What's in Your Water?

Blue Water Task Force Water Quality Analysis

June 2013 - October 2016

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Introduction

Life on the east end of Long Island revolves around water. Recreational activities like swimming, surfing, and fishing, as well as business interests such as commercial fishing and tourism are all dependent upon clean water. But there has not always been adequate information locally to identify where it is safe to swim and where water quality concerns exist. For this reason, the Eastern Long Island Chapter of the Surfrider Foundation joined forces with the Concerned Citizens of Montauk in June of 2013 to start implementing Surfrider's volunteer water quality monitoring program, the Blue Water Task Force (BWTF). In communities across the country, the BWTF provides critical water quality information to protect public health, raise awareness of local water pollution problems and to bring together stakeholders to implement solutions.

Surfrider's network of 35 volunteer-run labs measure bacteria levels at ocean and bay beaches, and freshwater sites, and compares the results to national water quality standards set by the Environmental Protection Agency (EPA) to protect public health in recreational waters. Water samples are analyzed for enterococcus, a coliform bacteria that is plentiful in the gut of warm-blooded animals. Measurable amounts of enterococcus in the water indicate the presence of fecal pollution (human or animal waste) and other harmful pathogens that could make people sick with a gastrointestinal illness, rashes, eye and ear infections, or worse.

Generally Blue Water Task Force sampling programs help provide critical water quality information to beach-goers in coastal communities by filling in the gaps and extending the coverage of agency-run beach water monitoring programs.

The Blue Water Task Force on Eastern Long Island

The Surfrider Foundation's Eastern Long Island (ELI) Chapter partners with the Concerned Citizens of Montauk (CCOM) to run their Blue Water Task Force. Initially, this partnership tested the water at

approximately two dozen sampling sites in Montauk and East Hampton in local ponds, lakes, creeks, bays, and ocean beaches. During the summer months (roughly June 1 - Oct 31) testing is performed on a weekly basis, and either biweekly or monthly during the winter months. This sampling program complements seasonal monitoring conducted by the Suffolk County Department of Health Services (SCDHS) who tests bacteria levels at lifeguarded beaches and makes management decisions to issue beach closures and swim advisories accordingly.

All water samples collected in the Town of East Hampton are processed at a lab set up at CCOM's office in Montauk. The resulting water quality information is shared online, via social media and email, and in community presentations to inform local management decisions and to provide safety information to beachgoers.

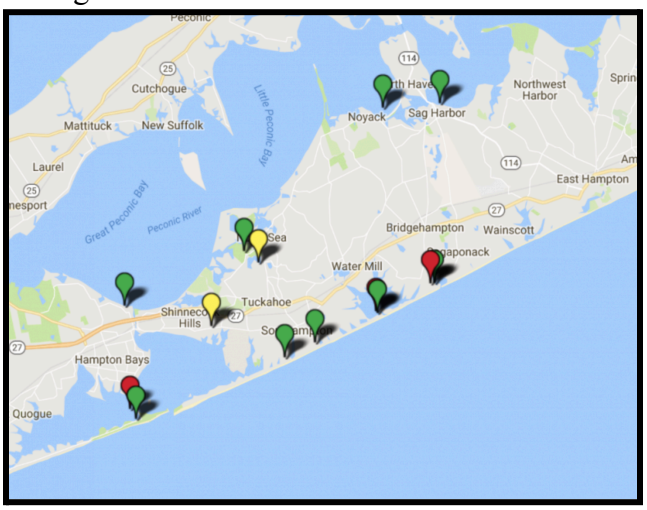

Figure 1: Blue Water Task Force sampling sites in Southampton, New York

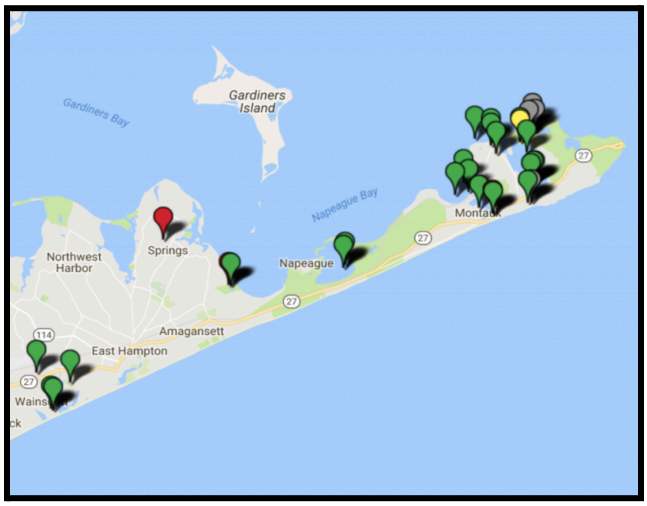

Figure 2: Blue Water Task Force sampling sites in East Hampton, New York

In September of 2016, the Eastern Long Island BWTF program expanded through a partnership with the Peconic Baykeeper to test more sites in the Town of Southampton. Dr. Chris Gobler is allowing us to use lab space at Stony Brook University in Southampton, and we are now sampling 18 sites from Sag Harbor, North Sea, Sagaponack, Southampton Village and Hampton Bays. In fact, with the addition of new sites now being monitored in Napeague, East Hampton Village and Three Mile Harbor, Surfrider volunteers along with our partners at CCOM and the Baykeeper, are testing 52 sites across the East End on a weekly basis this summer! It is truly an incredible community effort.

