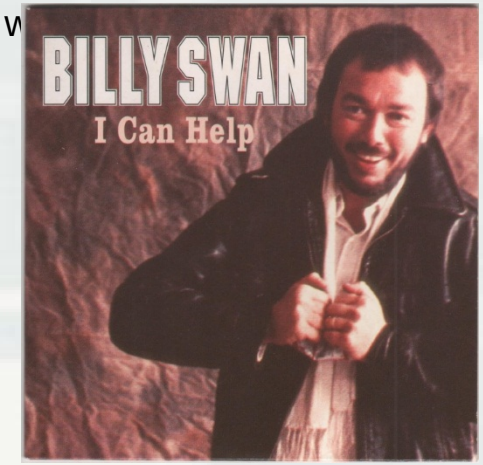

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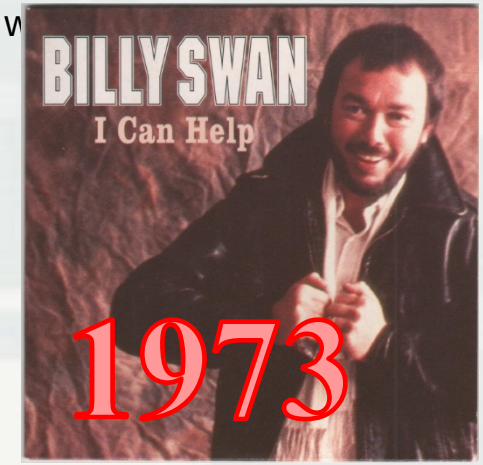


Why the 100-yr?

- Previous Standards where primarily for structural flood mitigation
  - TVA –Probable Maximum Flood (PMF)
  - USACE – Standard Project Flood (SPF)
- As the nation started to evaluate floodplain management and nonstructural a different standard was needed
  - Historical (event of record) – cannot be equally applied across nation
  - 1953 TVA regional flood (~50yr)
  - 1960 USACE Intermediate regional flood (~100yr)
  - Connecticut CRC 5-7 times mean annual flood (35yr – 150yr)
- 1966 EO11296 (precursor to EO11988) set a standard of the 100-yr “basic flood”
- 1968 NFIP adopts the 100-yr standard at the Chicago Seminar

Why the 100-yr?

- "The group deliberated about 1 ½ days and finally recommended that the 100-year flood would be a reasonable level to use in identifying flood prone areas....The recommended level was a compromise that all of those present were comfortable with and could support. There was no attempt to make any economic analysis due to the constraints of time."
  - Nick Lally – Participant in the 1968 Chicago Seminar

- "There was a very interesting development of the notion that there could be a flood of sufficiently low frequency that no effort should be made to cope with it. The Federal Insurance Administration picked one percent [or] a recurrence interval of a hundred years. And some of us were involved in that because we recognized they initially had to have some figure to use. ... What's the effect of having a criterion of 100 if in doing so a local community is encouraged to regulate any development up to that line and then to say we don't care what happens above that line. A simplified national policy tended to discourage communities from looking at the flood problem in a community-wide context, considering the whole range of possible floods that would occur.
  - Gilbert White – Chair of the 1968 Chicago Seminar

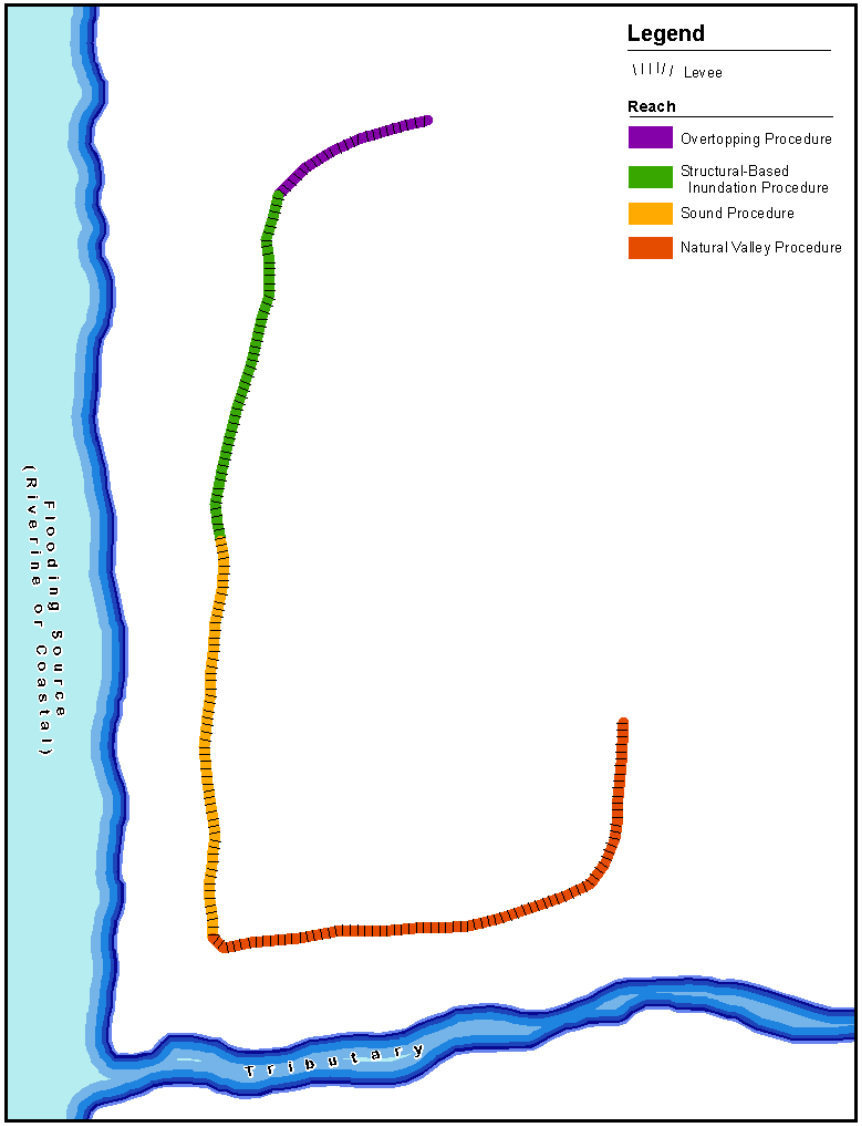
Why the 100-yr?

