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Environmental Finance Charette

**Hyannis Park on Lewis Bay: A Case Study**

Yarmouth, Massachusetts

September 21, 2000

Conducted by the Environmental Finance Centers of the University of Southern Maine and the University of Maryland System

**Area Demographics:  
Yarmouth, Massachusetts**

Population- 21,174  
Total area- 28.22 sq.mi.  
Housing Units- 15,913  
Owner occupied units- 7,014  
Renter, seasonal, vacation or vacant units-8,899  
Median property value, owner occupied- \$149,400  
Median household income- \$27,222  
Per capita income- \$15,042

**The Town**

The town of Yarmouth is located on the southern shore of Cape Cod in the mid-Cape region, one of fourteen communities in Barnstable County. English settlers first arrived in Yarmouth in 1630, after it had been occupied for many centuries by different tribes of the Wampanoag people. Three Englishmen settled the town of Mattacheese in 1639 and changed the settlement's name to Yarmouth the following year. In 1730, after smallpox had decimated the Pawkannawkut tribe, David Kelly, an English inhabitant, purchased the land that would become the southern section of Yarmouth from the last surviving tribal member.

Yarmouth today is a relatively affluent bedroom community, approximately 75 miles from Boston and Providence, R.I. Its population is better than 95% Caucasian, and 72% are native to Massachusetts. The median age of residents in 1990 was 39.5 years, with better than 25% of the population being over the age of 60. Nearly 60% of the economic base of the town is derived from tourist industries or retirement-based incomes.

In the decades between 1920 and 1990, the population of Barnstable County expanded

sevenfold, the highest rate of any Massachusetts county. The town of Yarmouth may be viewed as a microcosm of the phenomenal growth on Cape Cod during the past half century. Barnstable County in the 1990's saw an average of 1500 new housing starts per year, many of which are seasonal residences and cottages located on or near the water.

## **The Issue**

Hyannis Park is a residential/commercial section of Yarmouth located on Lewis Bay, just west of the Lewis Creek inlet, with an old cranberry bog at its center. It embraces approximately 1000 residences, 1000 motel units, and numerous commercial properties along a 1.6 mile stretch of Route 28, the central Cape state highway.

Hyannis Park is typical of many Cape Cod subdivisions begun around the turn of the 20th century, in terms of growth in population and density of homes, seasonal residences, motels, and businesses. The population density in these small pockets is extremely high, with most residences sitting close to the water on adjacent 1/8th acre plots. All of the commercial and private occupancies in the area use septic systems for wastewater removal. The nutrient-rich effluent of these septic systems appears to leaching through the sandy soils of the Cape and into the underground aquifer or water table which, in turn, feeds the surface waters of the ecosystem and co-mingles with the waters of the Bay. Roadside and pitched roof stormwater runoff along Route 28 also appears to be finding its way into Lewis Bay and the ecosystem it drains.

The town of Yarmouth currently has a \$30 million septic sludge treatment plant and transport lines in place. The vast majority of the dwellings and businesses in the Hyannis Park area are on septic systems that are viable and Title 5 compliant, regardless of age. Conventional, "non-failing" septic systems, however, were never intended to remove from their effluent nutrients such as nitrogen. These have become recognized as an environmental threat only as our understanding of the impacts of excess nutrients on ecosystems has increased in recent decades.

## **Environmental Context**

The environmental dilemma facing the town of Yarmouth is the apparent degradation of the Lewis Bay ecosystem, mostly as the result of effluent from these densely packed septic systems is seeping into the watershed. Approximately 80% of the nitrogen that enters the watershed comes from these private septic systems, and the

remainder from other non-point sources. The effect is nutrient or nitrogen loading of the surrounding watershed above the critical load. Various species of plants and animals which inhabit these estuaries cannot tolerate this level of nutrient loading, because it spawns a large amount of bottom algae, over-shading of eelgrass, and, ultimately, a depletion of oxygen in and an increase in the toxicity of the water. Each of these effects will send fish to other feeding grounds, while killing plants and animals that live on or in the ocean floor.

The potential damage is great not only to industries like fishing and shellfish harvesting on these lands, but also to seasonal tourism through impacts on the aesthetic character of the region. At some point, the health of persons recreating in these waters contaminated by septic runoff might well become an issue. The deterioration of the cranberry bog in Hyannis Park is cited as an example of what can happen if the problem is allowed to continue.