A map of all sampling sites and bacteria results are available online: Southampton & East Hampton.

Local Sources of Pollution

The major sources of fecal pollution in local waterways are failing and under capacity septic systems and cesspools and waste from pets and wildlife. Both sources pollute ground and surface waters with bacteria and other pathogens, as well as excess amounts of nutrients (nitrogen and phosphorous).

The most visible and alarming symptom of water quality degradation across Eastern Long Island has been the recent proliferation of toxic algal blooms in local ponds, lakes and bays. These blooms are largely caused by excessive nitrogen coming from septic systems and cesspools and by fertilizers that are applied to agricultural fields and residential lawns. These blooms wreak havoc on local fisheries and aquatic ecosystems, and pose serious health risks in recreational waters. This impact is illustrated in the

short film *Into the Sea*.

Although we don't sample for toxic algae itself, our bacteria results show which sites are affected by fecal pollution that can threaten public health directly or act as a fertilizer, providing nutrients that spur the growth of these toxic algae blooms.

Results and Discussion

Water quality results obtained from June 2013 through October 2016 were analyzed to evaluate trends in local water quality conditions at monitored sites. This report covers over 1500 unique data points collected from over 30 sampling locations. All data were compared to national water quality criteria recommended by the U. S. Environmental Protection Agency to protect public health in recreational waters and used by Suffolk County to issue swim advisories and beach closures. This recreational water quality criteria is 104 colony forming units (CFU) of enterococcus per 100 mL of seawater, or as presented in figures below as 104 cfu/100mL enterococcus.

Table 1: Sites tested and percentage of samples with high bacteria counts that failed to meet the health standard of 104 cfu Enterococcus.

Site Names	Site Type	Number of Samples	% Samples Above 104
Flying Point: Scott Cameron Beach	Ocean Beach	32	0
Lake Montauk: Harbor	Lake	19	0
Lake Montauk: Jay's Beach	Lake	20	0
Napeague 1	Bay Beach	8	0
Napeague 2	Bay Beach	8	0
Surfside Place Ocean Beach	Ocean Beach	57	0
Ditch Plains: Ditch Witch	Ocean Beach	95	1
Georgica Beach Association: 3rd Jetty	Ocean Beach	33	3
Sagg Main	Ocean Beach	32	3
L I Sound: Block Island Sound at Soundview Dr	Bay Beach	20	5
Lake Montauk: Causeway South	Lake	75	5
Lake Montauk: Coons Foot Cove	Lake	52	6
Fresh Pond: Beach	Bay Beach	49	6
Flying Point: Mecox Bay	Pond	31	10
Lake Montauk: South Beach	Lake	100	10
Fort Pond: Industrial	Pond	78	14
Fort Pond: Ramp	Pond	78	14
L I Sound: Fort Pond Bay at Navy Rd	Bay Beach	37	16
L I Sound: Fort Pond Bay at Tuthill Rd	Bay Beach	39	18
Lake Montauk: Nature Preserve Beach	Lake	40	20
Georgica Pond Beach-side	Pond	33	24
Georgica Pond Cove Hollow Access	Pond	6	33
Lake Montauk: Little Reed Pond Creek	Lake	83	36
Fresh Pond: Creek	Creek	70	39
Ditch Plains: Trailer Park Outfall Pipe	Stormwater	18	39
Sagg Pond	Pond	32	41
Lake Montauk: East Creek	Creek	100	44
Lake Montauk: West Creek	Creek	100	44
Georgica Route 27 Kayak Launch	Pond	33	52
Pussy's Pond	Pond	31	52
Surfside Place Creek / Outfall Pipe	Stormwater	20	70

Table 1: Table showing sites tested, number of samples processed, and the percentage of samples with high bacteria counts that met and/or exceeded the health standard of 104 cfu of enterococcus.

The above table and the figures below illustrate the first trend that we were able to discern by reviewing the last three years of water quality data. These results show that samples collected at ocean and open bay beaches yielded lower bacteria levels than sites located in creeks, enclosed ponds and bays, and areas with little flushing or circulation. Ocean beaches rarely exceeded the health standard, with high bacteria levels measured only 0% - 3% of the times they were sampled (Table 1). This is likely because any fecal pollution that does enter the ocean is quickly diluted and mixed by the open ocean water.

In comparison, many of the pond, creek and stormwater outfall sites measured high bacteria levels that exceeded the health standard at least 40% of the time they were tested, including Sagg Pond, Pussy's Pond, both creeks at South Lake Beach, the Route 27 Kayak Launch at Georgica Pond and the creek and subsequent outflow pipe at Surfside Place (Table 1.)

1. Bacteria levels tend to be higher in creeks and closed, still bodies of water than at open ocean and bay beaches.

This trend can be seen clearly when looking at results from the Creek and bay Beach site near Fresh Pond in Amagansett. We sample both Fresh Pond Creek which flows intermittently between Fresh Pond and Gardiner's Bay, and at the receiving bay beach. Sometimes the creek flow is open to the bay and fluctuates with the tide, and sometimes the inlet is closed and the water remains stagnant.