- What does the 100-yr Floodplain Mean?
  - 1% change of inundation any given year
  - Long term average recurrence interval of 100-yr
  - Often termed the “Base Flood” for NFIP purposes
- Over the course of a 30 year loan there is a 26% change of occurrence
- The SFHA represents the area with a minimum of 1% annual chance. Property could easily be exposed to hazards much more frequently
- 20% of insurance claims occur outside the SFHA

Why the 100-yr?

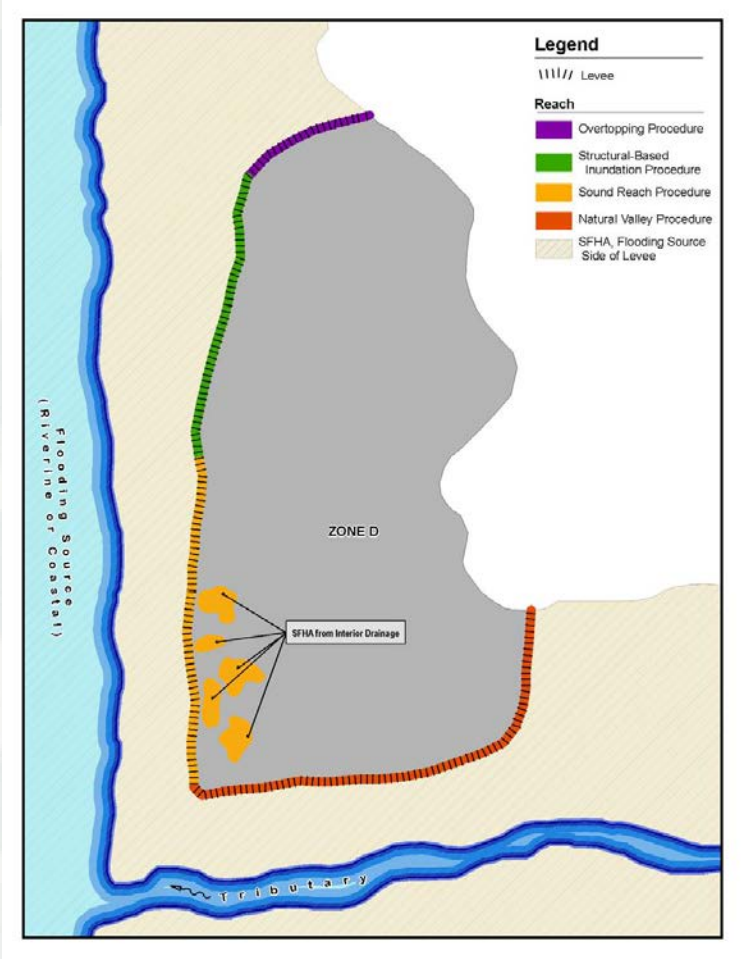
- The 1% Event (100-year) is **NOT a Safety Standard**
- Intended for Flood Insurance
- Unintentionally encouraged communities to seek this level

