

Using the Limit of Moderate Wave Action to Build Resilient Coastal Communities

Coastal communities are special places and home to vital resources. What makes them so distinctive also creates a high risk of flooding. Floods are the nation's costliest natural disasters. Coastal areas are dynamic environments that are constantly reshaped by the forces of nature. Coastal communities face a range of flood hazards, including storm surge, waves and erosion. All of these can cause extensive damage to homes, businesses and infrastructure. Waves, in particular, can damage properties farther inland than one would expect.

Flood Maps in Coastal Areas

Flood maps, or Flood Insurance Rate Maps (FIRMs), show Special Flood Hazard Areas (SFHA) — the areas affected by a 1%-annual-chance flood. Properties in SFHAs have a high risk of flooding. These areas have at least a 26% chance of flooding over the course of a 30-year mortgage. In coastal areas, the SFHAs are designated primarily as Zone VE or AE.

- **Zone VE**, a Coastal High Hazard Area, is where waves and fast-moving water can cause extensive damage during the 1-percent-annual chance flood. Wave heights of 3 feet or higher are expected.
- **Zone AE** is used for areas that have at least a 1% chance of being flooded in any year, but wave heights are expected to be less than 3 feet.

The primary difference between these two flood zones is potential wave damage. Structures in Zone VE have a higher risk of significant damage by the moving water and waves. As a result, buildings in Zone VE must be built to higher standards and may have higher flood insurance premiums.

What is the Limit of Moderate Wave Action?

FEMA has documented storm damage for decades. Post-storm damage shows that even 1.5-foot waves can cause significant damage to buildings that were not built to withstand them. To highlight this risk on flood maps, FEMA developed the Limit of Moderate Wave Action (LiMWA).

The LiMWA is an informational line that can be found on flood maps for some coastal areas. On a flood map, it is shown as a black line with black arrows that point to areas where wave heights are between 1.5 and 3 feet. It also marks the inland limit of the Coastal A Zone.



FEMA

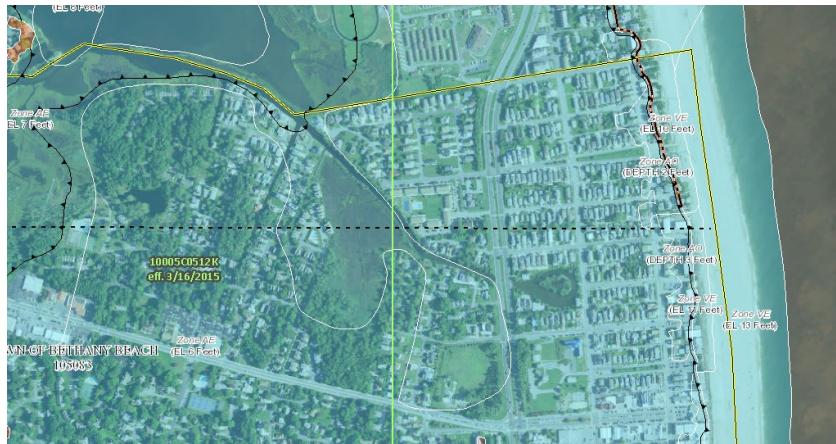


Figure 1: A flood map panel showing the Limit of Moderate Wave Action (LiMWA), indicated by the black lines with arrows. The arrows point toward the inland limit of the Coastal A Zone.

Using the Limit of Moderate Wave Action in Floodplain Management

Due to the higher risk of wave damage to structures in the Coastal A Zone, FEMA encourages communities to apply VE Zone floodplain management standards in this area. Communities are also encouraged to adopt the most recent International Building Codes. These require buildings in the Coastal A Zone to meet Zone VE standards. Adopting higher construction and floodplain management standards in the Coastal A Zone may also reduce flood insurance premiums.

Zone VE standards include:

- Buildings must be elevated on pile, post, pier, or column foundations, and must be adequately anchored to the foundation.
- Structural fill is prohibited.
- The bottom of the lowest horizontal structural member be at or above Base Flood Elevation (BFE).
- The area below the BFE must be built with flood-resistant materials and free of obstructions. If it is enclosed, the enclosure must be made of lightweight wood lattice, insect screening, or breakaway walls.
- The building design and method of construction must be certified by a design professional.

Find more information on Zone VE standards in Title 44 of the Code of the Federal Regulations, Section 60.3, and the [Local Officials Guide for Coastal Construction](#).

What are the benefits of adopting higher codes and standards for Coastal A Zones?

- Building to higher standards makes structures and the people inside them safer from wave damage. Communities that adopt higher standards for the Coastal A Zone may have less damage and be able to recover more quickly.
- Communities that adopt higher building codes and standards in the Coastal A Zone may be eligible for discounted flood insurance premium rates through the Community Rating System. More information about the Community Rating system is available [here](#).

Building Resilience in Coastal Communities

Adopting Zone VE standards in Coastal A Zones is one step communities can take to reduce their risk and build resilience. Communities across the country are exploring more ways to move toward resilience. This may include:

- **Adding freeboard.** Many communities adopt freeboard, a factor of safety usually expressed in feet above the Base Flood Elevation. Communities with freeboard will require structures to be built a few feet above the BFE. Freeboard accounts for the many unknown factors that could contribute to flooding that is higher than the BFE.
- **Planning for future conditions.** One way to keep families, businesses, and neighborhoods safe from natural disasters is long-term planning. Communities that invest in long-term planning and forward-looking projects will see fewer impacts and are more likely to recover quickly after severe events. Preparing for the future today supports growth and health. Learn more [here](#).
- **Incorporating nature-based solutions.** Nature-based solutions weave protective natural features into a community's landscape through planning, design, and engineering. These practices can be applied to a community's built environment (for example, a stormwater park) or its natural areas (for example, land conservation). While nature-based solutions have many hazard mitigation benefits, they can also help a community meet its social, environmental, and economic goals. Learn more [here](#).
- **Thinking beyond flood maps.** FEMA flood mapping data can be used for more than floodplain management ordinances or explaining flood insurance purchase requirements. This [story map](#) highlights four communities that are using these data to reduce risk and build resilience in innovative ways.

Additional Resources

- To access flood maps for your community, visit the [Map Service Center](#), or contact the Flood Mapping and Insurance eXchange (FMIX) at 877-336-2627 or FEMA-FMIX@fema.dhs.gov.
- To learn more about flood insurance, visit www.FloodSmart.gov.