

The State of North Carolina is updating the mapping of the **Primary Frontal Dune (PFD)** as part of the statewide coastal flood hazard risk mapping restudy. These updates will be shown on the revised **Digital Flood Insurance Rate Maps (DFIRM)** for the coastal communities.

## What is the Primary Frontal Dune?

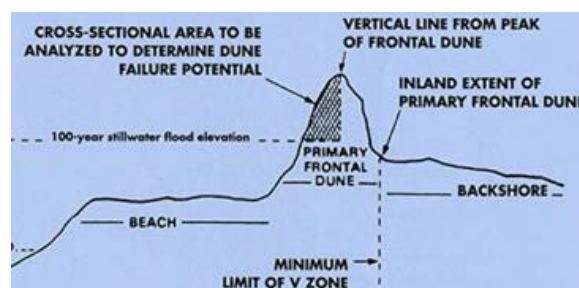
The **Primary Frontal Dune** is a continuous or nearly continuous mound or ridge of sand with relatively steep seaward and landward slopes immediately landward and adjacent to the beach and subject to erosion and overtopping from high tides and waves during major coastal storms. The limit of the primary frontal dune, also known as the landward toe of the dune, occurs at a point where there is a distinct change from a relatively steep slope to a relatively mild slope. At a minimum, the primary frontal dune represents the landward extension of the VE Zone.

## Why is the Primary Frontal Dune being updated?

- Dunes are dynamic features that can move frequently over a short span of time and the current representation of the VE Zones, based on the PFD, on DFIRMs may not be accurate any longer;
- New topographic datasets with a higher level of detail, such as Light Detections and Ranging (LiDAR) and ground surveys have become available;
- Improvements in modeling methodologies, such as reduced transect spacing, allow for a more accurate identification of the Primary Frontal Dune location; and
- Improvements in geospatial technologies provide the engineers with tools capable of delineating the floodplain and zone boundaries between transects more precisely.

## My community is protected from coastal storms by a large dune. Does the new coastal flood study take this into account?

If there is a continuous dune along the shoreline, i.e. the primary frontal dune, the coastal flood study includes an analysis of how the dune will be affected by the 1% annual chance storm. The analysis considers the height of the dune relative to the predicted height of the combined storm surge and wave effects to determine whether the dune will be overtopped. Since the dune will be subject to severe erosion during a coastal storm, the analysis also considers whether the dune is large enough to survive the storm or not. The Federal Emergency Management Agency (FEMA) has established the following criterion based on historical data: primary frontal dunes with a cross sectional area of more than 540 ft<sup>2</sup> are considered to provide adequate protection from a 1% annual chance coastal storm; dunes with less than 540 ft<sup>2</sup> are considered to fail and provide little to no protection from the 1% annual chance coastal storm. If the analysis shows that the primary frontal dune is not overtopped and has a large enough cross section to survive the effects of the modeled storm, then the inland limit of the VE zone is mapped at the inland "toe" of the primary frontal dune. If the dune is overtopped but still survives the storm, then the VE zone will extend inland beyond the dune, but the wave energy absorbed by the dune will limit the extent of the VE zone. However, if the analysis indicates that the dune will fail during the modeled storm, the analysis does not consider the dune and the VE zone typically extends much further inland.



**My property elevations are above the BFEs shown on the DFIRM panel. Why is it designated as a Zone VE?**

Where the landward toe of the PFD is farther inland than the modeled inland extent of the VE zone, then, by FEMA regulation, the VE zone is to be extended to the landward toe of the PFD, and the lowest VE elevation is to be carried to the extent of the VE zone. In this case, the entire dune is considered to be part of the VE zone, regardless of elevation. Therefore, areas seaward of the PFD with ground elevations above the total still water elevation (1% annual change stillwater elevation + wave setup) will be included in a VE zone.