NFIP LAMP

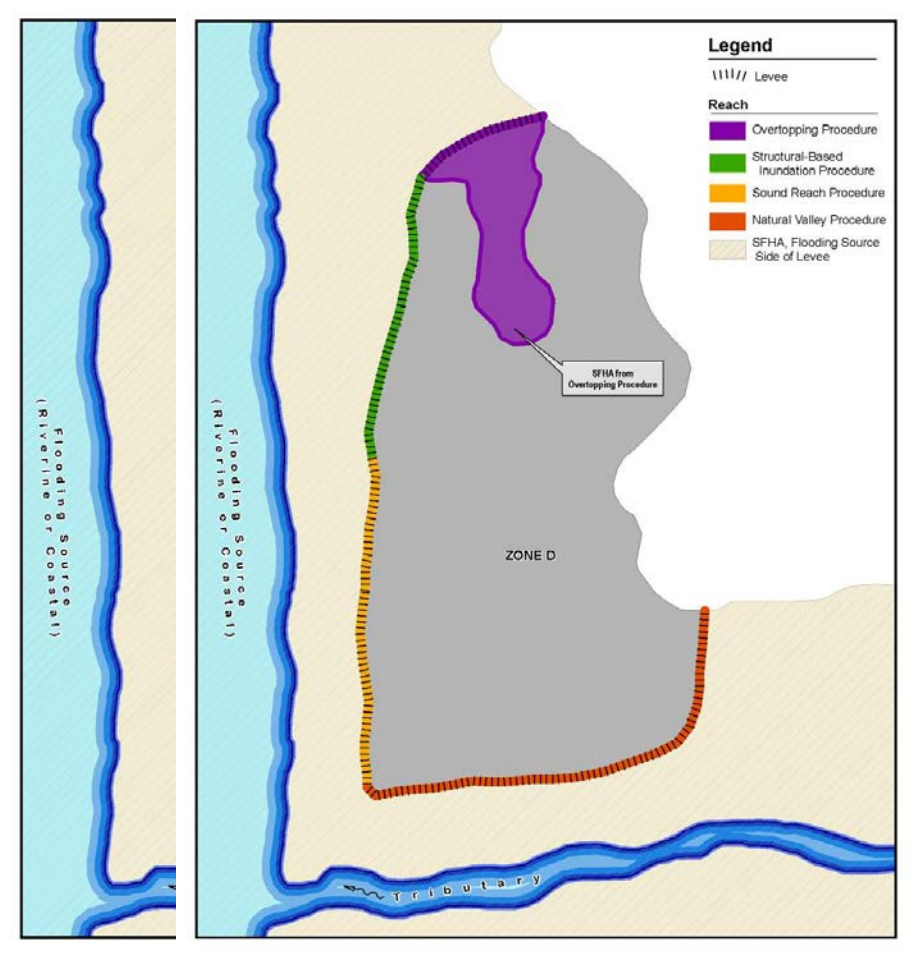


- Sound Reach
- Overtopping
- Structural Based Inundation (Geotechnical Failure, Noncontroled realease event, breach)
- Natural Valley
- Freeboard Deficient – Zone D

NFIP LAMP


Legend
Levee
Reach
Overtopping Procedure
Structural-Based Inundation Procedure
Sound Reach Procedure
Natural Valley Procedure
SFHA, Flooding Source Side of Levee
ZONE D
SFHA from Interior Drainage
Flooding Source (Riverine or Coastal)
Tributary