Fresh Pond, Amagansett

Figure 3: Sampling locations for Fresh Pond Creek and Beach in Amagansett

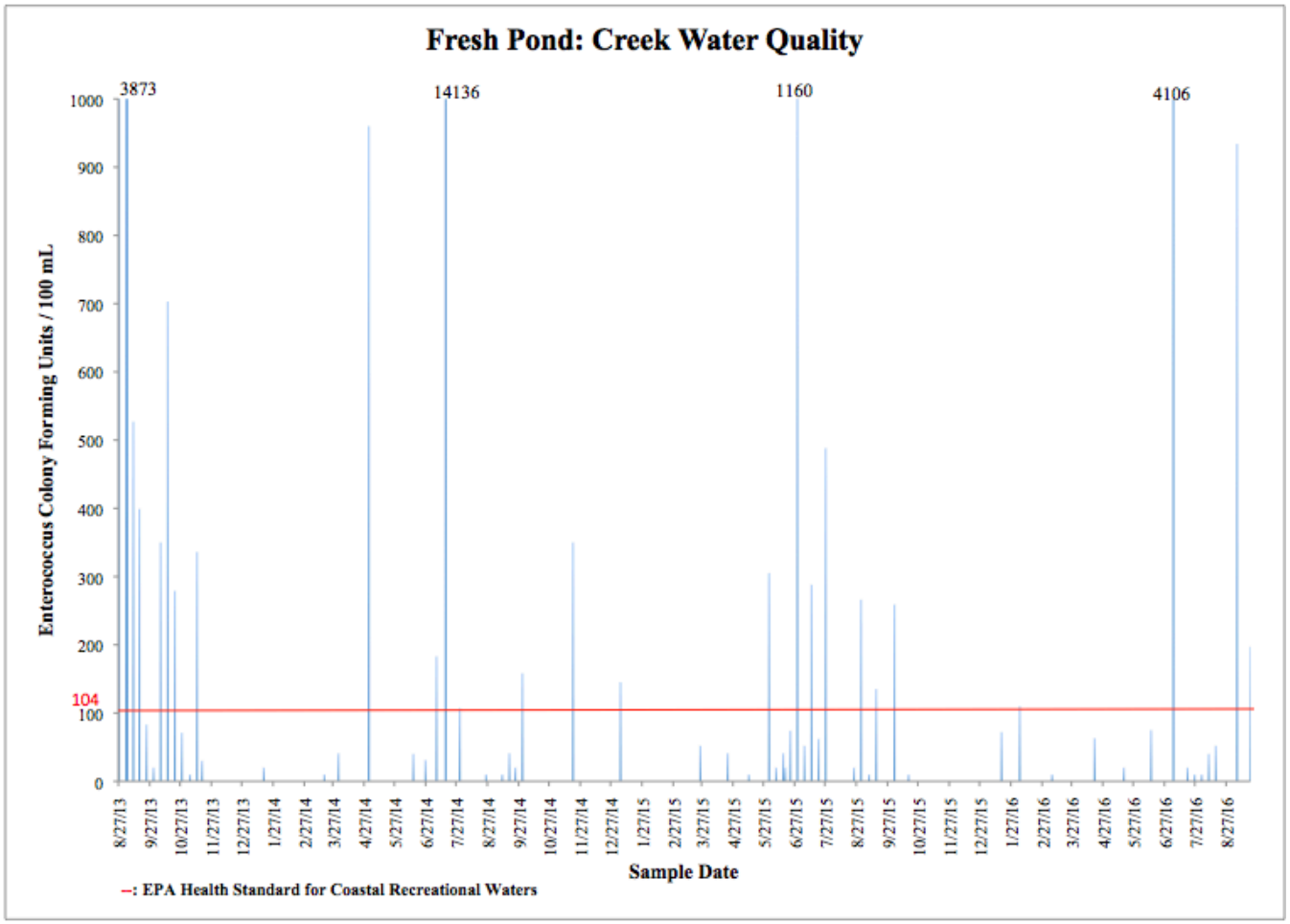

Figure 4: Graph showing enterococcus levels at Fresh Pond **Creek** in relation to the EPA Health Standard for Coastal Recreational Waters.

