

# Sippewissett Association

## Newsletter

### Woodneck Beach Study

#### Coliform Bacteria

By Arthur G. Gaines, Jr., Ph.D. and  
Elizabeth H. Gladfelter, Ph.D.

A study of Woodneck Beach was initiated by Elizabeth Gladfelter and Courtney Bird of the Falmouth Conservation Commission in 2006. The study addressed rising concerns over water quality and a diminishing beach asset. The main part of that study, on sand movement and flushing of the estuary, was completed by Applied Coastal Research and Engineering in late 2007. Ancillary studies, conducted by volunteers, have been conducted to address some remaining issues.

Results of nutrient measurements and their exchange between the marsh complex and Buzzards Bay were discussed in an earlier article in this newsletter (Sippewissett Association Newsletter, Winter 2011). We now give results of measurements of coliform bacteria, conducted jointly with Drs. Julie Huber and Mitchell Sogin of the

Bay Paul Center, Marine Biological Laboratory, Woods Hole, MA.

Monitoring by government agencies of certain bacteria levels in natural waters provides one basis upon which waters are certified as safe for human contact and for shellfish harvesting. In recent years, the closure of Woodneck Beach (town beach) for swimming has spawned public alarm and outcry over presumed human waste inputs.

#### The Coastal Complex

The Woodneck Beach coastal complex occupies a pre-existing glacial landform. A barrier beach across its mouth protects the Little Sippewissett Saltmarsh from

wave attack, while a permanent tidal inlet through the beach connects the saltmarsh system with Buzzard's Bay.

Woodneck Beach and the tidal marsh are depicted in the aerial photograph (Fig. 1). In a natural systems construct (Fig. 2), this coastal system can be represented as four parts: the sandy beach at Woodneck; 33 acres (+/-) of saltmarshes (intertidal flats dominated by grass plants); 11 acres (+/-) of marsh creeks conducting tidal flow throughout



Figure 1. The Woodneck Beach Coastal Complex, including the barrier beach and creeks, ponds, and marshlands of Little Sippewissett Marsh (modified from Google Maps).

(Continued on page 2)

*The mission of the Sippewissett Association is to: protect and foster the mutual benefit and interests of landowners of the Sippewissett region of the Town of Falmouth, Massachusetts; to promote and encourage cooperation among such landowners in order to ensure that the future development of said region shall be in keeping with its general residential zoning restrictions and to take whatever action or actions may be necessary to this end; and to protect and prevent the misuse of public and common areas in the Sippewissett region.*

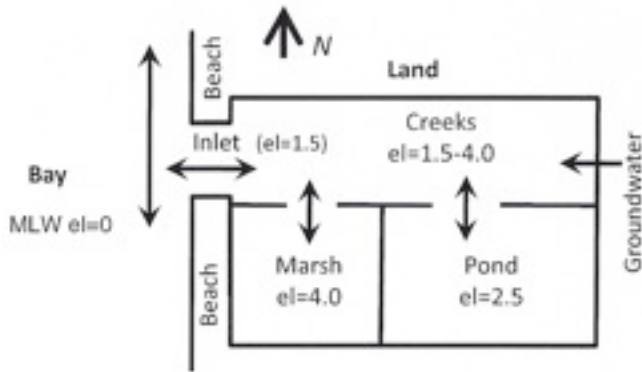


Fig. 2. Woodneck Beach Coastal Complex (minimum surface elevations, ft., are given).

the system; and a brackish pond of about 6 acres, characterized by standing water with a muddy bottom habitat.

These habitats are populated by a diversity of macro- and micro-flora and fauna that participate in the transformation and exchange of energy and materials that are distributed throughout this coastal system and can also be exchanged with Buzzards Bay.

Tidal water, flowing into and out of the marsh twice a day, amounts to about 400,000 cubic yards/day. Incorporated into this volume is about 7,400 to 11,000 cubic yards/day of fresh water entering the system as groundwater discharge around the margins of the marsh complex, and discharged into Buzzards Bay with the ebb tide. There are no streams entering this marsh complex. During our study the salt content of water varied from extremes of 29–32

parts per thousand (2.9 to 3.2%), varying with the stage of the tide.

tidal cycles from July 31 through August 3, 2007. At each station samples were collected during flood tide and during ebb tide, amounting to 24 samples over three days. Samples were col-

lected according to standard procedures and delivered to the laboratory of Drs. Julie Huber and Mitchell Sogin at MBL, whose staff analyzed the samples for fecal coliform bacteria.

