



Using Base Level Engineering Data in Hazard Mitigation Planning

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FEMA

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How Is BLE Data Useful In Hazard Mitigation Planning?

Base Level Engineering (BLE) is an engineering approach used to produce flood hazard data. That data can inform community planning and decisions. BLE uses methods similar to those of FEMA's Flood Risk Products and Flood Insurance Rate Maps (FIRMs).

Communities develop hazard mitigation plans to assess potential hazards. Those plans set a strategy to reduce risks. Hazard mitigation planners can use BLE data to create or update plans when recent flood information is not available.



What data is typically produced during a BLE assessment?

- 1%- and 0.2%-annual-chance floodplain boundaries.
- 1% and 0.2% flood depth and water surface elevation grids.
- Models for the following flood magnitudes: the 10%, 4%, 2%, 1%, and 0.2%-annual-chance events.

How Can This Data Be Used During a Hazard Mitigation Plan Update?

Communities must update their mitigation plans every five years. To do so, they identify their hazards, quantify risk, and develop strategies to reduce impacts. These updates keep them eligible for non-emergency disaster assistance. They are also needed for FEMA's [Hazard Mitigation Assistance \(HMA\) grants](#). HMA grant programs include:

- [Flood Mitigation Assistance \(FMA\)](#),
- [Building Resilient Infrastructure and Communities \(BRIC\)](#), and
- [Hazard Mitigation Grant Program \(HMGP\)](#).

BLE data can benefit the Risk Assessment and Mitigation Strategy sections of the mitigation plan:

Risk Assessment: Each plan must use accurate data to describe the type, location, and extent of all natural hazards that affect the area. It must describe each hazard's impact. It must also assess the community's vulnerability to those hazards. Flood extents (floodplain boundaries) from a BLE assessment can be helpful. When used with effective FIRMs, they can indicate other at-risk areas. New flood maps can be created from this data. Flood depth grids from BLE results can be used to assess flood risk through the use of depth-damage curves and structure values. Those are also available in FEMA's loss estimation software, [Hazus](#).

Mitigation Strategy: Plans must analyze a range of actions to reduce risk. Communities can use flood depth grids from their effective FIRMs and the BLE data. This will help them prioritize projects in areas with greater flood depths. BLE results can also be used to find structures to elevate or buyouts that may qualify based on a Benefit-Cost Analysis.

Can BLE Information Be Used When Implementing the Plan?

Yes! Mitigation planning does not stop at adoption and approval. BLE data continues to be useful when planning for and carrying out a project. Updated BLE data can inform important community discussions early in the decision-making process, helping local officials prioritize mitigation actions.



What are ways to use BLE data to apply and maintain hazard mitigation plans?

- Use hydraulic models from a watershed-scale BLE assessment to look at mitigation project design alternatives.
- Use flood depth grids to prioritize road, bridge, and other capital improvements.
- Inform the site layout and design for projects (such as drainage).
- Support land use and development regulations, like open space preservation and building and zoning changes to reduce risk.
- Confirm access to critical facilities or community lifelines during a flood.
- Promote mitigation projects that involve elevation, floodproofing or property buyouts.
- Provide data to support a Benefit-Cost Analysis.
- Provide the water surface elevation required in some FEMA grant applications or post-disaster Advisory Base Flood Elevations.

Mitigation planners don't need to wait for FEMA to release new flood maps. They can use BLE to plan for and reduce flood risk now. They can refine local flood data and plan for higher-frequency events. The results from BLE analyses can also be used to visualize, analyze, and describe the flood hazard in areas without regulatory information. Having this data reduces the burden on communities. They do not need to produce engineering information for their planning efforts or for mitigation grant applications.

Resources

- Create a Hazard Mitigation Plan: <https://go.usa.gov/xtqFG>
- Guidance for Flood Risk Analysis and Mapping, Base Level Engineering (BLE) Analysis and Mapping (November 2021):<https://go.usa.gov/xeJ7m>
- Hazard Mitigation Planning: <https://go.usa.gov/xtqFs>
- Hazard Mitigation Planning Resource List: <https://go.usa.gov/xsMZx>
- Hazus: www.fema.gov/hazus
- Local Mitigation Plan Review Guide: <https://go.usa.gov/xsMWG>
- Local Mitigation Planning Handbook: <https://go.usa.gov/xsMWe>
- Mitigation Planning Training: <https://go.usa.gov/xtqM3>
- National Flood Insurance Act of 1968: <https://go.usa.gov/xt33r>
- Robert T. Stafford Disaster Relief and Emergency Assistance Act: <https://go.usa.gov/xsMZb>
- Tribal Mitigation Plan Review Guide: <https://go.usa.gov/xsMW6>
- Tribal Mitigation Planning Handbook: <https://go.usa.gov/xsMWS>
- Water Infrastructure Improvements for the Nation: (WIIN) Act of 2016: <https://go.usa.gov/xt33V>
- Hazard Mitigation Assistance Grants: www.fema.gov/grants/mitigation