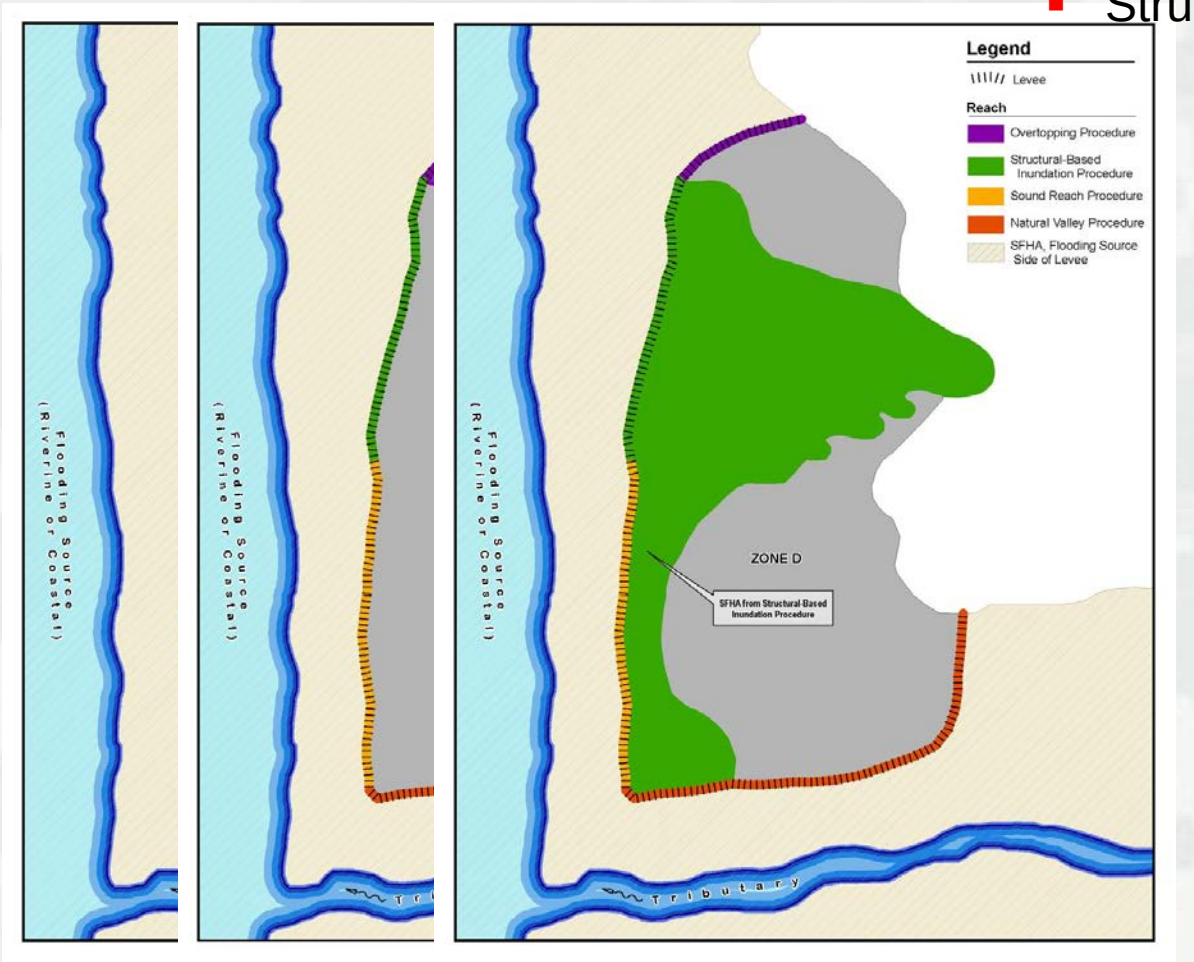
NFIP LAMP



- Overtopping

NFIP LAMP

- Structural Based Inundation



NFIP LAMP

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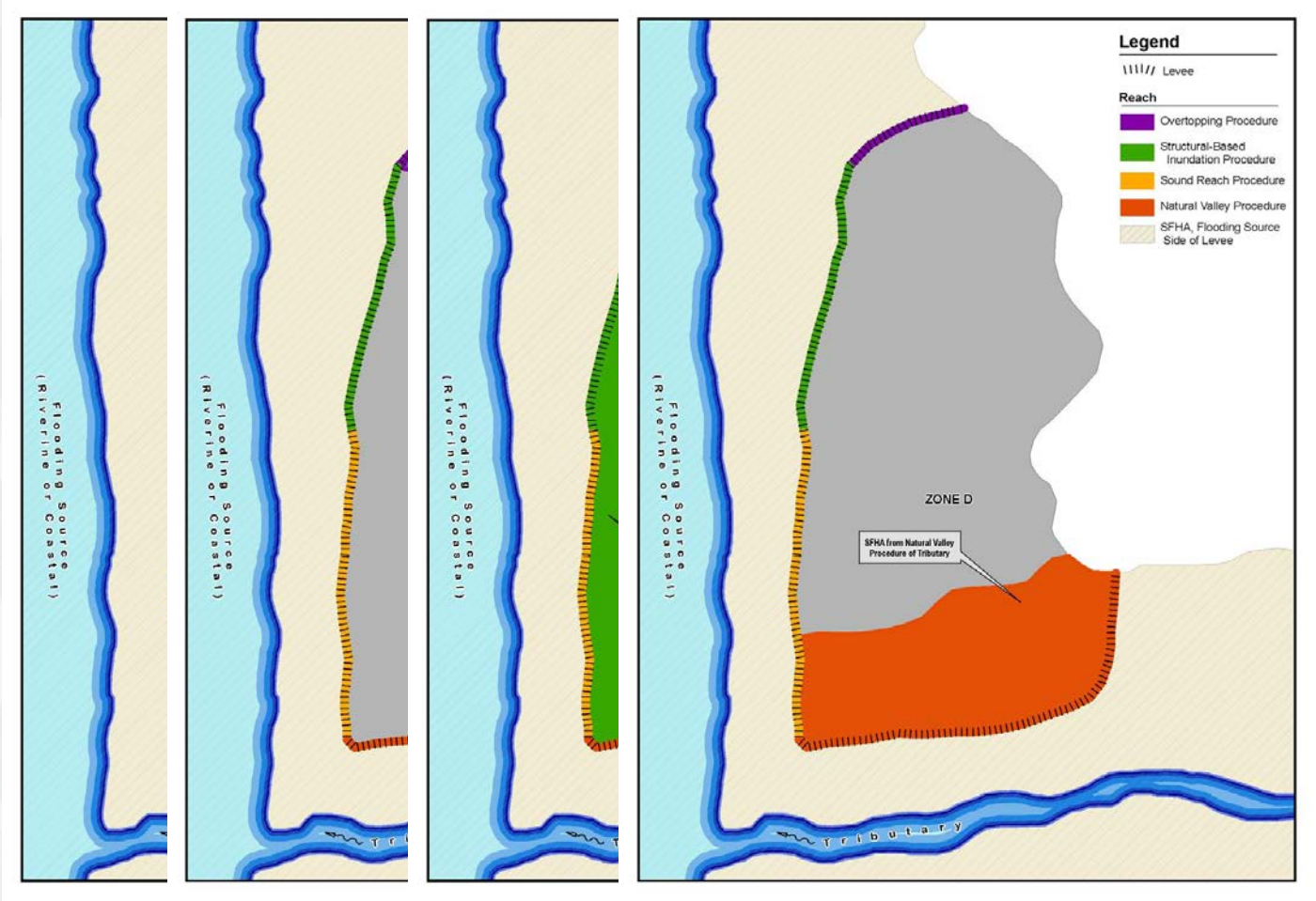

