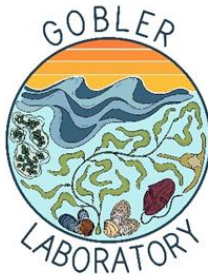


Montauk wastewater and sewerage considerations

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Overview

There are currently plans under consideration by the Town of East Hampton to sewer the downtown region of Montauk with potential future sewerage for the docks of Lake Montauk, Ditch Plains, and the LIRR station region. Benefits of sewerage can include reductions in nutrient loads to sensitive water bodies, reductions in pathogen loads, and protection of public drinking water supplies. Regarding protection of sensitive water bodies, Fort Pond represents an impaired water body that experiences annual blue green algae blooms in late summer. NYSDEC lists this water body as impaired due to low oxygen (NYSDEC, 2021). Low oxygen and blue-green algae are both a consequence of nutrient overloading. Suffolk County recommends that nitrogen loads to Fort Pond be reduced by 63%. The potential second largest environmental issue within Montauk could be considered fecal bacterial contamination in Lake Montauk. Presently, small regions of this water body are regions closed to shellfishing by NYSDEC possibly indicating some persistent fecal coliform bacteria contamination. Finally, groundwater containing wastewater from Main Street in Montauk and Ditch Plains flows to ocean beaches and may present a human health hazard. The consulting firm H2M has developed a sewerage plan and has cited improving water quality in Fort Pond and Lake Montauk and preventing fecal contamination on ocean beaches as motivations for sewerage Montauk. This document considers the potential benefits of this sewerage plan.

General principles:

- There can be four major motivations for sewerage.
 - To reduce fecal contamination in surface waters
 - To protect drinking water
 - To reduce nitrogen loads to surface waters thereby lessening problems with algal blooms and low oxygen

- To permit expanded building in regions where wastewater flows are at, or beyond, flow allowable by Suffolk County Health Code.
- This report considers the potential drinking water and surface water quality benefits as related to the proposed sewerage plan for Montauk as outlined by H2M.

Fort Pond:

- Fort Pond is an impaired water body that experiences annual harmful algal blooms (SCSWP, 2020).
- The Suffolk County Subwatersheds Wastewater Plan called for a 63% reduction in nitrogen loading to Fort Pond to improve water quality (SCSWP, 2020).
- The USGS, the Nation's authority on groundwater, has recently completed comprehensive and detailed groundwater models for all of Long Island and one specifically for Fort Pond (USGS, 2021).
- Suffolk County used these models to draft a subwatershed for Fort Pond using this most up-to-date information (SCSWP, 2020).
- The subwatersheds of Fort Pond are on its eastern and western border only (Figure 1).
- Water from Fort Pond drains as groundwater flow south to the ocean and north to Fort Pond Bay (Figure 1).
- The watershed drafted by Suffolk County (SCSWP, 2020) reflects these facts (Figure 2).
- The watershed drafted by H2M for Fort Pond (Figure 3; H2M, 2023) is inconsistent with the the USGS report and the Suffolk County Subwatersheds Wastewater Plan (Figure 4).
- It appears the proposed regions for sewerage Main Street are not within the watershed of Fort Pond (Figure 4). Therefore, the proposed sewerage of Main Street will not change the conditions within Fort Pond.
- The H2M watersheds also do not match the updated watersheds on the north side of Fort Pond. Outside of a sewerline that is being sent to the Surfside Lodge, almost none of the 'Railroad' sewer district is within the Fort Pond watershed and thus impacts on Fort Pond will be very minor and certainly much less than reported by H2M (2023).
- An aggressive plan to upgrade the septic systems and reduce fertilizer use within the actual subwatersheds of Fort Pond would improve water quality there. Suffolk County estimates 69% of the nitrogen entering Fort Pond comes from onsite wastewater and that 17% comes from fertilizer (SCSWP, 2020); Suffolk County recommends reducing nitrogen loading by 63% within this watershed to improve water quality.

Drinking water:

- None of the proposed regions for sewerage overlay known public drinking water sources in Montauk (Figure 5, 6).
- Therefore, the proposed sewerage plan will not protect drinking water supplies in Montauk.

- Public drinking water groundwater catchment areas could be targeted as regions for septic upgrades or sewerage to reduce contamination of public drinking water supplies.

Ocean Beach water quality:

- Groundwater and wastewater from Main Street of Montauk and Ditch Plains, two regions proposed to be sewerage, flows to the Atlantic Ocean (Figures 1,6).
- There has never been an algal bloom or low oxygen conditions in Montauk ocean waters. Therefore, nitrogen reductions are not needed for this region (SCWSP, 20200)
- CCOM joined Surfrider Foundation's nationwide Blue Water Task Force in 2013 to start testing enterococcus bacteria levels in Montauk. The samples are processed at the CCOM lab and results are shared on the CCOM and Blue Water Task Force websites.
- CCOM and Surfrider's assessments of ocean beach water quality indicates exceedances of indicator bacteria (*Enterococcus*) beyond NYSDOH standards are rare, occurring in 3% of samples obtained; *Enterococcus* was undetectable in ~90% of samples collected from 2014-2023 (Figure 7; Blue Water Task Force, 2023).
- Suffolk County sampled 12 East Hampton ocean beaches for levels of *Enterococcus* from 2014-2023 (Figure 8).
- Among these samples, *Enterococcus* was detectable in 23 – 48% of samples depending on location (Figure 8).
- Mean levels of *Enterococcus* varied from 3 to 10 colony forming units (CFU) per 100 mL (Figure 8); the NYSDOH swimming standard is 104 CFU per 100mL.
- Five of the 12 beaches had a single sample over 10 years that was over the NYSDOH standard which was about 1% of samples collected (Figure 8).
- While Edison Beach which is south of Main Street in Montauk had the highest mean level of *Enterococcus*, levels were one order of magnitude below NYSDOH standard and adjacent Kirks Beach south of Main Street had the lowest levels *Enterococcus* in all of East Hampton (Figure 8).
- Neither Kirks Beach nor Ditch Plains had any sample over 10 years that exceeded the NYSDOH swimming standard (Figure 8).
- Collectively, this data suggests wastewater draining to the ocean is not causing adverse effects on ocean beaches or is a significant public health threat. *Enterococcus* is rarely detectable and almost never above NYSDOH standards. There are no clear trends in water quality relative to the volume of wastewater flowing from regions north of the beaches.
- This makes sense as sand is known to be an excellent filter for viruses and bacteria. For example, according to Suffolk County Health Code, drinking water wells may be located 200 feet away from wastewater discharge points because of the well-known retention of pathogens by sandy soils.

Lake Montauk

- Suffolk County has identified Lake Montauk as being within the lowest priority category for mitigating wastewater, calling for a 6% reduction in nitrogen loads, the lowest percent given in the Subwatersheds report (Figure 9; SCSWP, 2020). This aligns with an absence of algal blooms and low oxygen conditions within this water body.
- A second water quality concern in Montauk is fecal bacterial contamination in Lake Montauk. Presently, isolated regions of this water body are permanently closed to shellfishing by NYSDEC and other regions are seasonally closed, indicating some persistent fecal coliform bacteria contamination (Figure 10).
- A recent study by USGS identified the sources of fecal bacterial in Lake Montauk (USGS, 2022).
- In the study, 15 of 16 samples collected from Lake Montauk had fecal coliform bacteria concentrations that were all at or below the reporting limit (less than 18 or 20 MPN/100 mL (USGS, 2022).
- Throughout the study, no sample in the Lake tested for fecal coliform bacteria had concentrations above 49 most probable number per 100 milliliters (MPN/100 mL; USGS, 2022), the National Shellfish Sanitation Program closure criteria.
- The highest frequency of fecal coliform bacteria detections in source samples (water flowing to Lake Montauk) was found to be under wet summer conditions at the South Beach, Stepping Stones Pond, and Stepping Stones Pond Culvert sites (300, 220, and more than 16,000 MPN/100 mL, respectively) (USGS, 2022).
- There was minimal human influence on fecal coliform bacteria loads from these sites to Lake Montauk during the study (USGS, 2022).
- The absence of fecal coliform bacteria and the human MST marker in all groundwater samples indicated limited transport of bacteria in the subsurface groundwater through the sandy aquifer material; water from septic systems did not influence the Lake Montauk during the study (USGS, 2022).
- The Little Reed Pond Culvert and South Beach sites were classified as locations most likely to contribute fecal contamination to Lake Montauk
- Samples adjacent to marinas (Lake Montauk Inlet and Star Island North sites) had a higher frequency of human marker detections; USGS suggested marinas were the source of elevated fecal bacteria within this water body (USGS, 2022).
- This conclusion is consistent with five years of microbial source tracking of East Hampton waters by the Gobbler Lab performed for the Eat Hampton Town Trustees which has consistently found human-derived fecal bacteria near marinas, but not near locations with many homes (EHTT, 2023).
- The findings of the USGS study suggest that sewerage 'The Docks' in the northwest corner of Lake Montauk will not address the most important water quality challenge in Lake Montauk: fecal bacteria.
- The findings of the USGS also suggest that mitigating run-off from South Beach, Stepping Stones Pond and improving vessel handling of wastewater would be likely to improve fecal bacterial contamination issues in Lake Montauk.

Conclusions

Improving drinking water and surface water quality is critically important for protecting public health, fisheries, ecosystems, and economies. Montauk has experienced water quality impairment in Fort Pond and its shallow aquifer is vulnerable to contamination. Nearly 70% of nitrogen entering Fort Pond comes from onsite wastewater and Suffolk County has called for a 63% reduction in nitrogen loading to this system. Hence, mitigating wastewater flow from the eastern and western shores of this water body seems warranted. Mitigating wastewater flow in the regions contributing to public water supplies would improve drinking water quality. Levels of *Enterococcus* on ocean beaches are low when detectable and levels do not parallel the density of septic systems north of these beaches. Suffolk County concluded nitrogen reductions are not needed in Lake Montauk and a recent USGS study concluded that Lake Montauk experiences elevated levels of fecal bacteria from surface water run-off and vessel discharge, but not from septic systems. Mitigating surface run-off within specifically identified locales and reducing vessel discharge will lower fecal bacterial levels in this system.