The results (Table 1) indicated incoming water from Buzzards Bay was low in fecal coliform bacteria; on two occasions the count was 0. During ebb flow at

the inlet, however, counts rose abruptly to as high as 1,200 bacteria per 100 ml (100 ml = 3.4 fluid ounces). For the series of six sets of measurements the geometric average count rose from 11 during flood to 511 during ebb.

At the Pond station the opposite trend appeared to be the case: counts during flood tide were generally higher than ebb counts, although the trend was weaker. The geometric averages for the measurement set dropped from 827 during flood to 636 during ebb.

Looking at the data another way, five out of six data pairs at the inlet station showed strong increases from flood tide to ebb tide; one data pair remained about constant (Fig. 3). For the pond station three of the pairs declined sharply or moderately from flood to ebb and two remained about constant. For one pair of measurements a strong increase was observed (Fig. 4).

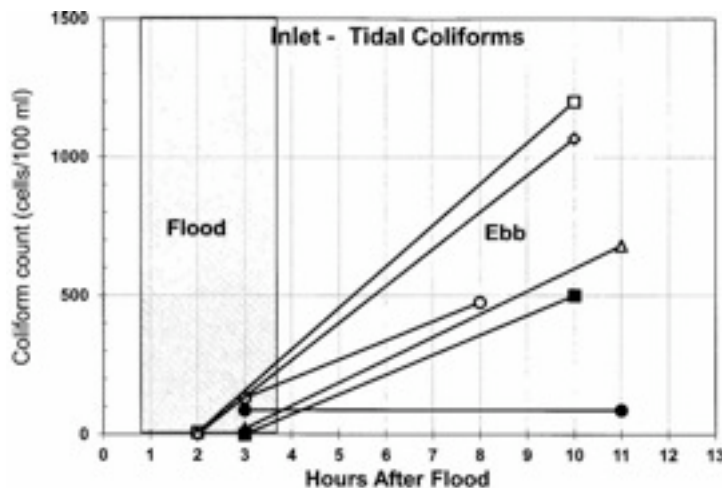


Fig. 3. Fecal coliform counts at two stages of the tide, sampled at the inlet station.

These data suggest a significant source or sources of coliform bacteria within the Little Sippewissett Marsh. Results at the pond station suggest the source is downstream or toward the inlet from the pond.

**Discussion**

The principal concern regarding coliform bacteria in natural

waters is the possibility of human fecal contamination, because fecal coliform bacteria are abundant in the human intestine. The concern is not so much over disease from the coliform bacteria themselves, but rather over the possibility that they are accompanied by human pathogenic bacteria or viruses (which are much harder to measure directly).

However, it is also true that fecal coliforms are found in the intestines of most warm-blooded animals—birds and mammals that are common and abundant on saltmarshes. It is also true that other members of the coliform bacteria group, such as soil or sediment bacteria or pairs, can test false positive as fecal bacteria.

It is our belief that the fecal coliform bacteria measured at Woodneck are the result of wildlife activity. This is not to suggest that bacteria or intestinal diseases in wildlife cannot be harmful to humans, only that we believe direct human contamination is not likely.

Additional evidence supporting this conclusion is sug-

gested by the magnitude of the coliform count during ebb at the inlet. According to one source, a fecal coliform count of 511/100 ml translates into about 0.5 grams per cubic meter. This concentration of coliform bacteria, suspended in a volume of 400,000 cubic yards of ebb tide water, amounts to the equivalent of more than 400 pounds of fecal bacterial matter. This would seem to be much too high to account for by daily human input.

