UD CITIZEN MONITORING PROGRAM

UNIVERSITY OF DELAWARE
EARTH, OCEAN & ENVIRONMENT

Sea Grant Delaware

DELAWARE CENTER FOR THE INLAND BAYS
Research. Educate. Restore.

DELAWARE DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL

Water Quality Monitoring for Total Enterococcus

Testing Site: Freshwater and Saltwater | Period of Time: April – September 2019

Fecal bacteria that live in the guts of warm-blooded animals are very diverse and numerous. Most are beneficial or harmless to the host, but some fecal bacteria can be pathogenic and cause gastroenteritis that results in diarrhea. To assess the fecal contamination of water, generally harmless fecal indicator bacteria are measured. Among the major groups of fecal bacteria, Total Enterococcus (TE) is considered to be the best, easily-measured indicator of the risk of acquiring gastroenteritis through inadvertent ingestion of water during recreational contact *(US EPA)*.

EPA's Indicator for Safe Swimming

Standards are expressed as TE bacteria colonies/100 mL sample

WATER TYPE	GEOMETRIC MEAN	SINGLE SAMPLE VALUE
Fresh	100	185
Salt	35	104

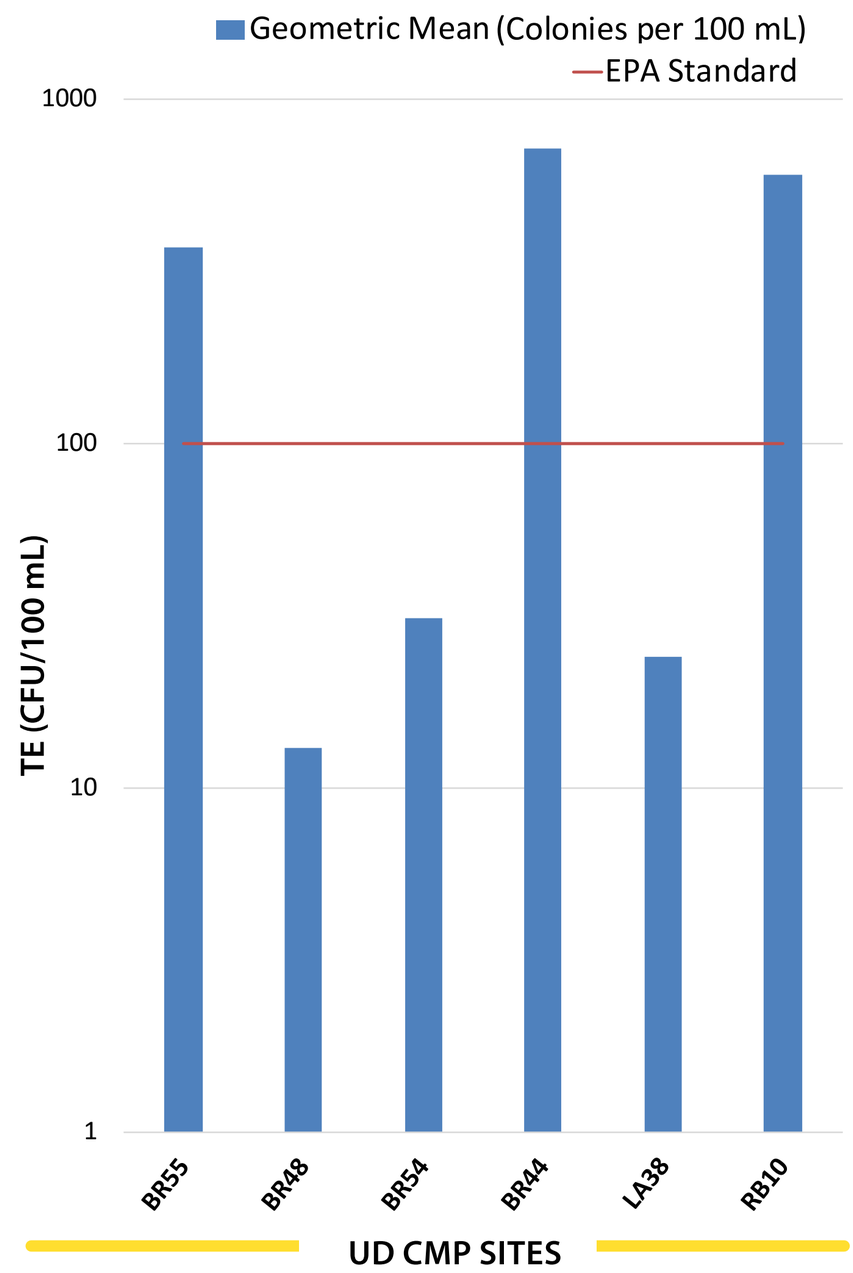
Delaware ocean beaches are considered among the "cleanest" in the nation, but the state posts a permanent advisory for the Inland Bays waters.

(2011–14 NRDC reports)

Current Test Method

Water samples are analyzed to determine the levels of Enterococci bacteria to ensure that swimming areas are safe. The current method for testing water uses the equipment on display here. A nutrient-based test kit is mixed with the water sample. The nutrients act as food for the Enterococci. The nutrients are infused with a fluorescent indicator so when the enterococci eat the nutrient it makes the bacteria glow under UV light.

Freshwater sites tested for Total Enterococcus (TE). Red line indicates EPA standard.



Bacteria water tests have inherent environmental limitations:

1. *Bacteria levels are variable in space and time.*
2. *Rain events can deliver pulses to water bodies.*
3. *Bacteria reside in sediments and can be resuspended by wind and waves.*

Saltwater sites tested for Total Enterococcus (TE). Red line indicates EPA standard.