References

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USGS, 2022. Tagliaferri, T.N., Fisher, S.C., Kephart, C.M., Cheung, N., Reed, A.P., and Welk, R.J., 2022, Using microbial source tracking to identify fecal contamination sources in Lake Montauk on Long Island, New York: U.S. Geological Survey. Scientific Investigations Report 2022–5038, 16 p., <https://doi.org/10.3133/sir20225038>.

FIGURES

Figure 1. The watersheds (light blue with purple border) and flow patterns (yellow, brown) for Fort Pond according to the USGS 2021 report. The entire north and south shores of Fort Pond have groundwater flowing out of the Pond and into Fort Pond Bay and the Atlantic Ocean, respectively.

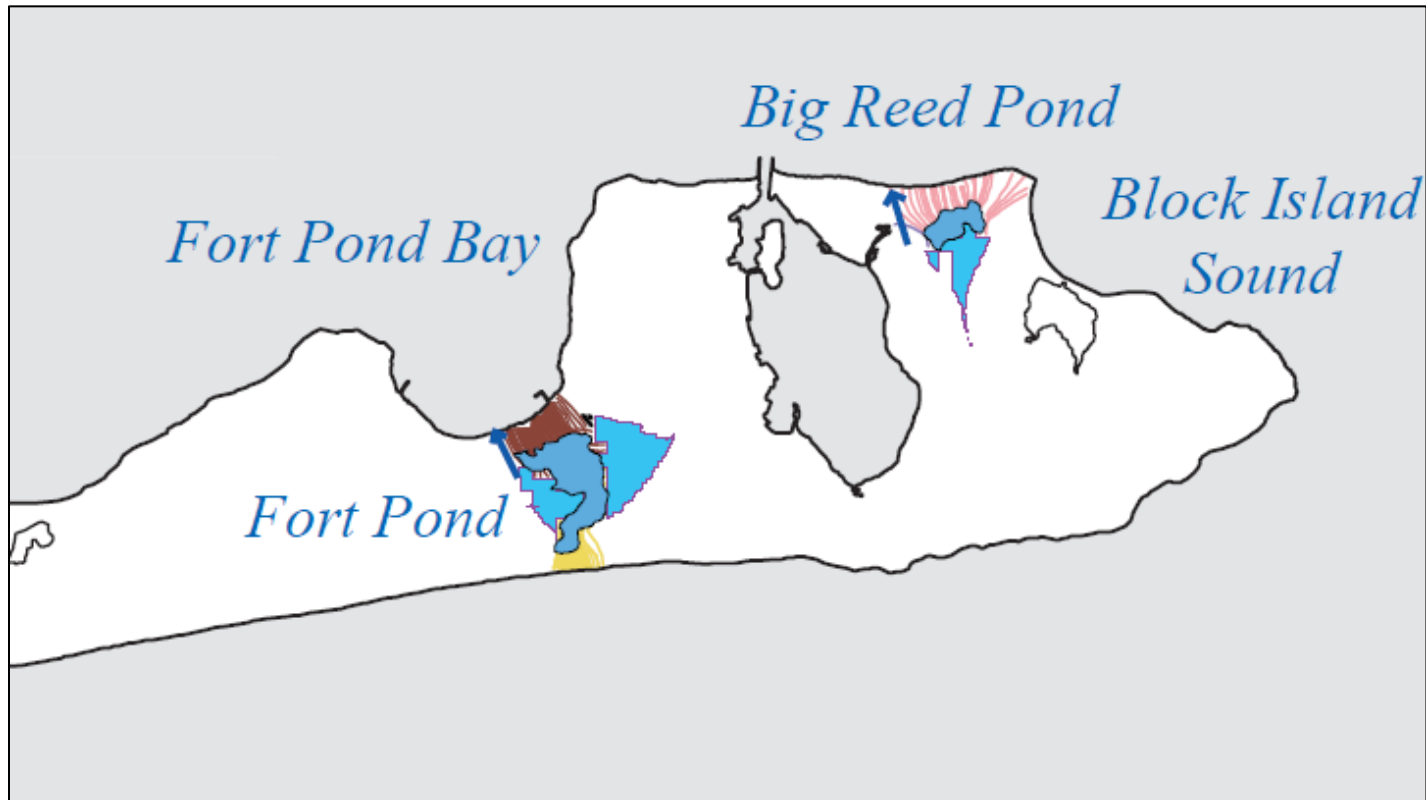


Figure 2. The watersheds (for Fort Pond according to the Suffolk County Subwatersheds Wastewater Plan (2020)). Nearly all the north and south shores of Fort Pond have groundwater flowing out of the Pond and into Fort Pond Bay and the Atlantic Ocean, respectively. Coloration of the watersheds denote groundwater travel times: red = 0 – 2 years; orange = 2 – 10 years; yellow = 10 – 25 years.