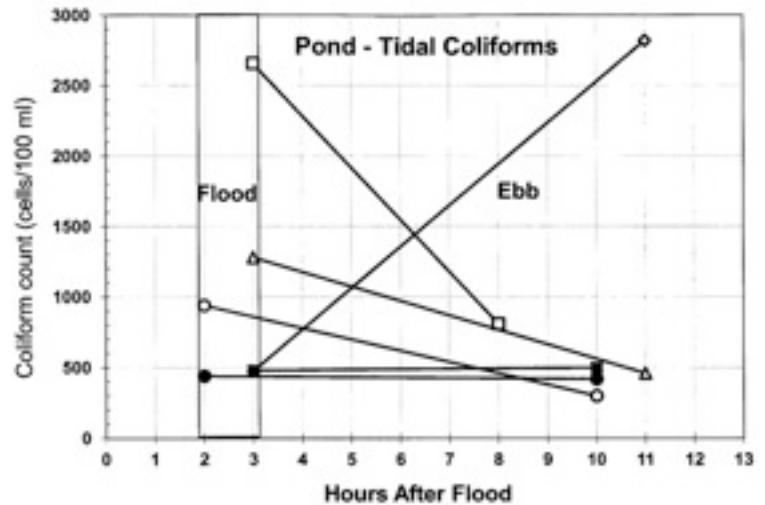


Fig. 4. Fecal coliform counts at two stages of the tide, sampled at the pond station.

Elsewhere in our study we measured an export of about 150 pounds (dry weight) of particulate organic matter through the inlet. This would

amount to more than 600 pounds of wet organic matter, of which some could be coliform bacteria.

Finally, according to Dr. Mitchell Sogin (personal communication), using DNA sequencing surveys, their laboratory found no

evidence of microbial community populations that one would predict from human wastes. At this time their data from Little Sippewissett Marsh do not indicate anthropogenic origins of detected coliform bacteria.

*Dr. Gaines is Oceanographer Emeritus, Woods Hole Oceanographic Institution, and Dr. Gladfelter is Chairman, Falmouth Conservation Commission.*

	INLET						G AVG.
<b>Flood</b>	130	20	87	7	0	0	11
<b>Ebb</b>	475	680	87	0	500	7	511
				1,20		1,06	
	POND						
<b>Flood</b>	2,660	475	1,280	440	480	940	827
<b>Ebb</b>	810	2,820	460	420	500	300	636

Table 1. Fecal coliform bacteria counts (viable cells/100 ml) at two stations in Little Sippewissett Marsh, July 31–August 2, 2007, in late flood and late ebb conditions. Geometrical averages (G AVG.) are given



*Conclusion from:*

## Coastal Access: Who Can Go Where Along the Seashore

*By Robert S. Mangiaratti, Esq.*

With more than 1,500 miles of ocean waterfront, the ownership of the area between high tide and low tide has long been an important legal issue in Massachusetts. Initially, commerce was the principal value of the waterfront. Subsequently, over time the pure and simple pleasure of being close to the ocean has taken on great importance. Thus, in the last century, Massachusetts courts have often addressed real estate matters arising from the recreational value of ocean side property.

The Colonial Ordinance, which generally assigned ownership of the tidal flats to the owners of adjacent upland, remains the dominant feature of the common law regarding the ownership of and access to Massachusetts flats (the area between mean high water and mean low water—or 100 rods from mean high water, if lesser).

The owners of waterfront upland are presumed to own the flats adjacent to their properties. Members of the public only have the

right to go upon privately owned flats for the limited purposes of fishing, fowling and navigation. Although an owner may sever the flats from its adjacent upland, deeds for waterfront properties generally include the flats, in the absence of clear exclusionary language.

The owners of lots in seaside resort developments often have private easement rights to use beaches and other amenities shown on a recorded plan. In the absence of an express easement grant, courts sometimes recognize implied beach easements for lot owners in seaside subdivisions on the basis of the presumed intent of the parties to the deeds for the lots.

*Mr. Mangiaratti will present his full paper at the Annual Meeting of the Sippewissett Association, June 23, 11:00 a.m., at the Cape Codder Clubhouse. The complete article can be found on the Sippewissett Association Web site [www.sippewissett.org](http://www.sippewissett.org).*

## Congratulations to Salt Pond Areas Bird Sanctuaries

For 50 years, the Salt Pond Areas Bird Sanctuaries (SPABS) has worked to preserve “the natural, the beautiful, and the traditional” in the Town of Falmouth.

Incorporated as a non-profit association in 1962, SPABS is one of the oldest nature conservancies on the Cape. Among their properties are The Knob in Quissett Harbor, Bourne Farm and Peach Tree Farm in West Falmouth, and Salt Pond.

Through the Dr. Donald Zinn Scholarship fund, SPABS awards scholarships to Falmouth Public Schools and Falmouth Academy science fair winners.