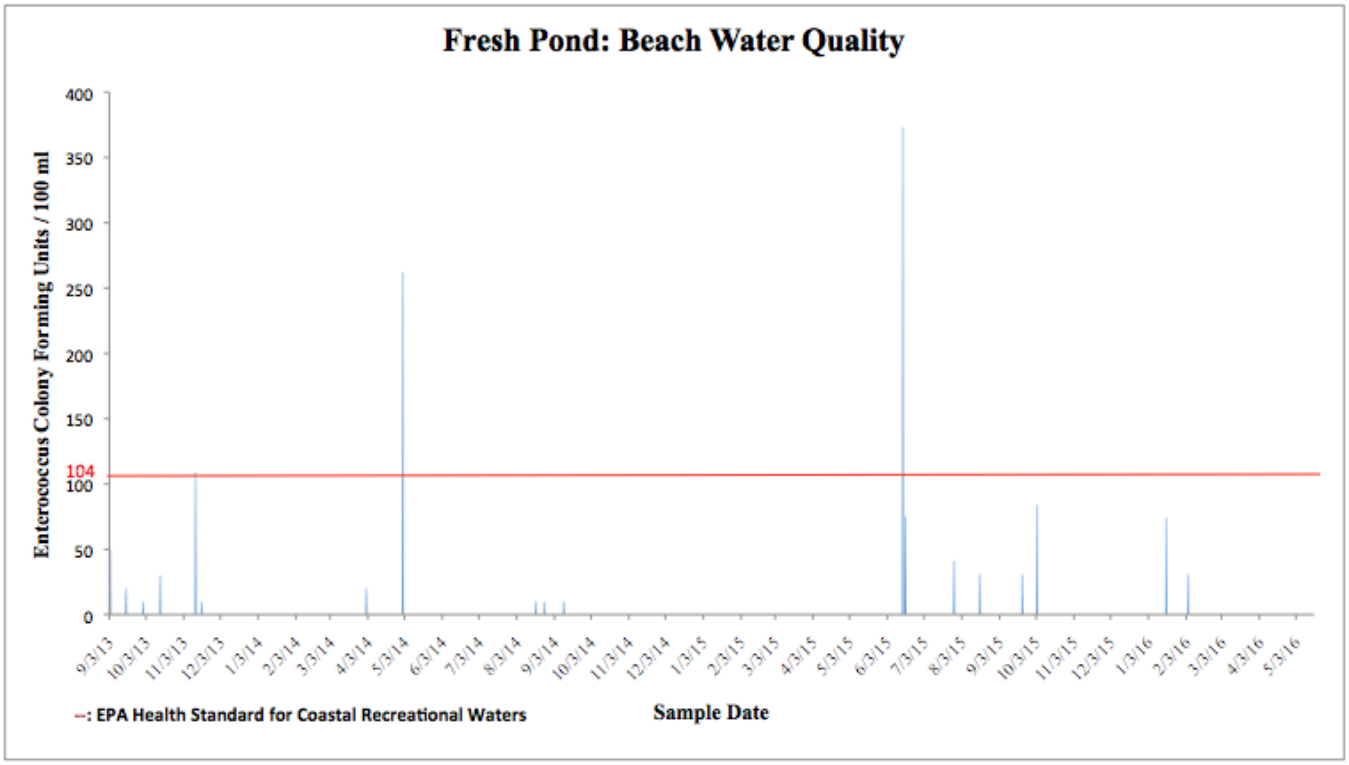

Figure 5: Graph showing enterococcus levels at Fresh Pond **Beach** in relation to the EPA Health Standard for Coastal

Recreational Waters.

In summary, 39% of samples taken at Fresh Pond Creek were above the EPA standard, whereas only 6% of samples taken at the Fresh Pond Beach were above 104 cfu/100mL (Table 1). Not only were there more bacteria exceedances at the creek than at the bay beach, we also measured much higher bacteria counts at the creek. Bacteria levels at the beach on Gardiner's Bay only exceeded 104 twice, with counts under 400 both times, whereas we obtained several results from the creek above 400 and even 1000 on four occasions.

A similar trend can be detected from the results of our four sampling sites in Georgica Pond in East Hampton. On the northern end of the Pond, samples are collected from the Kayak Launch site along Route 27 and from the Cove Hollow public access. On the beach, we pull a sample from the most southern part of Georgica Pond or in the inlet if it's open, and another at the adjacent ocean beach near the third jetty at Georgica.

Georgica Pond, East Hampton

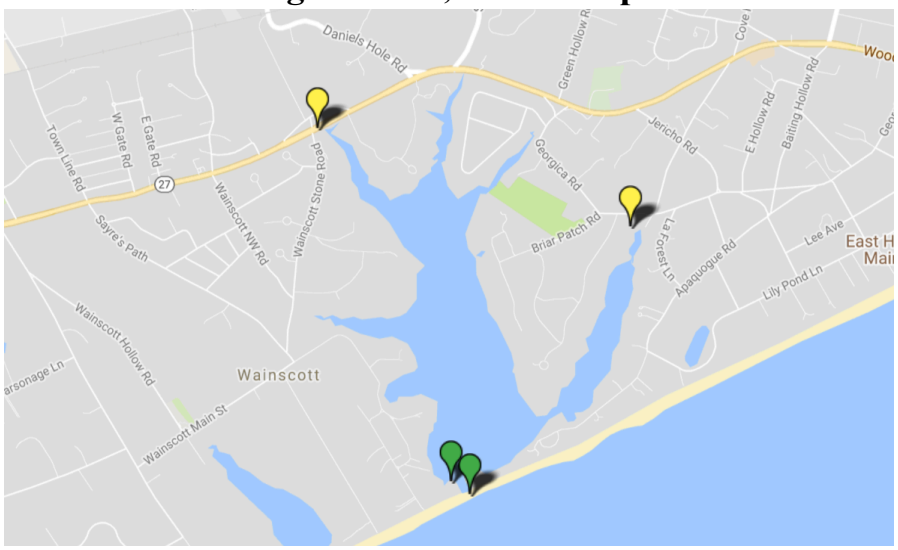

Figure 6: Sampling locations within Georgica Pond.