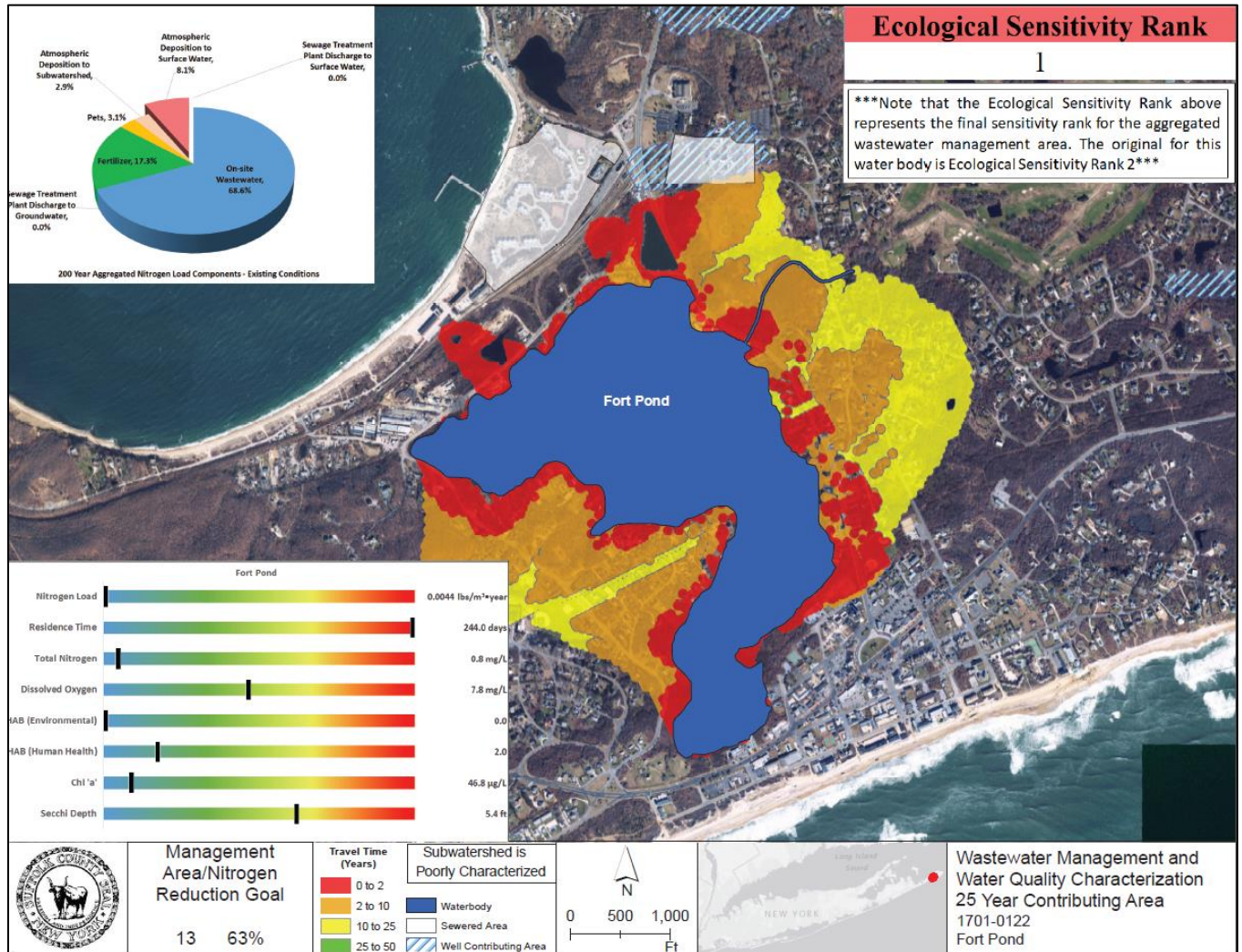


Figure 3. The watersheds of Fort Pond as outlined by H2M.



Figure 4. Side-by-side comparisons of subwatersheds of Fort Pond as depicted by: A. Suffolk County (2020), B. USGS (2021), and C. H2M (2023). The watersheds of Fort Pond as outlined by H2M do not reflect the known groundwater flow patterns as established by the seminal USGS 2021 report or the Suffolk County 2020 report. Comparison of these watersheds demonstrates the consistency between USGS and Suffolk County, but significant differences between these two and the H2M watershed which, for example, depicts regions along the southern shore of the lake being part of the watershed.