The problems for proponents of this initiative are many and multifaceted. There is little public knowledge and support in the affected area regarding the nitrogen loading of the Lewis Bay watershed. No conclusive data has been adduced to support the assertions of the Conservation Consortium Foundation, the group that has spearheaded this campaign, about the extent and effects of the contamination of the watershed. The Route 28 Task Force, Hyannis Board of Selectmen, the Cape Cod Commission, the Massachusetts D.E.P., and the Massachusetts State Legislature have not yet been effectively engaged in shaping this initiative.

### **Proposed Remedy**

The solution proposed by the local, non-profit Conservation Consortium Foundation (CCF) is a new, state-of-the-art water treatment system produced by AquaGen, Inc. This "cluster" wastewater treatment facility would collect, treat, monitor, and redistribute wastewater from approximately 1000 homes and 1000 commercial motel units, at an initial capital cost of some \$9.6 million. The system would be designed to handle 500,000 gallons per day, up to a maximum of 1,000,000 gallons per day. For an additional \$350,000 investment, storm-water runoff from the streets and roofs of the area could be collected into this system.

Connection to the system is proposed to be voluntary, with a projected cost of \$6000-\$7000 per household if every available unit were to sign onto the plan. Under the same assumption, each dwelling would pay approximately \$220 per bedroom for annual operation and maintenance costs. The proposal also contemplates potential

revenue from the re-selling of treated wastewater to area businesses for industrial uses. The remaining treated water would be subsurface discharged into a bog area.

The system, if effectively implemented, could well become a model for the many other Cape Cod communities confronting similar wastewater and non-point pollution dilemmas.

## **Project Financing**

At this time no funding has been secured for the project.

With no direct evidence to substantiate and prioritize the problem, no widespread public understanding of its implications, and no general political support for the proposed plan, financing of the initiative becomes problematic. In the short term, the proposal is predicated on a voluntary commitment to the AquaGen system by citizens in the affected area, though many of these are either unaware of or indifferent to the problem of the non-point source pollution of Lewis Bay. As well, these citizens are now on legal septic systems, some of which have recently been updated at substantial cost. This could potentially leave a small number of citizens to pay for the initial \$9.6 million installation, even while their neighbors will benefit later, as their septic systems age and fail.

## **Recommendations & Observations**

***1. Potential sources of funding.*** Numerous state and federal assistance programs are available as potential sources of support for the initiative, including:

- State Septic Management and Drinking Water Revolving Loan Funds (RLF);
- Community Development Block Grant (CDBG) funds;
- Economic Development Administration (EDA) grants and loans;
- Farmers Home Rural Development grants;
- Coastal Zone Management (CZM) funds;
- State EOEA monitoring and assessment grants;
- U.S. EPA Environmental Education grants;
- EPA Sustainable Development Challenge Grants (Region I); and
- U.S. Army Corps of Engineers Watershed Restoration funds.

The Provincetown (MA) "wastewater enterprise account" was specifically cited as a local funding model to research for its potential application.

To be eligible to receive funds from any of the above state and federal sources, however, the Town itself must stand ready to apply. As noted above, state and local political leaders in the area are not well informed of the pollution of the Lewis Bay estuary, and in some cases are even skeptical of a problem's existence. Only rigorous data collection and analysis and greater public understanding will overcome the obstacles to addressing the problem identified; given these, funding should not be the issue.

**2. *Research & Analysis.*** It was recommended that this more conclusive research and analysis be undertaken by the CCF, Cape Cod Commission, and/or the EPA. Only detailed verification of the problem, assessment of its impacts and importance, and analysis of its treatment options may move interested parties and decisionmakers to an effective solution.

**3. *Public Education.*** Public discussion and education is needed, beginning with raising awareness of the problem, followed by the clarification of potential solutions. Warren Village, Vermont, was cited as an example of a successful program in raising public awareness and concern through teaching local citizens to test water samples from their own septic systems, and to understand the full implications of the cumulative results.

**4. *Political Support.*** Public education must spur political support. The project cannot be brought to fruition without political support from the local Board of Selectman and other regional organizations and state decisionmakers. Political support will lead to an expansion of possible funding and implementation options.

**5. *Sprawl.*** Finally, the nutrient loading of Lewis Bay may be viewed as a direct result of failed planning and suburban "sprawl". It was recommended that the Town's zoning laws be examined to assess their adequacy to prevent any further deterioration of the Bay; and that consideration be given to legal initiatives to mandate over time septic conversion to the type of "cluster" treatment system proposed for Hyannis Park.