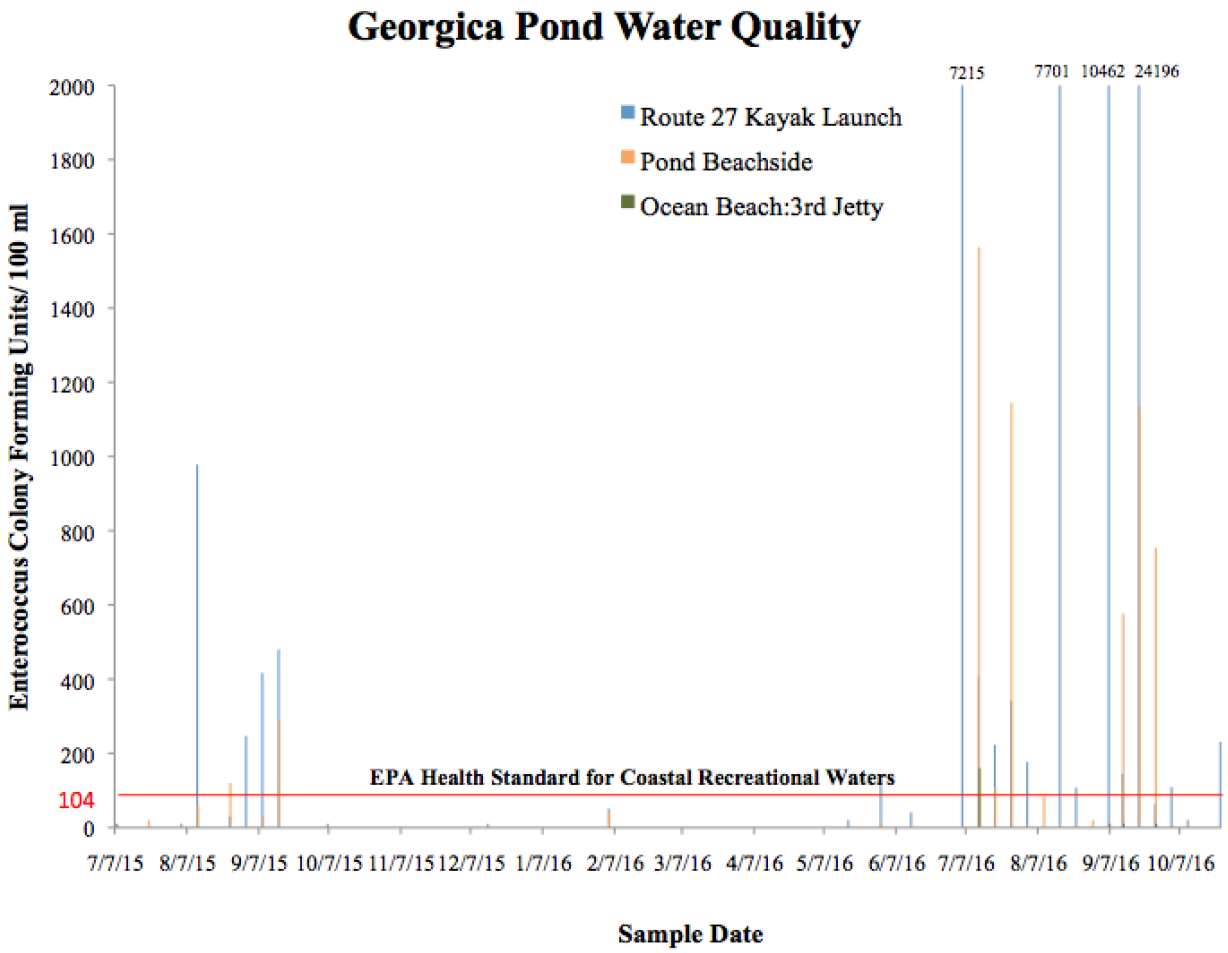

Figure 7: Graph showing levels of enterococcus at Georgica Pond's Route 27 Kayak Launch, Beachside location, and Ocean Beach: 3rd Jetty. Results are depicted in relation to the EPA Health Standard for Coastal Recreational Waters.

Figure 7 shows that the highest bacteria counts in Georgica Pond were collected at the Route 27 Kayak Launch. This site also had more frequent exceedances with 52% of samples yielding enterococcus results above 104 cfu/100mL. The sampling site in Georgica Pond right on the beach exceeded the health standard less frequently with 24% of results higher than 104, but here closer to the ocean the bacteria did not get as high as they did at the Kayak Launch where bacteria counts over 7000 were measured four times during the summer of 2016. Only one sample collected from the ocean water near the 3rd Jetty at Georgica measured high bacteria levels. These results illustrate perfectly that the more sluggish, northern end of Georgica Pond is more affected by fecal pollution than the southern end that has more exposure to the open ocean. Sampling at the Cove Hollow public access began at the end of the summer of 2016, and data from this site will be included in future analyses.

A seasonal analysis of the data also illustrates another trend in bacteria pollution patterns locally.

