

## **Chapter 5**

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# **Needs Assessment Summary**

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### NEEDS ASSESSMENT SUMMARY

#### 5.1 INTRODUCTION

The purpose of this chapter is to summarize wastewater issues and problems (needs) in the Town of Eastham. The Interim Needs Assessment portion of the Wastewater Management and Disposal Study is developed to clearly summarize the needs of the Town of Eastham as they relate to the existing and future conditions and more broadly, the public health and environmental needs as approaches to wastewater management are examined. In Chapter 14, technologies will be selected and alternatives identified with respect to the public health and environmental needs of the Town of Eastham.

#### 5.2 DECLINING DRINKING WATER QUALITY AND PUBLIC HEALTH CONCERNS

The Town of Eastham has long considered the implementation of a town-wide municipal drinking water system. As discussed in Chapter 4, a Municipal Water Distribution System Master Plan was completed in May 2006 with results presented at Town Meetings, the last one being Special Town Meeting on October 1, 2007. The drinking water sampling program and nitrogen analysis has indicated the following findings on the individual water supplies in Eastham for nitrate concentrations:

- The number of households with nitrate levels above 5 mg/L has increased over time.
- The number of households with nitrate levels less than 2 mg/L has declined over this same period.
- Also, the number of households above 10 mg/L has increased.

Nitrate has a State and Federal drinking water limit (maximum contaminant limit or MCL) of 10 mg/L because it may cause serious illness in newborn children. As a result, the Cape Cod

Commission has set a groundwater planning limit of 5 mg/L total nitrogen to protect drinking water supplies and other water resources. Despite the information presented, efforts to fund a municipal drinking water system have failed at Town meeting.

Drinking water standards have not been set for all of the potential contaminants in wastewater especially the “emerging contaminants of concern” such as personal care products, pharmaceuticals, and endocrine disruptors. Analysis of these contaminants is very expensive, therefore the nitrate analysis is used as an indicator that these other contaminants may be present at the affected private water supplies.

As shown in Chapter 4, Figure 4-5 illustrates an analysis of nitrate results of a water survey program conducted in Eastham fiscal years 2003 through 2005. To illustrate the number of properties affected by high nitrate levels, Figures 5-1 and 5-2 were developed in GIS. Figure 5-1 illustrates an average of nitrate sampling data as reported from the years 1999 through 2006 for individual properties in the Town of Eastham. The red parcels designate properties that have average sampling results greater than 5 mg/L and the yellow parcels designate properties that have average sampling results between 2 – 5 mg/L. Figure 5-2 illustrates the sampling data in terms of displaying the highest sampling result achieved between 1999 and 2006 for each property. The purple parcels designate properties that have had one sampling result greater than 10 mg/L. The red parcels designate properties that have had one sampling result greater than 5 mg/L. Table 5-1 summarizes the sampling results.

While difficult to determine relationships between the parcel size and watershed location, the nitrate readings between 5 - 10 mg/L seem more pronounced in areas with increased residential levels such as the Cape Cod Bay Recharge Area.

Every three years the Town of Eastham creates a new composite map illustrating the findings of the nitrate results of the water survey program. Similar to Figure 4-5, a map has been developed for testing conducted during fiscal years 2005 to 2008. Similar trends are identified during this time period in comparison to Figure 4-5.

### **5.3 ENVIRONMENTAL EFFECTS OF WASTEWATER**

The MEP technical report has evaluated nitrogen limitations for the Rock Harbor Embayment System as discussed in Chapter 4. Although a final TMDL report has not been released at the

time this Wastewater Management and Disposal Study was developed, a threshold septic load has been drafted indicating the present septic load needs to decrease. The TMDLs (once approved by the USEPA) will become the regulatory limit on the amount of nitrogen that can be discharged into the watershed of this marine estuary and other estuaries within the Town, and will be enforceable by MassDEP.

It is expected that subsequent MEP technical reports and TMDL reports will indicate the marine waters in Eastham have exceeded their nitrogen limits, and significant amounts of nitrogen must be removed from the watersheds. It is also expected that results of the Cape Cod Commission's Pond Evaluation Report will show similar issues with respect to phosphorus. Previously released reports from other Cape Cod estuaries and the Rock Harbor Technical Report have documented that most of the nitrogen is coming from individual septic systems in the watershed, and have identified the percentage of wastewater nitrogen that needs to be removed to meet the nitrogen limits.

