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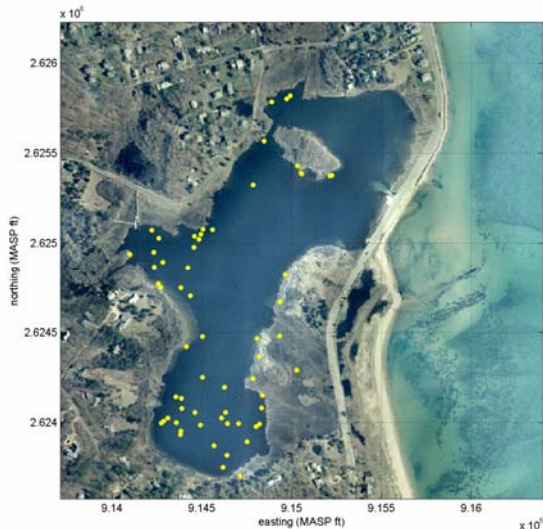
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Project: Hydrodynamic and Inlet Alternatives Analysis for Farm Pond, Oak Bluffs, Massachusetts

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A hydrodynamic study was performed for Farm Pond, located within the town of Oak Bluffs, Massachusetts, on the northeastern side of Martha's Vineyard. The Pond presently has a 48 inch-wide inlet, that was constructed in 1991 to re-establish tidal exchange between the Pond and the Sound. The main goal of this study was to determine if additional widening of the inlet could further improve water quality in the pond, and what the implications to storm surge elevations in the Pond would be. Due to the presence of low-lying dwellings along the shoreline of the Pond, water quality improvements would likely not be perceived if flood risk to these properties increased.

The analysis results were based upon a 2-dimensional hydrodynamic model developed for the Pond. This model was calibrated using tide data, and modified to represent several inlet culvert widths. A particle tracking model was employed to better quantify improvements to tidal flushing for two of the culvert scenarios. Additionally, a real storm event captured in the tide record collected for this study was modeled for both present and selected culvert scenarios to determine how storm surge elevations in the Pond would change.

The tide record collected between October and November 2005 shows that water elevations in the Pond react quickly to storm surges in Nantucket Sound. A storm on October 25, 2005 raised water elevations in the Pond to 3.9 feet MLW, or about 1.6 feet above the Mean Higher High Water (MHHW) level of Farm Pond. The maximum tide level in the Pond was only 0.8 ft less than the maximum offshore elevation.

Hydrodynamic modeling of the storm event that occurred October 25 shows that flood elevations in the Pond are more dependent upon the storm duration than on the width of the inlet. The results of the storm surge analysis show that for most storms, the flood elevation and duration will not change significantly with the wider inlets. This is due to the long duration of a typical storm (compared to the average tide cycle length), which presents ample time for the Pond level to rise to the same level as the Sound.