2. Bacteria levels are higher during summer months (June - October).

In Fort Pond, Montauk two sites are monitored, the access point at Industrial Road on the northern end and the boat ramp on the southern end. An analysis of 78 data points from each site gave an exceedance

rate of 14% for both sites (Table 1). Figure 11 below illustrates quite clearly clusters of high bacteria counts, above the health standard of 104 cfu enterococcus, during the summer months of June through October, and relatively low bacteria results during the colder winter months. This trend repeated itself each of the four years monitoring occurred.

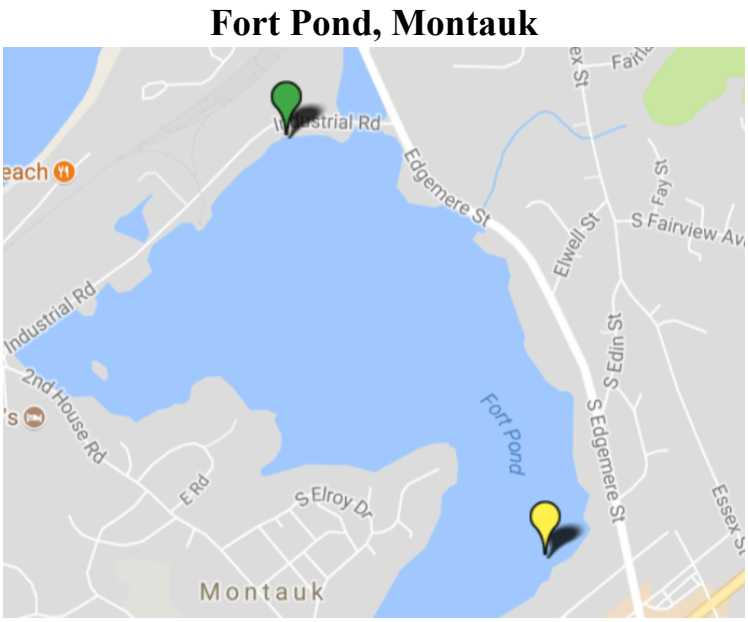

Figure 10: Sampling Locations in Fort Pond: Industrial (green pin) and Ramp (yellow pin).

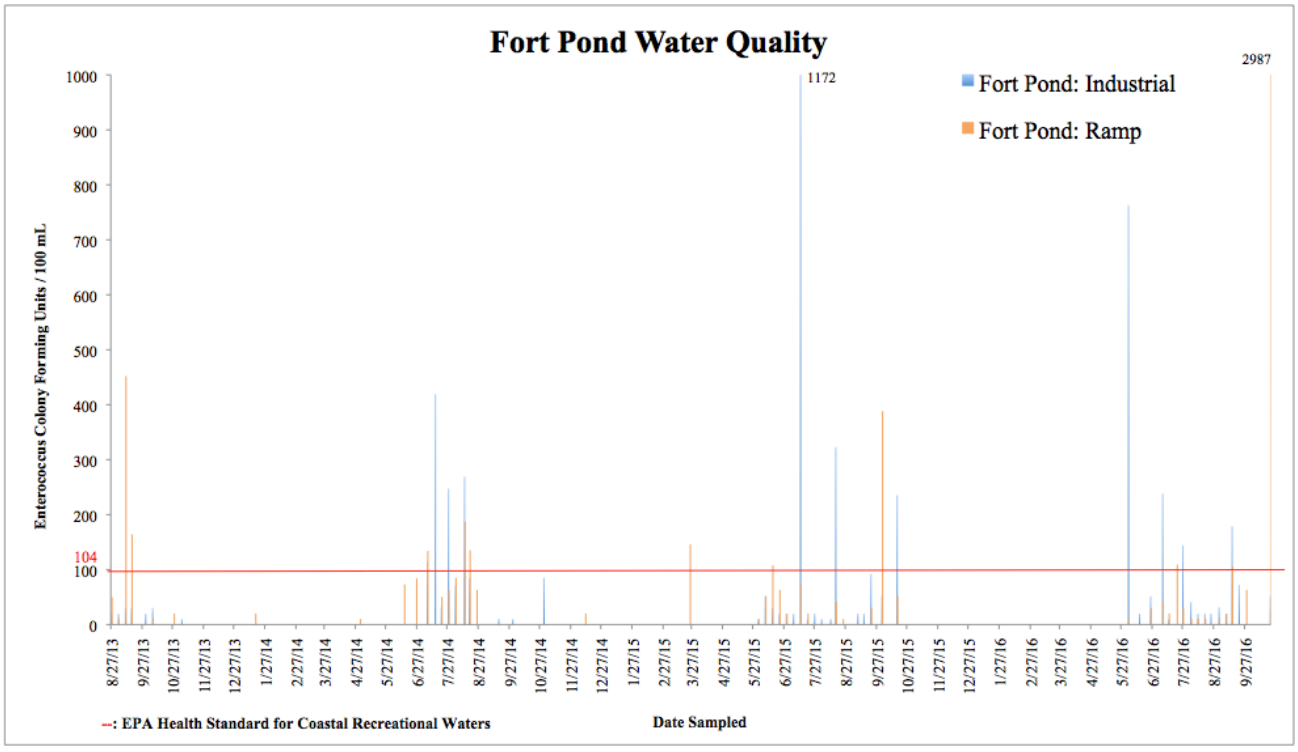

Figure 11: Graph of results from Fort Pond in Montauk clearly indicating the fluctuations in enterococcus levels.