In 2011, SPABS acquired 4.48 acres in Gunning Point. SPABS President Barrie Murray, in the association’s 2011 *Annual Report*, acknowledges the efforts of Sippowissett homeowners whose “tireless efforts through the years saved this property from development.” The 300 Committee

was also instrumental in preserving this property with a conservation restriction.

All of their properties are acquired and maintained through generous donations, membership dues and member volunteer hours. Please consider becoming a member of SPABS, and partner with them to conserve Falmouth’s natural resources. For more information, go to their Web site, [www.saltpond.info](http://www.saltpond.info), or call 508-548-8484.



## Phragmites Control: Update

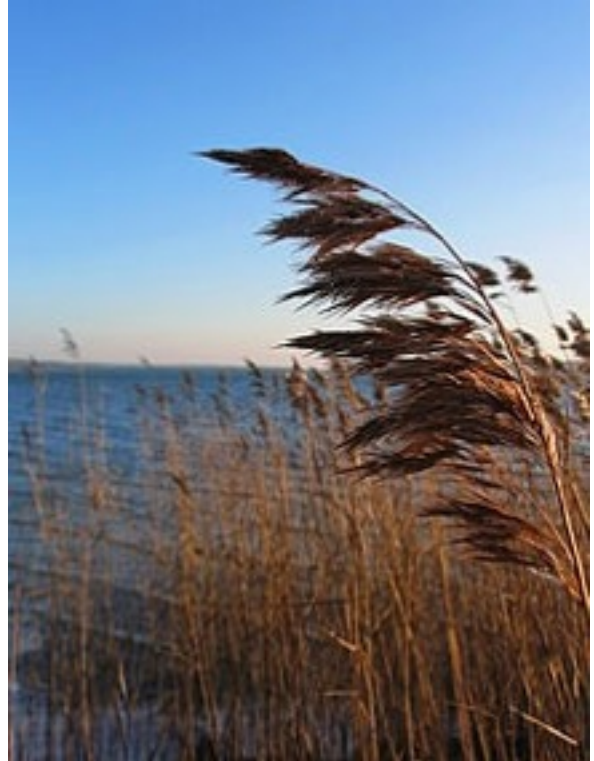
By Dick Payne

I have partnered with the Buzzards Bay Coalition (BBC) to begin the control of phragmites in Woodneck, Gunning Point, and Flume ponds in the fall of 2012. Woodneck and Gunning Point ponds belong mostly to Salt Pond Areas Bird Sanctuaries, Inc., and Flume Pond to The 300 Committee.

BBC will provide project and fund management. The total cost will be \$75,000 for the three years' worth of treatments. Currently, 85% of that amount has been raised.

Because keeping any invasive under control requires constant vigilance, BBC intends to send one of their staff members every year or two to check the ponds and provide any control necessary.

Please consider supporting this effort to control phragmites on our three ponds. Donations can be sent to: Buzzards Bay Coalition, Three Ponds Project, 114 Front Street, New Bedford MA 02740.



## Sippewissett Drivers—Share the Road!

By Maureen Conte, Ph.D.

As you drive down windy and scenic Sippewissett Road, please remember: Sippewissett is a designated bike route with a **25 MPH** speed limit. Blind curves hide bicycles, joggers, walkers, children, and animals.

For the safety of all users, please **SLOW DOWN!** And don't pass on blind curves. Remind your family and friends to do the same. Safely share our scenic road with bikers, walkers and other users.

## New Walking Access to Flume Pond

Vicky Lowell reports that there is a newly cleared path to the shore of Flume Pond that makes a wonderful destination for walkers in the Sippewissett area. The path starts at the roadside on Sippewissett Road, halfway between Valley Road and Dearborn Road on the bay side (no on-site parking is available). This land at Flume Pond is owned by The 300 Committee Land Trust; if you're not already a member please support this association for open land in Falmouth.

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*Don't Miss—*  
**SA Annual Meeting**

**Saturday, June 23**

**Cape Codder Clubhouse**

**10:00 a.m.** Business meeting

**11:00 a.m.** Robert S. Mangiaratti, Esq., discusses property law  
on Massachusetts tidal flats:

"Coastal Access: Who Can Go Where along the Seashore"



**SA Summer Social**

*Sunday, August 5*

*3:00–5:00 p.m.*

*217 Sippewissett Road*

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**The Sippewissett Association**  
**PO Box 501**  
**Falmouth MA 02541**