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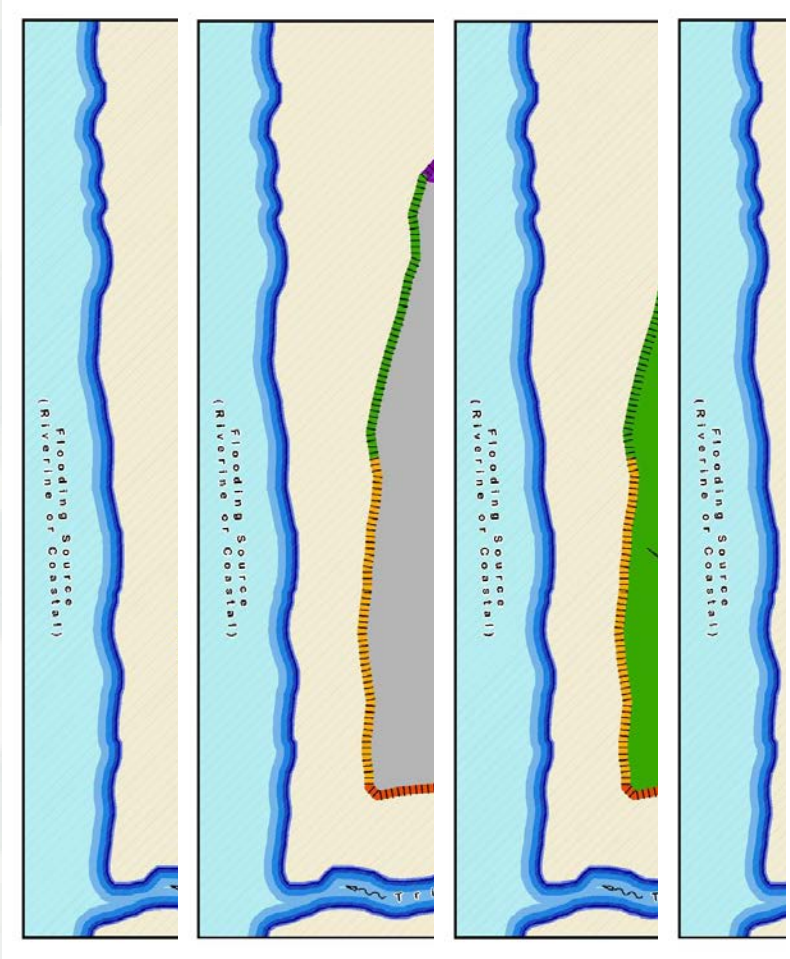
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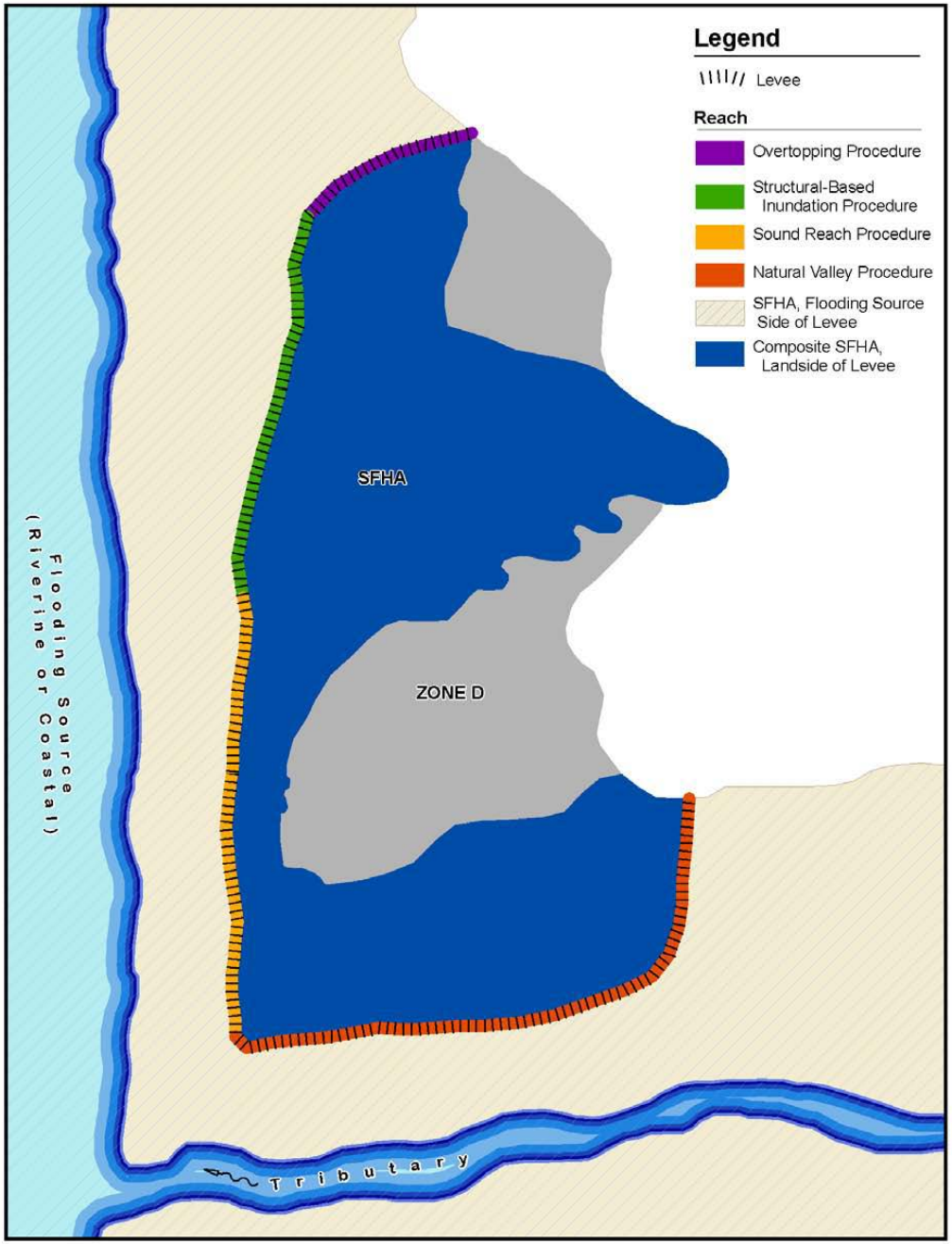
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SFHA, Flooding Source Side of Levee
Composite SFHA, Landside of Levee
SFHA
ZONE D
Flooding Source
(Riverine or Coastal)
Tributary