An analysis of data obtained from South Lake Beach in Lake Montauk shows the same trend of higher bacteria levels during the summer. Samples are collected from the Lake directly in front of the parking lot and access path as well as from each of the creeks that flow into the Lake at this beach.

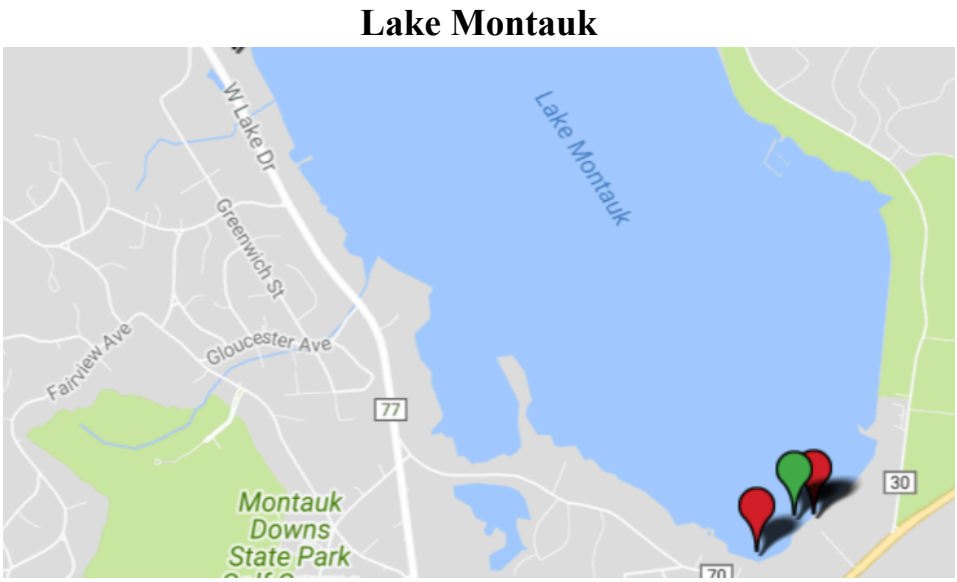

Figure 8: Sampling locations at South Lake Beach in Lake Montauk.