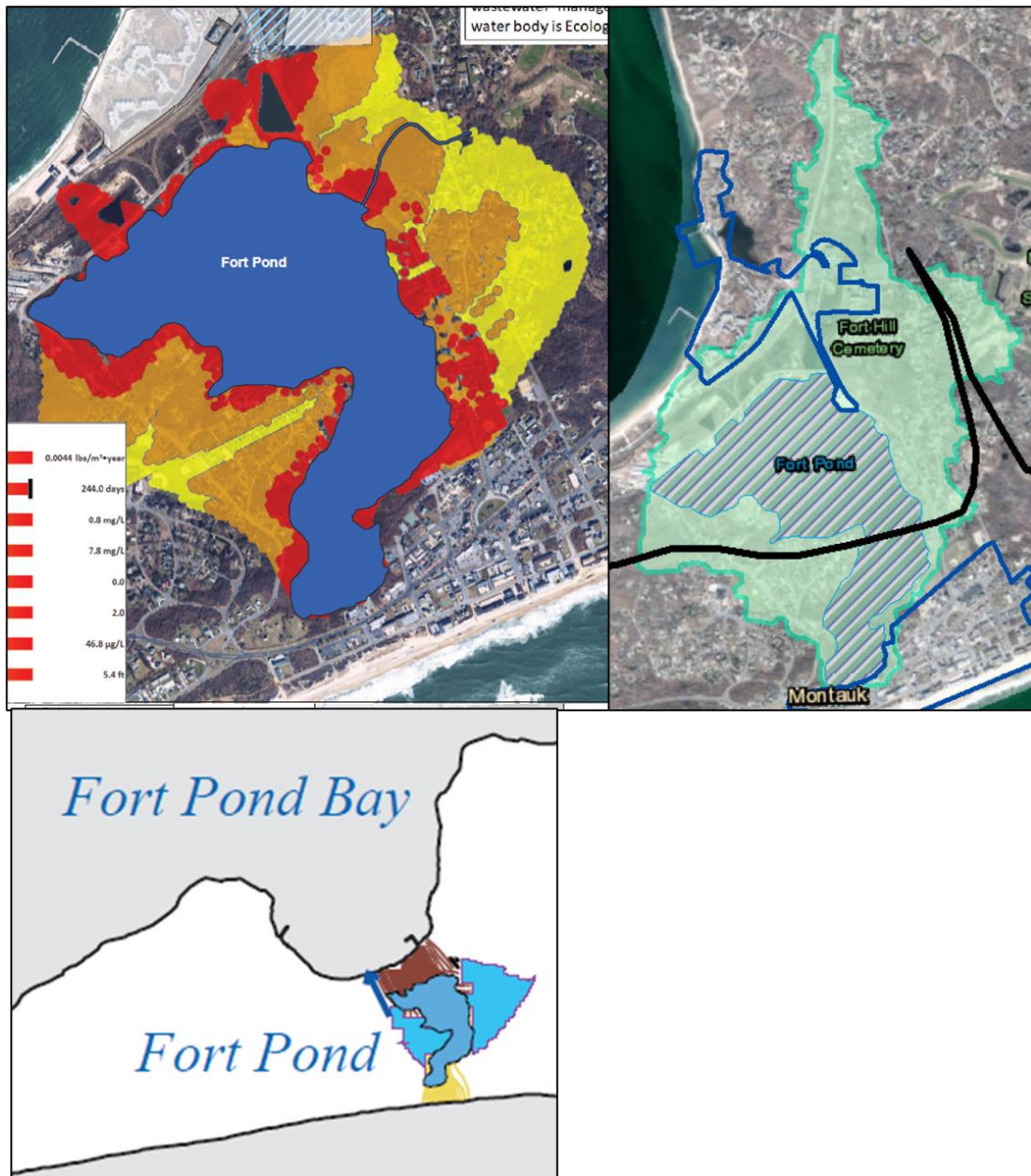


Figure 5. Regions for proposed sewerage by the H2M sewerage Map and Plan (2023)

