

Modeling and Mapping Non-Accredited Levees: Sound Reach Procedure

The Federal Emergency Management Agency (FEMA) has developed a new set of procedures for analyzing and mapping flood hazard on the landward side of non-accredited levee systems on Flood Insurance Rate Maps (FIRMs). Non-accredited levee systems are those that do not meet all the requirements outlined in Title 44 of Code of Federal Regulations (CFR), Section 65.10.

The fact sheet summarizes the **Sound Reach** procedure. A “sound reach” is a levee reach designed, constructed, and maintained to withstand and reduce the flood hazard posed by a 1-percent-annual-chance flood event. The **Sound Reach** procedure can be used to analyzed sound reaches in a levee system that is not accredited, thus, accounting for reaches of a non-accredited levee that may provide a measure of flood risk reduction. The **Sound Reach** procedure can be applied to one or more reaches in a levee system and mapped on a FIRM.

When to Use the Sound Reach Procedure

Figure 1 illustrates a sound levee reach. To use the **Sound Reach** procedure, the levee reach must both be structurally sound have adequate freeboard (see Fact Sheet 4 for additional information on freeboard). To qualify for the **Sound Reach** procedure, the reach must have proper design, operation, and

Updated Levee Analysis and Mapping Methodologies

FEMA has developed procedures for analyzing and mapping hazards associated with non-accredited levees shown on FIRMs. An overview is provided in Fact Sheets titled:

1. Dividing Levee Systems into Multiple Reaches
2. Natural Valley Procedure
3. Sound Reach Procedure
4. Freeboard Deficient Procedure
5. Overtopping Procedure
6. Structural-Based Inundation Procedure
7. Understanding the Zone D Designation

For more information, please visit:

<https://www.fema.gov/flood-maps/living-levees/tools-templates>.

The CFR can be accessed at:

<https://www.ecfr.gov>.

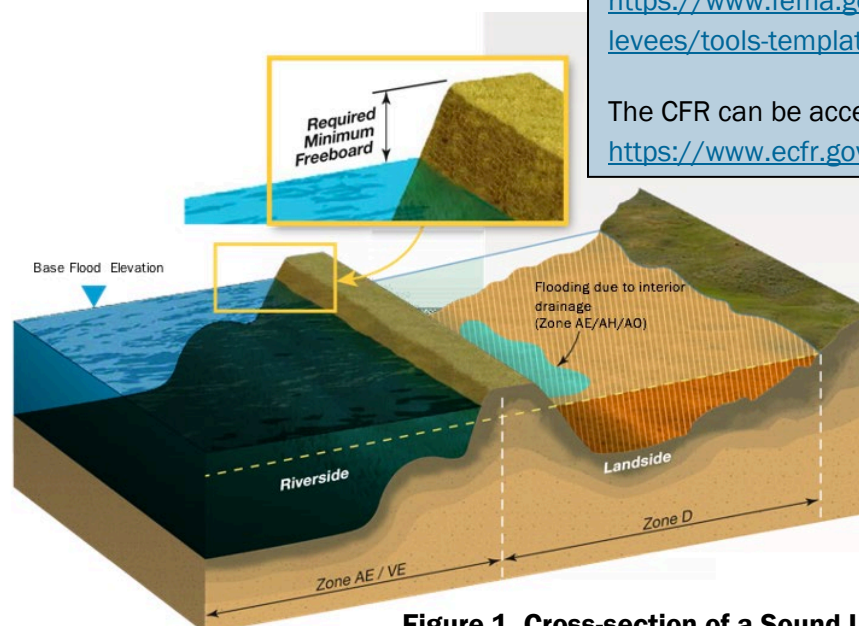


Figure 1. Cross-section of a Sound Levee Reach



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maintenance. While only a full levee system can be shown to meet 44 CFR 65.10, FEMA will use the standards outlined to determine when a reach has the proper design, operation, and maintenance to be shown as a sound reach. If any of the criteria are not met, one of the other procedures may apply (refer to side bar).

Minimum Levee Documentation Requirements

The *Sound Reach* procedure requires documentation by levee owners and/or the associated communities for their levee systems. FEMA will perform a completeness check for levee submittal documentation currently on file and will notify owners of any missing information. When using the *Sound Reach* procedure, the levee documentation submitted to FEMA must denote the reaches along the levee system that meet the sign, operation, and maintenance standards as outlined in 44 CFR 65.10. The upstream and downstream limits of each sound reach along the levee system must be clearly identified.

