



FEMA



Modeling and Mapping Non-Accredited Levees: Dividing Levee Systems into Multiple Reaches

The Federal Emergency Management Agency (FEMA) has developed a new set of procedures for analyzing and mapping flood hazards 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 the Code of Federal Regulations (CFR), Section 65.10. FEMA’s new procedures allow a levee system to be segmented into multiple reaches for analysis and mapping purposes.

A levee reach is defined as any continuous length of a levee system to which a single analysis and mapping procedure may be applied. There is no minimum or maximum length for a levee reach; the reach length depends on the levee characteristics.

This fact sheet summarizes how the new procedures can be combined to map an entire levee system. FEMA’s new procedures develop

a more realistic determination of flood hazards by dividing a levee system into multiple reaches for analysis (Figure1). By dividing a non-accredited levee system into multiple reaches, each reach can be modeled and mapped appropriately.

The Benefit of Using Multiple Reaches

Many non-accredited levee systems do not have the same characteristics throughout their length. By independently analyzing the multiple reaches of the levee system, we can improve the results of the flood hazard analysis on the landward side of the levee.

Identifying Reaches of a Levee System for Individual Analysis

FEMA will work with local officials and levee owners in study areas to establish a Local Levee Partnership Team. Based on their operational knowledge of the levee system, the Local Levee Partnership Team will be asked to provide FEMA with pertinent information (see text boxes on this factsheet titled “Other Considerations” and “Technical Factors”). FEMA will work with the team to evaluate this information and decide how a levee should be divided into reaches to facilitate proper analysis and mapping of the flood hazards.

Other Considerations

- Input from local community and levee officials
- Property and lives at risk
- Data requirements and funding availability (local, Tribal, State, and Federal)

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: <http://www.fema.gov/final-levee-analysis-and-mapping-approach>

The CFR can be accessed at: <http://ecfr.gpoaccess.gov>

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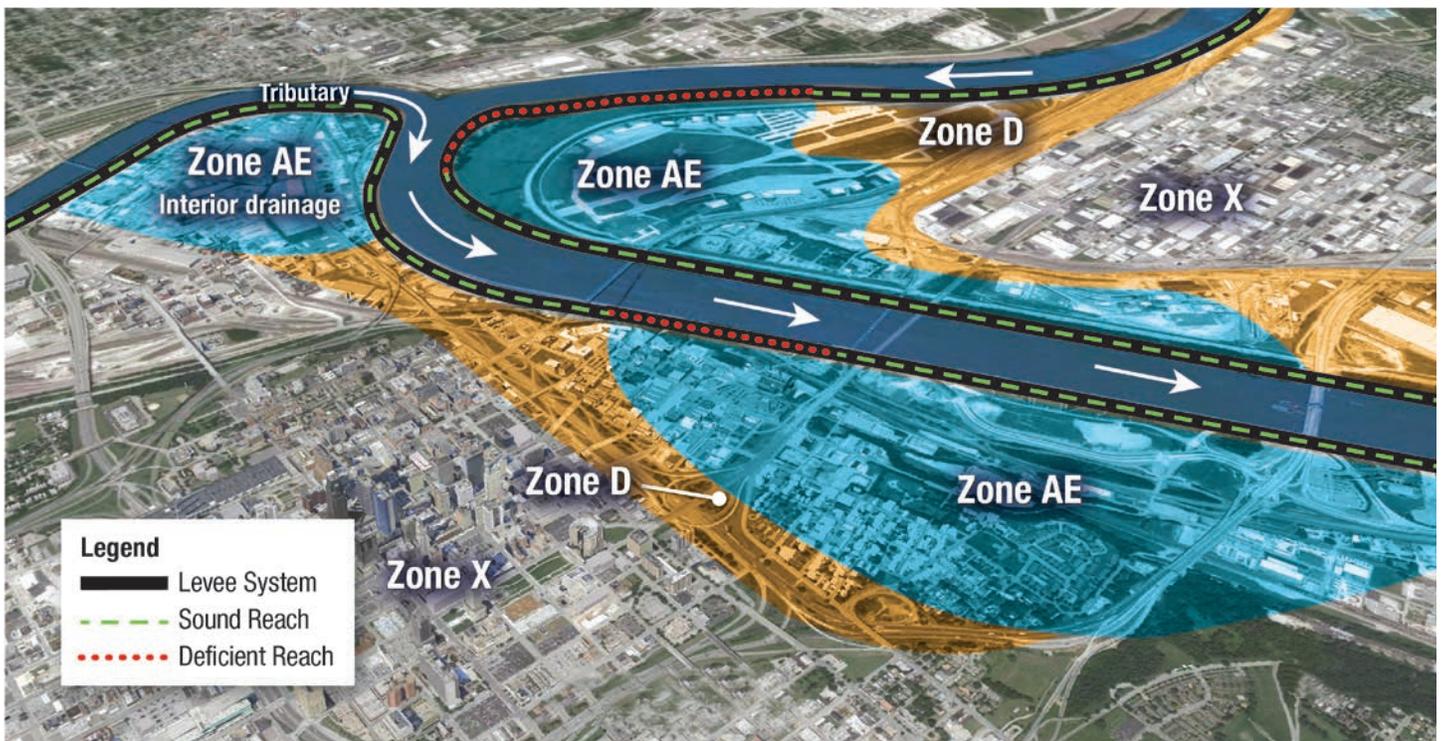


Figure 1: Divided levee system

Preliminary Analysis to Select Levee Reaches

Prior to initial meetings with the Local Levee Partnership Team, FEMA will review available data and prepare a preliminary **Natural Valley** model to estimate potential areas of inundation. These preliminary results will allow the Partnership Team to review the most applicable approaches for the levee system and make informed recommendations about possible reach locations and analysis approaches.

Mapping the Results

Once a levee system and its reaches are analyzed using one or more of the new approaches (described in Fact Sheets 2 through 6), the resulting flood hazard areas will be combined to form the final flood hazard areas depicted on the FIRM. The resulting FIRM may show Zone D and/or Zone A/V/AE/AH/AO/VE areas to designate the flood hazard extents behind the levee system; which zone is mapped will be determined by the individual levee reach analyses.

Technical Factors

- Height of levee crest versus BFE
- Levee condition
 - Initial design criteria
 - Current conditions based on inspections, past performance, and operations and maintenance plans
- Data availability: Digital Elevation Models, design data, condition assessments, structural and geotechnical analyses, and hydrologic and hydraulic analyses
- Flooding characteristics: contributing drainage areas, duration of flooding, terrain of protected area, historic flooding