

FEMA CERC Region V - Coastal Talking Points video

Hello, my name is Rebecca Akin and I am a coastal engineer with STAR-2. Today we will discuss flood hazards within your community associated with developments for FEMA Region Five's risk map program.

Floods are the nation's most common and costly natural disaster. Flooding occurs in all 50 states and nearly 12.5 million square miles are identified as high risk areas. Floods cause millions of dollars in damage every year, and understanding your community's flood risks can help it prepare for and mitigate flood hazards and the associated negative socio-economic impacts of these natural disasters.

In order to understand flood hazards in your community, flood insurance rate maps or firms are provided through FEMA's National Flood Insurance Program. Flood maps can also be used to help property owners make decisions to mitigate flood risks and to help them identify where minimum flood development standards should apply to ensure the community builds safely and resiliently in the future. The flood insurance rate maps also provide information on flood zones and base flood elevations, which can be used to determine the cost of flood insurance. These can also provide information to local emergency managers.

In recent years, FEMA Region Five has been working to update coastal flood studies along the Great Lakes. The re-analysis applies updated technologies, methodologies and newly acquired data in order to determine coastal flood hazards. Included in the updates are new terrain data, as well as more complex and detailed numerical models that capture nearshore flooding behavior. Additionally, the Great Lakes communities and shorelines are dynamic and revisions to FEMA's flood maps reflect changes to coastal flood hazards caused by new infrastructure from growing populations as well as migration of rivers and coastal shorelines that can influence how flooding behaves.

The new coastal flood studies were composed of a multi step analytical process, which began with a regional lake-wide assessment of storm surge and wave behavior within each of the Great Lakes. The regional studies were conducted using the coupled two dimensional numerical models, swan and ad circ. These models were used to capture wave behavior and storm surge behavior respectively. The models were run using historical storm conditions that occurred between 1960 and 2009. Among the factors considered for capturing storm surge and wave behavior were the influence of lake levels, ice coverage, wind and pressure conditions. The number of storms used to compute wave and storm surge across the lake varied but was generally around 150 storms.

Using the output from the two dimensional model, the studies then investigated flooding conditions on a county level using one dimensional transects. Application of one dimensional transect models enabled engineers to capture complex near shore physical processes. These models investigated near shore wave transformation, storm induced erosion, wave set up, as well as run up and overtopping, and overland wave propagation.

Results from near shore analyses were ultimately applied to assess dominant flood hazards and inform floodplain mapping on updated flood insurance rate maps. The maps illustrate various flood zone designations that provide information on the magnitude and type of flood hazards as well. Flood insurance rate maps depict information on the 1% annual floodplain and the .2% annual chance floodplain. The 1% annual transload plan is of importance because it depicts Special Flood Hazard areas, which are subject to the National Flood Insurance programs floodplain management regulations. Within the 1% floodplain properties with a federally backed mortgage or other types of federal funding are required to purchase flood insurance.

On the updated firms the following zones may be depicted to capture coastal flood hazards in your community. BE zones are new to the Great Lakes but have been used in other coastal environments such as the Atlantic and Pacific coasts. The VE zone designation is used to identify coastal high hazard areas where wave action or high velocities can cause structural damage. These areas are applied anywhere wave heights or wave run up are greater than or equal to three feet. These zones are also associated with a base flood elevation.

Additionally, AE zones will appear on the maps. These zones have historically been used in association with flood zones along the Great Lakes.

AE zones are used in areas of the 1% floodplain, where lower flood risks are present. The AE zone is used to classify flood zones where wave heights and run up are less than three feet. They can also be used to capture plateau overtopping zones. Similar to VE zones, the AE zone will also be associated with a base flood elevation.

Finally on the new flood maps, AO and AH zones will also appear. These zones are used to designate areas of wave overtopping. The difference in the zone classification is related to the flow path of over tapped water. AO zones are used to reflect areas of sheet flow or shallow flooding and are associated with a water depth. AH zones however, are used to designate areas of ponding where overtop flow is trapped in a low ground feature. AH stones will be classified with a base flood elevation.

Wave run up tends to be the dominant Flood Hazard along steep shorelines. As a result, it's often associated with narrower floodplains unless wave overtopping occurs. When mapping wave run up as the dominant flood hazard, a VE zone is provided in areas where the base flood elevation is greater than or equal to three feet above the ground elevation. Farther inland, where the base flood elevation is less than three feet above the ground, the flood zone designation will change to an AE zone. Ultimately, the 1% floodplain ends and leads to either an interior shaded X zone designating the 500 year floodplain, or an unshaded X zone, which indicates areas outside both the 100 year and 500 year flood plains.

In a similar fashion, this graphic provides an example of flood zone mapping associated with overland wave propagation. Overland wave propagation is often the dominant Flood Hazard on mild gently sloping shorelines, where storm surge and waves are capable of propagating inland. In this flooding scenario, areas with wave heights greater than or equal to three feet are classified with a VE zone. As waves propagate inland, they may begin to break due to reduced water depths or the presence of obstructions such as buildings or vegetation. In areas where wave heights are expected to be less than three feet, AE zones are mapped. Within the AE zone, you'll also notice the limit of moderate wave action line or LiMWA. The LiMWA line is provided on flood insurance rate maps

because field visits and laboratory studies have shown wave heights as low as 1.5 feet can cause significant structural damage. The delineation of this line may then be useful for community members with property inside the coastal A zone. Some communities may also adopt additional regulations for properties within the coastal A zone, and received community rating system credits.

Like a three legged stool, the National Flood Insurance Program balances three related areas that must support each other. With coordination between Flood Hazard mapping, floodplain management and flood insurance, the program aims to reduce the impact of flooding on private and public structures.

Along with this presentation, additional resources are available to address questions related to the National Flood Insurance Program, as well as materials on mapping updates in the Great Lakes. For details on flood hazard mapping GreatLakesCoast.org, as well as FEMA's mapping and insurance exchange and Map Service Center are available. Information related to preliminary mapped flood hazards, as well as access to FEMA's flood map changes viewer may also be found using the second link on this page.

Likewise, information related to flood insurance is available through the National Flood Insurance programs help center, and online at FloodSmart.gov

In order to access and compare preliminary flood hazards against presently mapped flood hazards, the FEMA maps service center or flood map changes viewer can be used. These websites allow the user to search for a county or area of interest for closer inspection of flood hazard changes. Of course, you can always reach out to your local officials and certified floodplain managers for additional information as well.

Thank you so much for your time. If you have additional questions or seek additional information, please don't hesitate to reach out to the FEMA map service center at msc.fema.gov.