



Paved Stormwater Swale on Route 28

Recommendations

Based on these findings, several specific recommendations were made and are being considered by the Town to mitigate the presence of enterococci.

Stormwater:

- Improved stormwater facilities should be implemented to reduce the existing discharges from road runoff. Route 28 is the primary source of road runoff to the Cockle Cove Creek watershed. The Massachusetts Highway Department should be encouraged to replace an existing paved swale with catchbasins and leaching facilities capable of containing the first flush of stormwater runoff.
- Construction of a fresh water pond in the upper portion of Cockle Cove Creek may be considered. The pond would improve water quality by preventing the stormwater from flowing directly into Cockle Cove Creek, allowing infiltration of the stormwater.

Septic Systems:

- While septic systems around Cockle Cove Creek were not found to be a significant source of enterococci, the Town should continue with its program of septic system design reviews and inspections to ensure the proper design, location, and operation of these facilities.



Waterfowl in Cockle Cove Creek

- The assessment identified a handful of properties for which information was unavailable. The Town should require inspection of the septic systems on these properties to ensure that they are functioning properly and not contributing to enterococci contamination in Cockle Cove Creek.
- The groundwater monitoring wells sampled during the project should be maintained and monitored periodically to identify long-term groundwater quality trends.

Other:

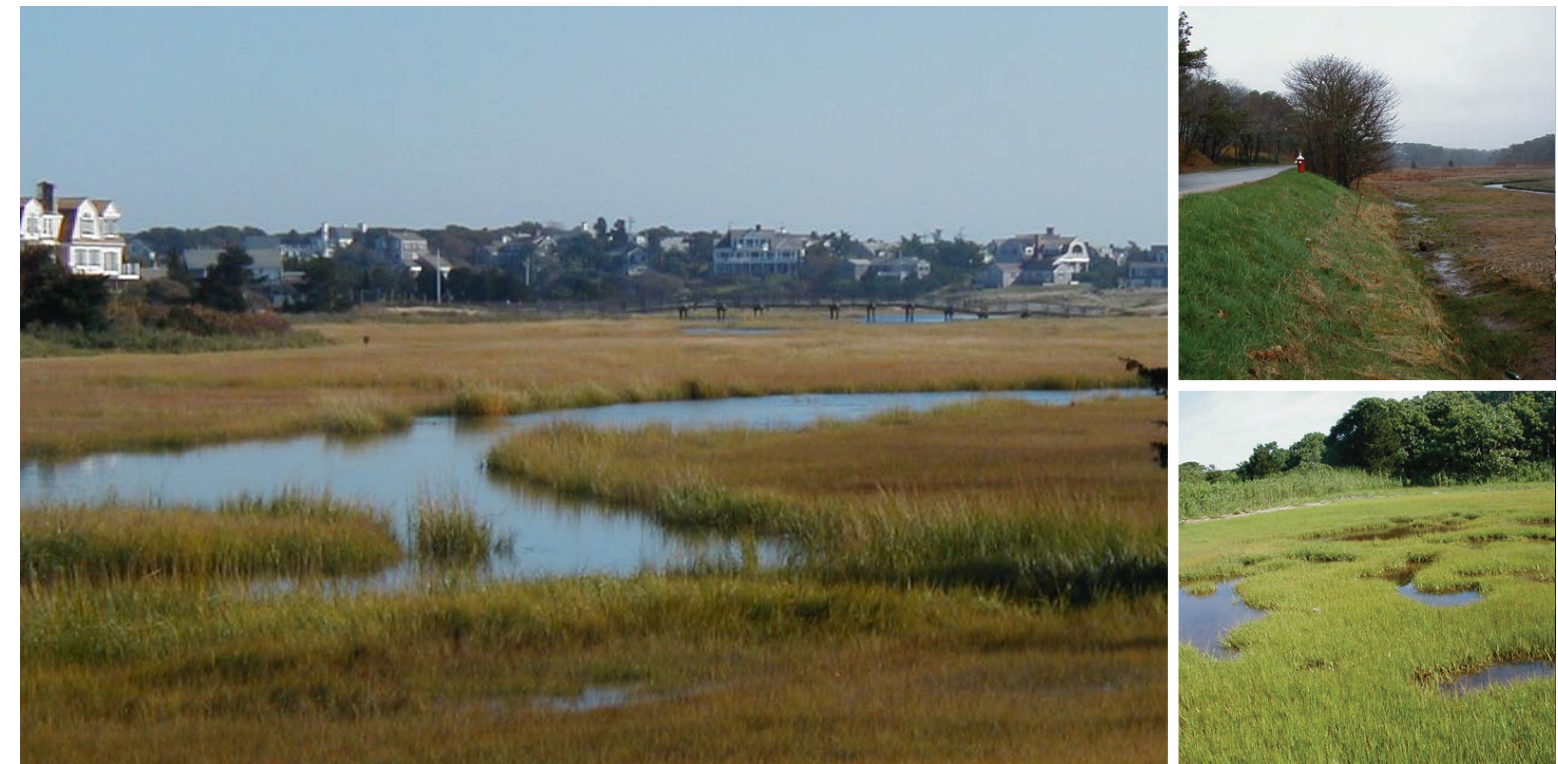
- Further analyses should be performed to better understand the Cockle Cove Creek ecosystem. A better understanding will help to verify the conclusion that natural sources are responsible for enterococci levels. The analyses that are recommended are:
 - Analysis of the link between water temperature and enterococci levels.
 - Analysis of sediment from Cockle Cove Creek.