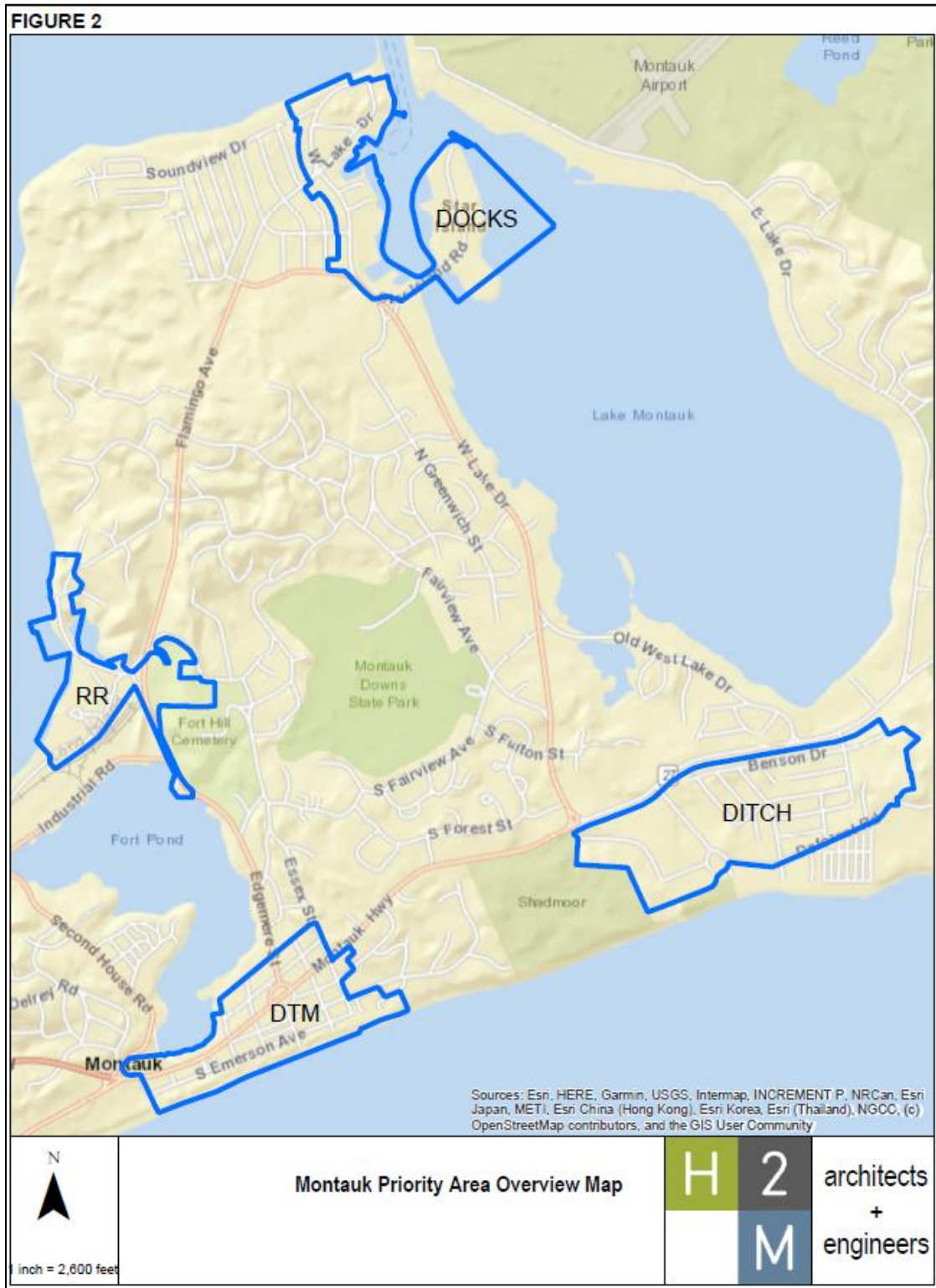


Figure 6. The subwatersheds for Montauk according to the USGS 2021 report. Drinking water well contributing areas appear in grey.

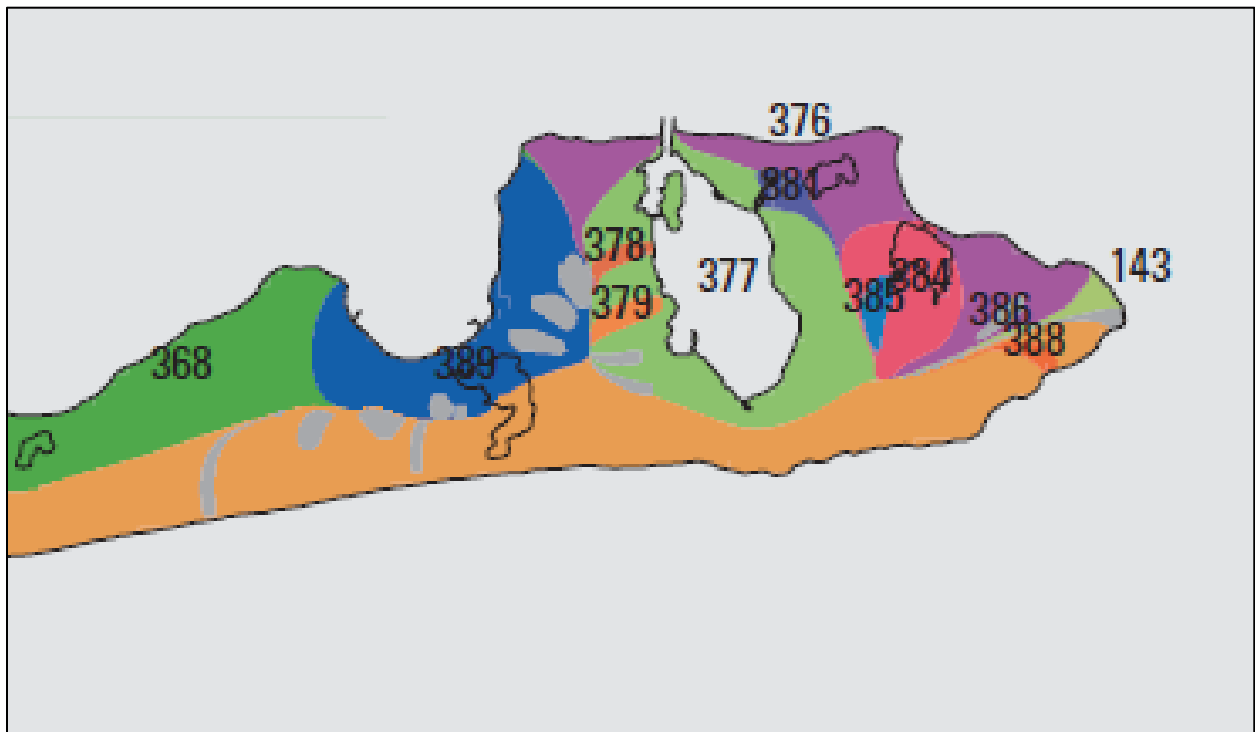
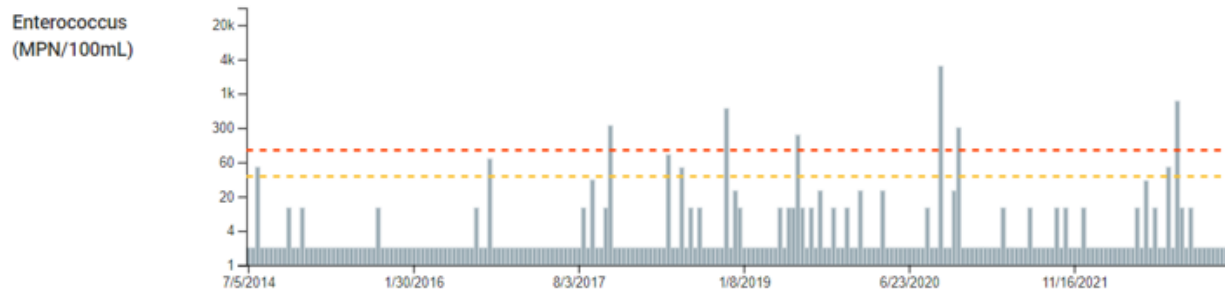


