

Executive Summary

Inter-municipal Watershed Planning and TMDL Implementation to Restore Embayment Water Quality on Cape Cod

Nitrogen TMDL Planning: Three Case Studies of Towns Sharing Coastal Watersheds

The findings and recommendations from three case studies on Cape Cod are presented – each targeting the reduction of nitrogen loads from nonpoint sources of pollution resulting from land development within three unsewered coastal watersheds. The goal of this EPA funded project was to report the decision making process that engaged the attention community leaders for the load reductions the towns would collectively share for restoring estuarine water and habitat quality for compliance with the federal Clean Water Act Total Maximum Daily Load (TMDL). This project engaged the stakeholders (municipal, county, state, and environmental organizations) within the Popponesset Bay (Mashpee, Barnstable, and Sandwich, MA), Three Bays (Barnstable, Sandwich, and Mashpee, MA), and Pleasant Bay watersheds (Chatham, Orleans, Brewster, and Harwich, MA).

The towns sharing these coastal watersheds were presented the outcome of detailed, science-based, parcel-specific calculations that defined the nitrogen loads that affected each embayment system and the load reductions required to restore water quality of the affected coastal embayments. These identified load reductions were the outcome of the MEP Linked Model; a tool that relies on water quality monitoring data, land use, and parcel data that defined the critical nitrogen loading thresholds of each coastal watershed and embayment system. The outcome of the Linked Model in defining the nitrogen loads that must be reduced for restoring water quality to each embayment took into account the delineation of the watershed and its area, embayment bathymetry, water quality monitoring data, tidal elevations/flows, groundwater flows, embayment flushing, and nitrogen assimilative capacity. The loads that were defined for reduction were further calibrated and validated prior to being recorded in the technical reports prepared by the University of Massachusetts School of Marine Science and Technology (SMAST) in consultation with Applied Coastal Research, Inc.

The Linked Watershed-Embayment Model was employed by the three Pilot Project Teams for intermunicipal decision making, utilizing funds provided by the EPA grant to help define the best locations within the watershed for sewerage and treatment/disposal; locations that would achieve the desired reduction in watershed loads to achieve the estuarine water quality standard that was cost and environmentally effective.

Ultimately, all communities will use what was learned in these case studies to guide their wastewater management plans in junction with the nitrogen reductions each of the towns is responsible for reducing; either in collaboration or alone.

Past municipal wastewater planning has typically limited its attention to wastewater discharges to a single town or small portions of them. This study was geared to promote a regional, watershed-based evaluation that accounts for all nitrogen sources within a watershed, both point and nonpoint, and integrates a broad range of infrastructure and management solutions into existing permitting programs for surface and ground water discharges.

Based on the experience and the lessons learned, the recommendations of stakeholders have been defined for consideration by MassDEP to help facilitate future wastewater management planning. These include improvements to existing state statutes, regulations, and policies. As a result of this EPA funded study, MassDEP will be evaluating its existing regulatory framework, policies and guidelines with the goal of developing a roadmap that will facilitate intermunicipal planning on a watershed scale to encourage watershed-wide NPDES and ground water permitting and nutrient trading.

For further information on these Case Studies and a copy of the final report, please contact Dr. George Zoto of MassDEP at the Department's Cape Cod Office, 973 Iyannough Road (Route 132), Hyannis, MA 02601; Telephone: 508-771-6034 or by Email: George.Zoto@state.ma.us