#### **5.4 NO ACTION ALTERNATIVE**

The No Action Alternative is developed to identify the likely outcome of not acting on the current water quality problem in the Town of Eastham. Increased nutrient loading from on-site septic systems will continue to negatively affect private water supply wells, potentially increasing the nitrate levels past the maximum contaminant level for drinking water, making the drinking water unsafe. With the continued increase in nitrate concentrations within private supply wells, other contaminants currently not being analyzed in the groundwater such as phosphorus, volatile organic compounds, personal care products, pharmaceuticals and viruses may also be reaching the private drinking water wells of Eastham residents. These contaminants are not only unknown, their concentrations are also unknown. Levels beyond what is regulated safe for public health is expected to affect private wells if no action is taken to remedy the public drinking water supply.

In addition to decreased drinking water quality, the degradation of embayment water quality is expected to continue. As the MEP technical reports are developed for Nauset Estuary – Town Cove and Wellfleet Harbor, and subsequent TMDLs established, the Town will need to demonstrate progress to meet them or be subject to MassDEP enforcement actions.

## 5.5 SUMMARY OF FINDINGS AND PROPOSED SOLUTIONS

A. **Human Health Need.** Throughout Town, there is a growing and imminent human health need related to degraded private drinking water supplies due to wastewater discharges on individual properties. The following proposed solutions will be evaluated in following chapters to address this human health need:

- Municipal drinking water supply.
- Point of use technologies.
- Bottled water purchase.

B. **Environmental Health Need.** There is a documented environmental health need for the Rock Harbor Estuary and watershed. The draft MEP Technical Report has indicated that 79 percent of the existing wastewater nitrogen load needs to be removed to meet the proposed limit. Though the environmental health need has not been documented for the Nauset-Town Cove Estuary and watershed, preliminary findings indicate that 55 percent of the existing wastewater nitrogen needs to be removed.

Preliminary findings for the Town's freshwater ponds have been summarized in the December 2008 draft report by the Cape Cod Commission. Those findings indicate that additional sampling and analysis and environmental studies are needed to fully determine the environmental need for this resource. The draft report (and the current science) indicates that phosphorus discharged into the watersheds of these ponds is moving to the ponds, is emerging into the ponds, and will continue to emerge as long as the phosphorus is discharged into the watershed. At this time the environmental health need is estimated as 100 percent wastewater phosphorus removal due to current science that indicates that phosphorus loading to the soil will travel to surface waters and cause eutrophication in fresh waters. Further evaluations may revise this finding.

The following proposed solutions will be evaluated in following chapters to address these environmental health needs:

### Rock Harbor Estuary:

- Community/municipal wastewater collection, treatment and groundwater recharge for properties in this watershed.
- Connection to the proposed Orleans wastewater system for properties in this watershed.
- Further evaluation (possibly through MassDEP pilot study) for improved tidal flushing and/or watershed modification at the Rock Harbor boat basin to lower the needed wastewater nitrogen removals from the watershed.

### Nauset-Town Cove Estuary:

- Community/municipal wastewater collection, treatment and groundwater recharge for properties in this watershed.
- Connection to the proposed Orleans wastewater system for properties in this watershed.
- Individual on-site systems approved by MassDEP for nitrogen removal for the properties in this watershed. This solution would need to be supported by an expanded Town Health Department to enforce operation, maintenance, and discharge compliance.

### Freshwater Pond System Watershed:

- Community/municipal wastewater collection treatment and groundwater recharge for properties in the watershed to remove future phosphorus loadings to the ponds.
- Periodic chemical treatment (alum is the chemical typically used) of affected ponds to chemically bind the phosphorus once it arrives in the ponds.

C. **Consequences of No Action.** If the human health and environmental health needs are not addressed, they will get worse.

High nitrate levels at private water supply wells are expected to increase exposure to human pathogens (as deduced from higher nitrate levels) and could increase the risk of human illness. Additional unknown contaminants in the groundwater will affect private wells as time progresses and is expected to further impact the threat to public health. The risks of not establishing a

public water supply are immeasurable and the consequences could be detrimental to the current residents and future generations in Eastham.

Continued high nitrogen loadings to Rock Harbor and Nauset-Town Cove Estuaries will increase the incidence of algal blooms, degraded water quality, fouled sediments and loss of shellfish resources, and loss of aesthetic qualities that could result in property value decline. The Town could also face financial penalties imposed by USEPA or MassDEP once the nitrogen limits for these estuaries become TMDL limits.

Continued high phosphorus loadings to the freshwater ponds could have a similar effect (as stated above for the estuaries) on the ponds. No phosphorus limits have been created yet, but the Cape Cod Commission may recommend them, and they may become a reality with financial penalties.

## **5.6 NEXT STEPS TO IDENTIFY SOLUTIONS FOR WASTEWATER NEEDS**

Chapters 6 through 13 identify and discuss these proposed solutions and the various advantages and disadvantages of their components. In the final Chapter 14, these solutions and their components will be screened to determine reasonable alternatives and approaches for the Town of Eastham that will receive additional evaluation to develop the Wastewater Management and Disposal Study.