Sound Reach Analysis and Mapping Procedures

FEMA will map all non-accredited levee systems using the *Natural Valley* procedure (Fact Sheet 2) to establish areas of potential inundation. Figure 2 shows how flood zones may be mapped for non-accredited levee systems with *Sound Reaches*.

Analysis using the *Sound Reach* procedure must examine the potential for flood waters resulting from upstream levee systems/reaches that do not meet all the requirements of 44 CFR 65.10, and are therefore not considered sound. It must also include an interior drainage analysis for backwater areas resulting from larger streams downstream and areas drained by pumping systems. Coastal levees must also be examined for potential flooding from adjacent reaches.

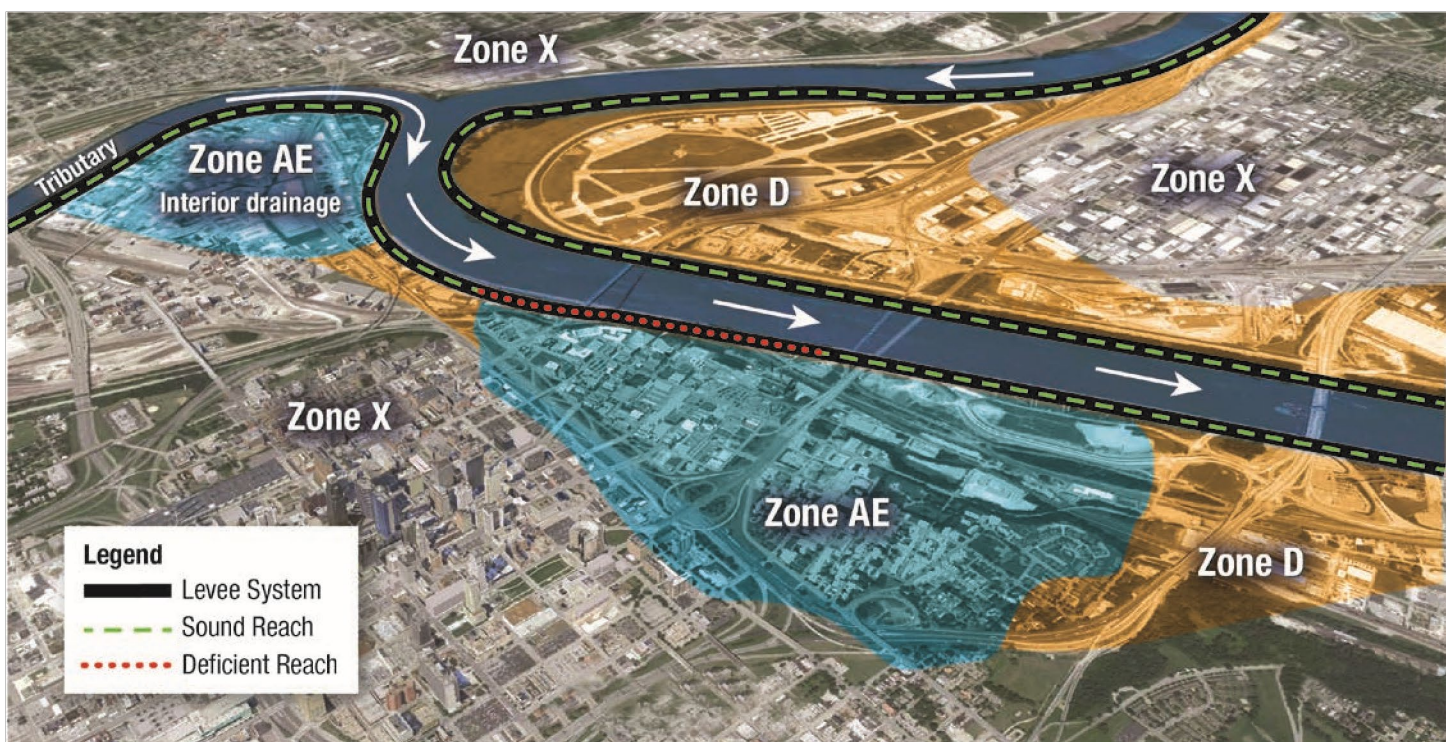


Figure 2. Mapped flood zones behind a Sound Reach