**For more information, please call
Robert Duncanson, Ph. D., Director, Department of
Health and Environment, at (508) 945-5165.**



Stearns & Wheler, LLC

Cockle Cove Creek Enterococci Source Assessment Study: Findings & Recommendations



During the summer and fall of 2005, the Town of Chatham performed an evaluation of the Cockle Cove Creek watershed. The goal of this assessment project was to investigate the source of the bacteria, to provide greater understanding of the problem, and to aid in identifying possible management strategies to mitigate the bacteria problem.





Accumulated Algal Wrack

For the past several years, bacterial testing in a portion of Cackle Cove Creek has indicated elevated levels of enterococci bacteria. Bacterial counts are typically at acceptable levels during incoming tides, but the consistently high levels on outgoing tides have prompted the Town to issue a swimming ban for the southern end of Cackle Cove Creek, which is adjacent to two popular Nantucket Sound beaches. Cackle Cove Creek is not a designated bathing beach, but it does attract bathers from the adjacent bathing beaches because the water is warm and shallow.

What is enterococci?

Enterococci is an “indicator” bacteria, and its presence in a water body indicates the possible presence of waterborne pathogens (bacteria or viruses that can cause disease), which are a risk to human health.

Where is it coming from?

The preliminary evaluation phase of the study identified several potential sources:

- Stormwater runoff from the roadways and other impervious surfaces around Cackle Cove Creek.
- Failed septic systems, causing a surface flow of effluent to Cackle Cove Creek.
- Properly operating septic systems that potentially contribute enterococci to the groundwater, which subsequently recharges to Cackle Cove Creek.



Fiddler Crab Holes

- Septic systems that could be connected to a stormwater outfall or other direct outlet to Cackle Cove Creek.
- Treated effluent from the Wastewater Treatment Facility (WWTF), which is discharged into sand infiltration beds.
- Flow from Buck’s Creek flowing into Cackle Cove Creek, which could possibly carry bacteria.
- Vegetation and algae accumulated in the wrack line, which can harbor enterococci for later release, or can incubate bacteria of non-fecal origin, resulting in false high enterococci values.
- Animals living in or visiting the watershed including: waterfowl, seagulls, and wild and domesticated animals.
- Sediments accumulated in various parts of Cackle Cove Creek, which can potentially store fecal material from the sources listed above, that can be resuspended into the water column.

What was found?

A detailed evaluation was conducted by the Chatham Department of Health and Environment and Stearns & Wheeler, the environmental engineering firm retained by the Town. The evaluation included multiple site inspections, septic system records review, and a comprehensive sampling program, including existing monitoring wells, WWTF effluent, and multiple locations in Cackle Cove Creek. Town of Chatham personnel carefully sampled marine water and potential groundwater pollution sources. These samples were then analyzed by the Chatham Department of Health and Environment. The results of this evaluation told us that:

1. Stormwater runoff from impervious surfaces may play a small role in contributing to enterococci contamination. However, it is believed that stormwater runoff is not one of the major contributors to the enterococci levels.
2. No significant septic system impacts were identified after detailed investigations.
3. Based on several sampling events, it was concluded that the WWTF does not significantly contribute to the elevated enterococci levels.
4. Buck’s Creek flow was observed during a tidal cycle. When Buck’s Creek stops flowing out into Nantucket Sound and the tide begins coming in, Cackle Cove Creek continues to flow out for a period of time. Therefore, no water from Buck’s Creek was observed flowing into Cackle Cove Creek, thus reducing the likelihood that Buck’s Creek is a potential enterococci source.
5. Natural sources, such as wildlife activity and accumulation of wrack material, were considered to be the primary source of the elevated enterococci levels.



Accumulated Wrack



Fox Den



Wildlife Fecal Material