Figure 7. *Enterococcus* data from The Blue Water Task Force, 2014-2023 for Surfside Place and Ditch Plains.

Surfside Place



Ditch Plains, east of jetty

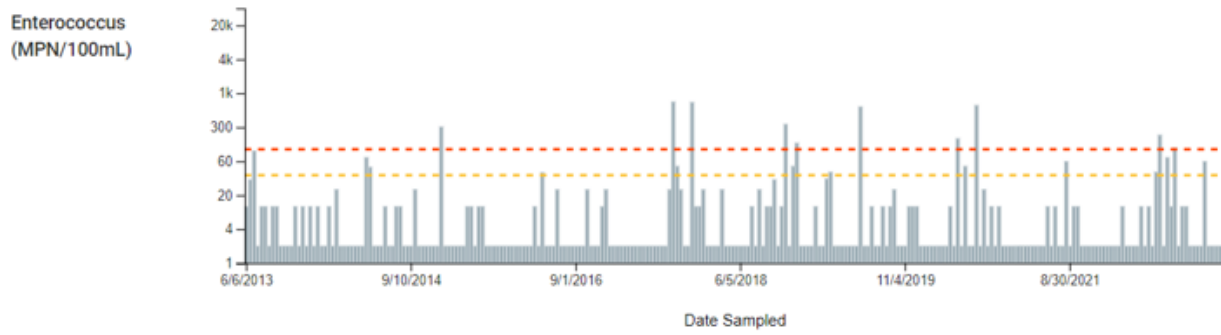


Figure 8. *Enterococcus* data from Suffolk County Department of health Services, 2014-2023 for East Hampton ocean beaches.