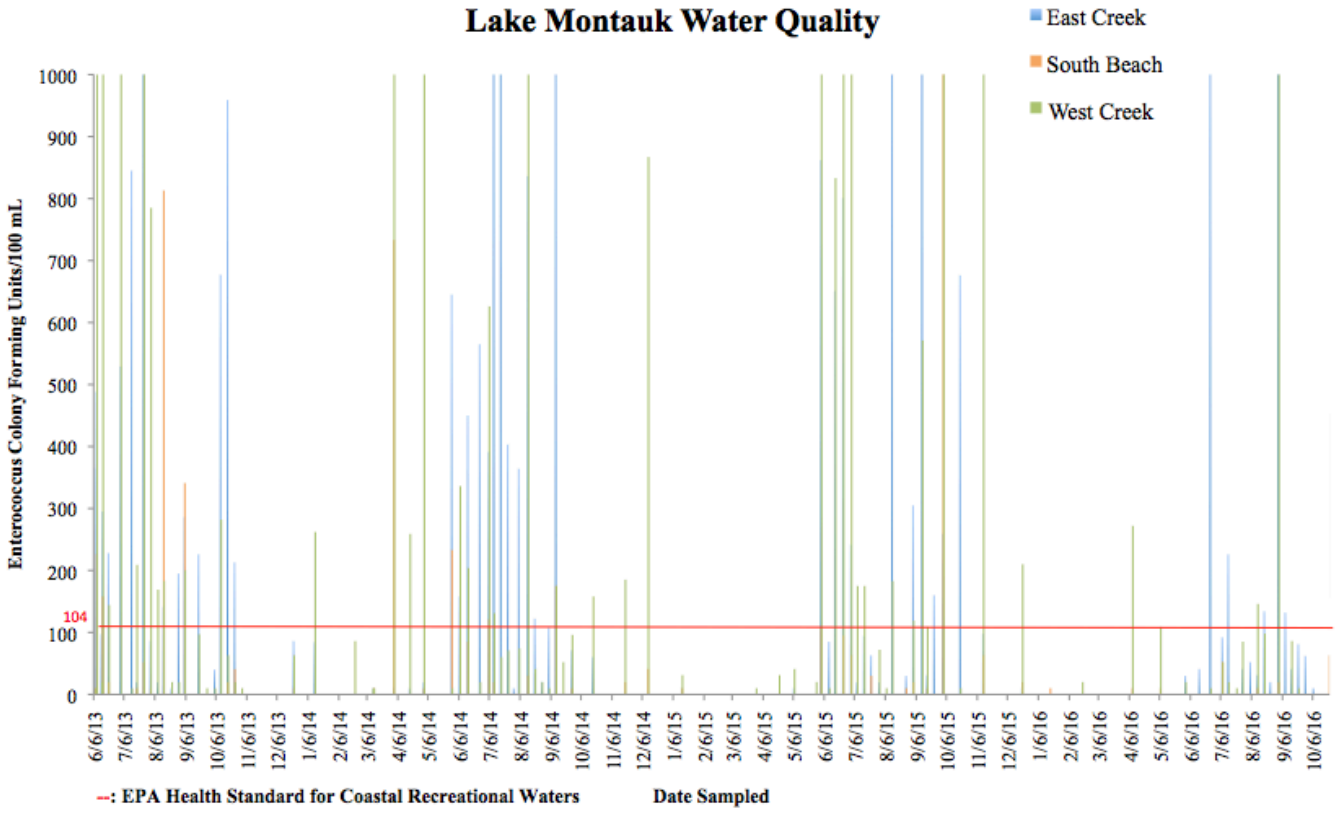

Figure 9: Graph depicting fluctuations of enterococcus levels in Lake Montauk's East Creek, South Beach and West Creek.

All three sites were sampled 100 times, and 44% of the time the measured bacteria levels at the East Creek and West Creek sites were above the recreational health standard. The water in the Lake itself at South Lake Beach only exceeded the health standard 10% of the time it was sampled (Table 1). Figure 9 clearly shows that the majority of these exceedances occurred during the months of June, July, August, September, and October, as the clumping pattern around the summer months seen at the Fort Pond sites is repeated here in Lake Montauk as well. During the summer, not only is the water warmer, but we think more importantly, the local population increases significantly. More people in the watershed and

higher usage of septic systems places a higher fecal burden on our water resources.

An analysis of data obtained at South Lake Beach in Lake Montauk also reveals our final trend.

3. Higher bacteria levels are measured after rain events.

One of the parameters BWTF volunteers record when sampling is whether or not it has rained in recent days leading up to the sampling event. Recent rain has been defined locally as more than ½ an inch of rain within 48 hours of sampling. An Analysis of Variance (ANOVA) was performed on all three sites at South Lake Beach to determine if recent rain had an impact on bacteria results. Approximately 50 results obtained under both recent rain and dry conditions were analyzed.

Table 2: Average Enterococcus Count Under Recent Rain & Dry Conditions

Site Name	No Rain	Recent Rain
Lake Montauk: West Creek	101.96	**1637.26**
Lake Montauk: South Beach	13.57	**123.33**
Lake Montauk: East Creek	274.37	**521.34**

The results of our analysis showed that recent rain did significantly affect bacteria levels at Lake Montauk's West Creek and South Beach sampling sites. The average bacteria count for West Creek jumped from nearly 102 to 1,637 with rain, and from 14 to 123 at South Beach itself. The results for East Creek, however, did not show a significant difference between rain and non-rain events. This could be because East Creek has consistently high levels of enterococcus despite rain events, with an average bacteria count of 274 even under dry conditions (Table 2).

Urban runoff and stormwater are the largest causes of beach closures in the United States. Rain runs across impermeable surfaces picking up pollutants off of streets, beaches, and yards. These pollutants run down storm drains, or downhill directly into our waterways. Here on the East End, as in other areas on septic, heavy rain can saturate the ground leading to septic or cesspool overflow and seepage. The Suffolk County Department of Health advises avoiding swimming for 24 hours - 48 hours after a heavy rainfall, particularly in locations that are poorly flushed embayments.

Summary of Findings

1. **Bacteria levels tend to be higher in creeks and closed, still bodies of water than at open ocean and bay beaches.**

2. **Bacteria levels are higher during summer months (June - October).**

3. Higher bacteria levels are measured after rain events.

Conclusions

Our Blue Water Task Force results show that on Eastern Long Island, creeks and closed bodies of water with little water circulation tend to be more affected by fecal pollution as demonstrated by a higher rate of bacteria levels above the EPA health standard for coastal recreational waters. The good news is our ocean and bay beaches generally test clean and are safe for swimming and surfing.

Higher bacteria levels measured in bays, ponds and creeks during the summer months indicate a higher fecal load from the much higher population of summer residents and visitors. According to a recent article published in the East Hampton Star, the year-round population of East Hampton is just over 22,000 but this grows to about 73,000 during the months of July and August.

We also found that certain sites, like those at the southern end of Lake Montauk, experience higher bacteria levels after it rains. As we continue to monitor new and existing sites in Southampton and East Hampton, we will continue to evaluate the data to determine if other sites are likewise affected by rain and runoff.

The goal of the Blue Water Task Force is to provide critical water quality information to protect public health, raise awareness of local water pollution problems and to bring together the community to implement solutions. We encourage everyone to check our water quality results posted online before you head to the beach. All data are available here: go.surfrider.org/BWTF.

Other tips to protect yourself and your family from getting sick at the beach include:

- Swim at ocean or bay beaches with lifeguards on duty.
- Avoid swimming 24-48 hours after it rains, especially in ponds and enclosed bay and lake sites.
- Keep your kids out of streams and runoff at the beach.
- Don't enter the water where there are Blue-Green Algae Bloom signs posted. Don't let your dogs in the water either!
- Rinse with freshwater before you eat or leave the beach.

For further information about our Blue Water Task Force Program or if you are interested in volunteering, feel free to contact Colleen Henn, chenn@surfrider.org, or Mara Dias, mdias@surfrider.org.