NFIP LAMP

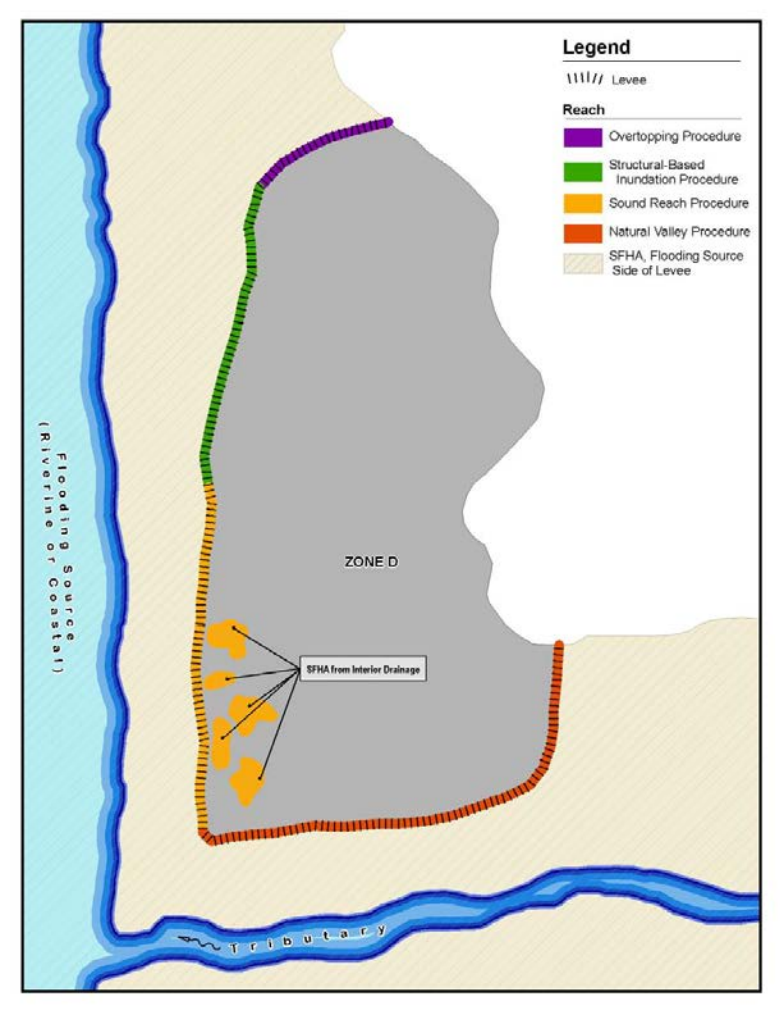
Pros

- **It removes the mandatory purchase requirement under the current NFIP requirements**
- It is an alternative that can be used for communities w/o sufficient funding to raise a levee
- It does account for the existence of the levee in a manner more appropriate than the natural valley method.

