

APPLIED COASTAL

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Project: Hydrodynamic and Water Quality Modeling Study of Great, Green, and Bourne Ponds, Falmouth, MA.

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Applied Coastal performed hydrodynamic and water quality analyses for three tidal ponds (Great, Green, and Bourne Ponds) located in Falmouth, MA. The study was initiated to determine the water quality impacts of a septic nutrient plume propagating from the Massachusetts Military Reservation (MMR) on Cape Cod. This study was performed in cooperation with the University of Massachusetts Center for Marine Science and Technology (CMAST), under contract with Horsley & Witten, Inc.

Based on residence time predictions from the hydrodynamic flushing study, all three ponds were determined to be rapidly flushing systems. The rapid flushing rate of a system typically is an indicator of good relative water quality; however, each pond clearly shows signs of ecological stress, indicative of poor water quality.

A concurrent evaluation of nutrient loading to each of the ponds was performed by CMAST. This evaluation showed that the greatest contributions to nutrient loading of the ponds were septic tank loads and lawn fertilizers. The MMR septic plume was determined to have no contribution.

The water quality was calibrated based on existing information and then used to predict levels of total nitrogen within the various sections of Great, Green, and Bourne Ponds. Additional model scenarios were run to determine effects of build-out in the pond watersheds, as well as removing all nitrogen from on-site septic disposal of wastewater from the watersheds of each Salt Pond. By sewerage the septic loads in the Ashumet watershed, model results showed significant lowering of nitrogen levels in the ponds. However, even the removal of all wastewater nitrogen is insufficient to fully restore the Ponds to a high level of nutrient related health.