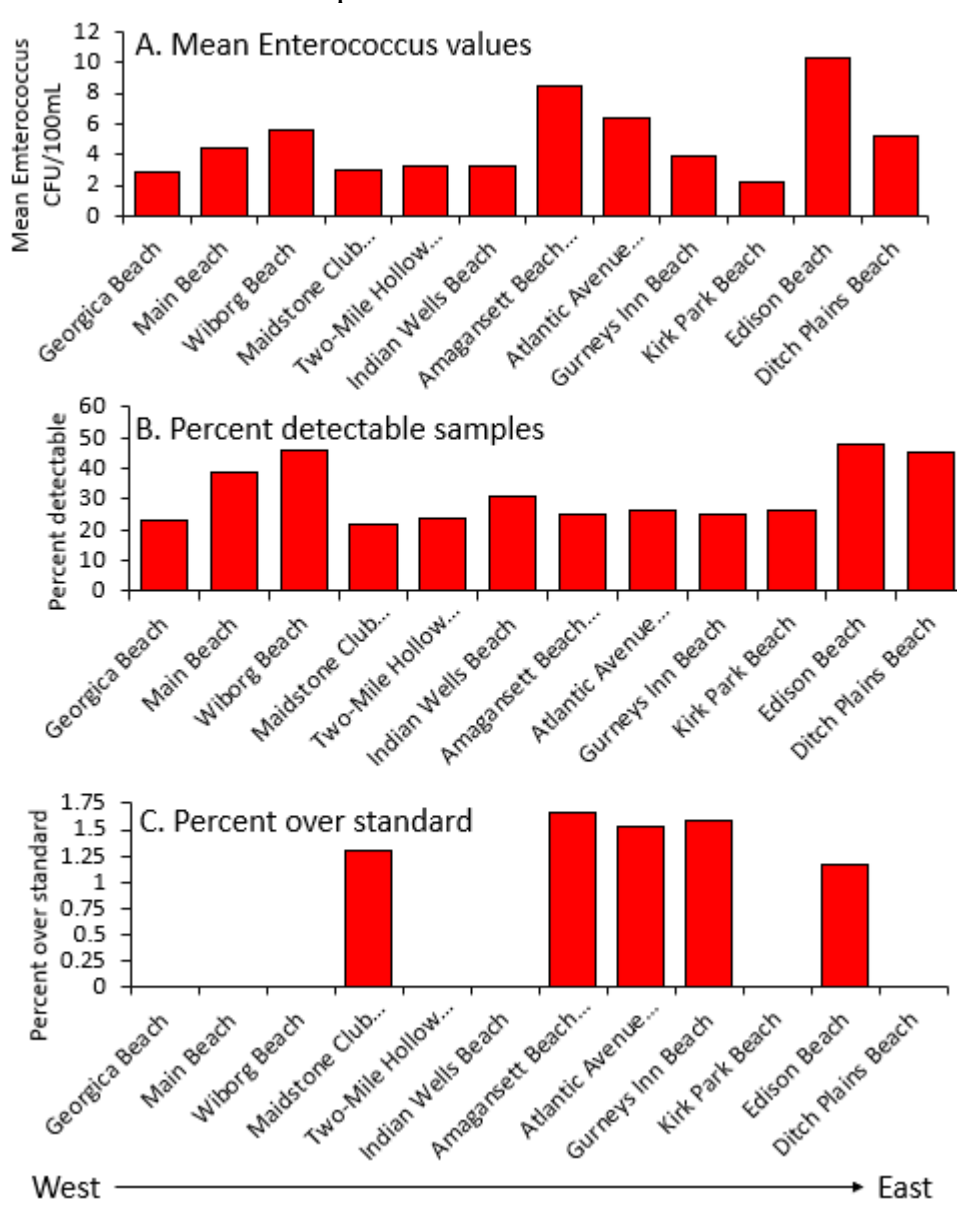


Figure 9. Subwatershed for Lake Montauk according to the Suffolk County Subwatershed wastewater Plan (2020).

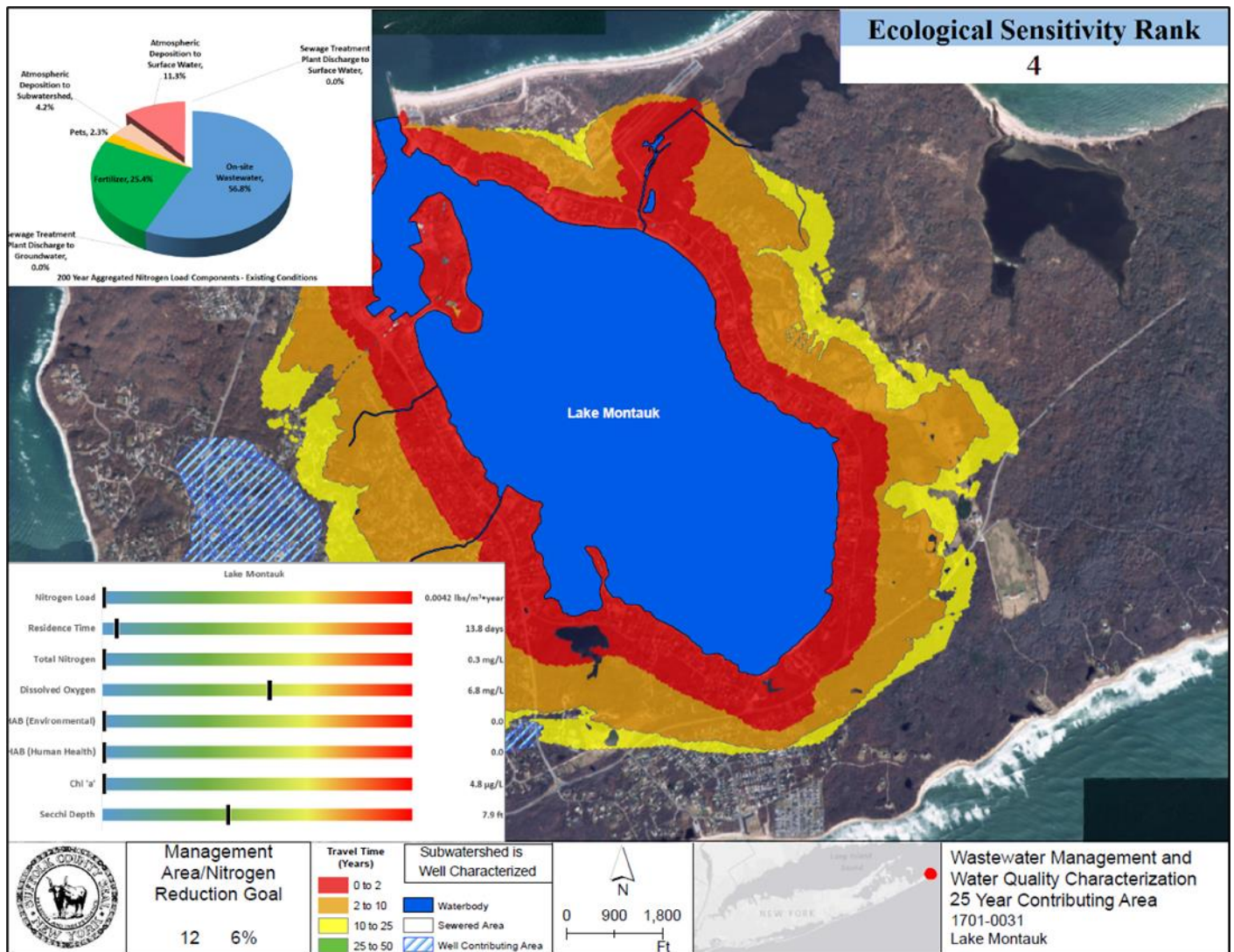


Figure 10. Regions of Lake Montauk open, seasonally closed, and permanently closed to shell fishing as declared by the NYSDEC.