Cons

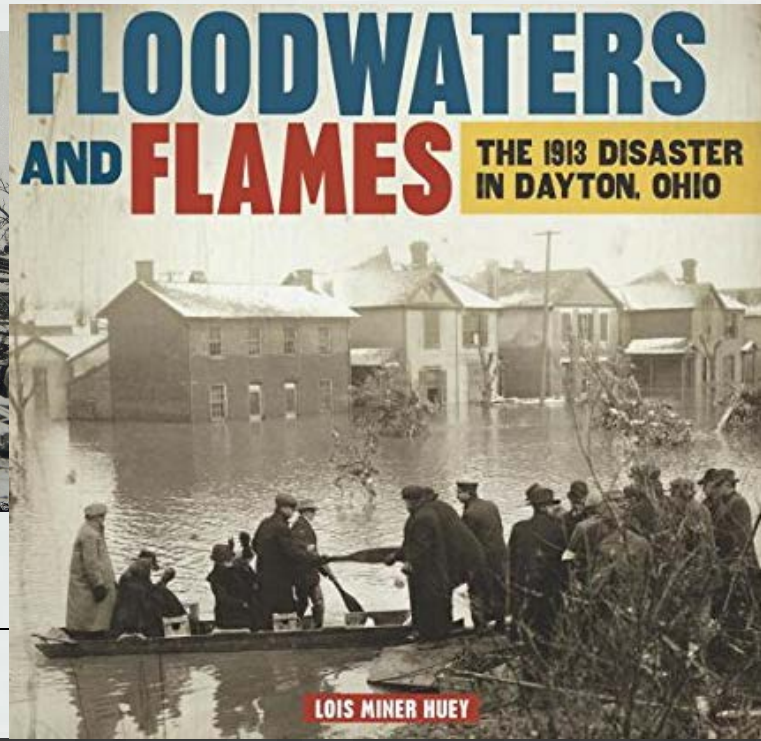
- **It removes the mandatory purchase requirement under the current NFIP requirements**
- It does not alter the communities flood risk
- It does not provide clarity to the community on their flood risk. For community members that want to make risk informed decisions the information provided by a zone D is less than other methods.
- The cost of insurance in Zone D areas is higher for those that choose to purchase insurance.
- It is undetermined how zone D areas will be viewed by private insurers or other decision makers. For example EO11988 review could identify that federal investments/actions in zone D areas is inappropriate.

▪Freeboard Deficient – Zone D



History of USACE Programs

- 1882 Mississippi Flood – First Official USACE Disaster Mission
- 1907-1913 Mississippi, and Ohio Floods
  - 1913 – Our National Calamity
    - Omaha Tornados – Ohio River Flood – Mississippi River Flood
- 1917 Flood Control Act - First Act aimed exclusively on controlling floods
- 1927 Rivers and Harbors Act – 1928 Flood Control Act – 1936 Flood Control Act
- 1941 Flood Control Act– Authorized to repair or maintain flood control works (PL84-99)
  - Revisions/Updates 1955, 1962, 1974, 1976, 1977, 1979, 1986, 1990
- 2006 USACE Levee Safety Program



Basics of the USACE Programs

- PL84-99
  - 6 Activities (Purposes)
    - Disaster Preparation
    - Emergency Operations
    - Rehabilitation
    - Emergency Water Assistance
    - Advanced Measures
    - Hazard Mitigation
- Levee Safety Program
  - works to better understand, manage, and reduce the flood risks associated with *levees*
    - NLD
    - Levee Inspections
    - Risk Assessments (LSAC)
- Civil Works Authorities
  - General Investigations, Section 205, Section 1135, Section 22, FPMS, Silver Jackets

Program Overlaps

- General Comparison
- Does USACE Certify Levees?
- Is information from USACE applicable in certifying levees?

	PL 84-99 + Levee Safety	Levee Certification in the NFIP
Administering Agency	USACE	FEMA
Federal Code	33USC 701.n	44CFR65.10
Year of Initiation	1953	1986
Purpose	Prevent Loss of Life Preserve Federal Investments	Insurance Purposes NOT a health and Safety Standard
Primary Evaluation criteria	Inspection of O&M activities and that project is being maintained as constructed	Certification - Review of Infrastructures ability to protect against the 100-yr Flood
Entity Conducting Evaluation	USACE and Sponsor	Certification: Professional Engineer (PE)* Accreditation: FEMA
Functional Benefit to Community	Assistance with Rehabilitation of Flood Risk Infrastructure in event of Flood Damage	Removal of Floodplain Management requirements associated with SFHA and/or reduced insurance rates
Ancilary Benefits	Data from Inspections and Levee Screening Efforts assist in understanding and managing risk	CRS credits are available for maintaining levees and emergency response plans (CRS activity 620)
Minimum Level of Protection for Eligibility	Agricultural: 5yr+1ft of Freeboard Urban 10yr+2ft of Freeboard	100-yr+3ft of Freeboard*
Continued Eligibility	Acceptable O&M as identified in annual Continued Eligibility Inspection (CEI)	Recertification with each NFIP map update
Intermediary Status Designations	System Wide Improvement Framework (SWIF) (Temporary eligibility for assistance while deficiencies are corrected)	Provisionally Accredited Levee (PAL) Levee Analysis and Mapping Procedure (LAMP) (how to map uncertified levees)
Modification Review	408 process (33 USC 408) Guidance: EC1165-2-216	Floodplain Permitting and/or LOMR Guidance: IS-9

Does USACE Certify Levee's?

- YES - Levees USACE owns and operate - If requested by a local sponsor, USACE may budget for and perform a certification for systems it has O&M responsibility for

- YES - New Projects - If requested by a local sponsor, USACE may certify a levee system as part of a current project

- YES – Through the support for others function of FPMS, certification can be done on a reimbursable basis

- Maybe – WRDA 2014 included language referring ot the use of the section 22 program for this purpose (50% cost share). This section of WRDA has not been implemented. This would not provide funding for modifications

- No,,,but - Levee Safety Program activities can support local's certification efforts

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ANY USACE Certificaiton Effort would use EC 1110-2-6067 NOT 44 CFR 65.10

65.10 vs. EC

FEMA 44CFR65.10

- 3’ Freeboard
- “Certifies” design and construction
- Components can be submitted separately
- Applies to everyone
- No validity period
- Does not address residual risk
- Does not evaluate performance

USACE EC

- Probabilistic method
- Evaluates entire system, all components and features
- No partial certifications
- Only applies to USACE evaluations
- 10 year validity period
- Addresses residual risk and public safety
- Evaluates performance

How Much Overlap is there?

ICW LEVEES AND THEIR ACCREDITATION STATUS, MAY 2013			
ACCREDITATION STATUS	LEVEE SYSTEM COUNT	LEVEE MILES	NUMBER OF COMMUNITIES
Accredited	70	400	75
In PAL (Accredited)	150	1300	100
Not Accredited	1180	7800	610
TOTAL	**1400**	**9500**	**785**

Source: 2013 Flood Protection Structure Accreditation Task Force: Final Report

What Data from ICW can be used for certification?

NFIP REQUIREMENTS AND RELATION TO USACE ACTIVITIES				
NFIP REQUIREMENTS (44 CFR 65.10)		COMPLIANCE CAN BE DETERMINED THROUGH		
CFR CRITERIA CATEGORY	CFR CRITERIA SUBCATEGORY	USACE INSPECTION	USACE SCREENING	USACE RISK ASSESSMENT
Design Criteria	Freeboard (levee height)	NO	RARELY	YES
	Closure devices for all openings	NO	RARELY	YES
	Embankment protection	NO	RARELY	YES
	Embankment and foundation stability	NO	RARELY	YES
	Settlement	NO	RARELY	YES
	Interior drainage	NO	NO	AS APPROPRIATE*
Operation Plans	Closures	YES	YES	YES
	Interior drainage systems	YES	YES	YES
Maintenance Plans		YES	YES	YES

*Interior Drainage. Though the accreditation requirement for interior drainage may not be covered during a USACE risk assessment, USACE and FEMA will ensure the data needed to address interior drainage will be collected.

Source: 2013 Flood Protection Structure Accreditation Task Force: Final Report

How Much Will This Cost?

TABLE 6: ESTIMATED COST OF COLLECTING AND ANALYZING INFORMATION AND DATA TO COMPILE AN ACCREDITATION PACKAGE UNDER 44 CFR 65.10*

SAMPLE SIZE	RANGE	AVERAGE COST PER LEVEE	ACTIVITIES PERFORMED	% OF ACCREDITATION PACKAGE COMPLETED
57 Levees	$142,500 – $4,630,000**	$600,000	■ Review and compilation of available information ■ Exploratory field work to gain additional information ■ Engineering analyses ■ Verifying accreditation package	100%

*Please note, information collected for this analysis was limited to information from a handful of private firms and sponsors voluntarily provided to the Task Force for this purpose. It does not claim to be geographically or technically representative of all the types of levee systems in the ICW program or those seeking accreditation.

**The levee at the high end of this range was 51 miles long.

TABLE 7: ESTIMATED COST OF USACE ACTIVITIES AND PERCENTAGE OF ACCREDITATION PACKAGE THAT IS ESTIMATED TO BE ACHIEVED

SAMPLE SIZE	ACTIVITY	RANGE	AVERAGE COST PER LEVEE	PRIMARY COST DRIVER	ESTIMATED % OF ACCREDITATION PACKAGE COMPLETED
1048 Levees	Inspections	$3,000 – $32,000	$11,500	Complexity of System	5%
150 Levees	Screenings	N/A	$26,000	District Level Assessment	20%
8 Levees	Risk Assessments	$250,000 - $700,000	$545,000	Potential Failure Modes Analysis	95%*

* The risk assessment will result in sufficient information about the performance of the levee itself, but there may be additional information related to interior drainage needed. If this is the case, USACE and FEMA will collect the additional information needed.

Source: 2013 Flood Protection Structure Accreditation Task Force: Final Report