



Summary of Existing Water Quality Monitoring Programs in the Peconic Estuary and Watershed

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Background

The Peconic Estuary Program (PEP) and its partners are currently updating the Peconic Estuary Comprehensive Conservation and Management Plan (CCMP). As part of the CCMP update the participants also wish to evaluate and, if necessary, update their water quality monitoring strategy. PEP selected CoastWise Partners to assist in evaluating the current monitoring strategy. This draft summary of existing water quality monitoring programs is an initial step in the evaluation process.

The primary purposes of the PEP monitoring strategy are to ensure that water quality monitoring efforts are aligned with the resource management objectives identified in the CCMP and provide the information needed to track progress towards those objectives. The monitoring strategy should also make efficient use of available budget and staff resources by streamlining monitoring efforts, encouraging cooperation and collaboration between monitoring programs, and eliminating unnecessary duplication of effort wherever possible.

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CCMP Objectives:

The current draft of the updated Peconic Estuary CCMP includes eight Objectives supporting the goal of Clean Waters and Watershed (WQ):

- Objective WQ-1: Substantially reduce present-day and future sources of nutrient pollution into the Peconic estuary watershed.
- Objective WQ-2: Develop and implement strategies to manage existing, historical nutrient loads presently in groundwater that could enter the Peconic estuary.
- Objective WQ-3: Reduce harmful algal blooms (HABs) in the Peconic estuary.
- Objective WQ-4: Reduce pathogen loading to the Peconic estuary.
- Objective WQ-5: Maintain and protect existing high-quality waters.
- Objective WQ-6: Understand various types of toxic contaminants and their impacts, and work to address current and emerging concerns.

- Objective WQ-7: Reduce macro- and micro-plastic pollution.
- Objective WQ-8: Support water quality monitoring and research that will help guide and evaluate management efforts.

Other goals, such as Healthy Ecosystems with Abundant Wildlife (HE), and Resilient Estuary Communities Prepared for Climate Change (CC), also include objectives that involve water quality, either directly or indirectly. These include:

- Objective HE-3: Improve water quality to increase habitat suitability for eelgrass and establish new or restored eelgrass beds.
- Objective HE-4: Maintain and restore wetland habitat.
- Objective HE-6: Maintain, restore and enhance viable diadromous fish spawning and maturation habitat.
- Objective CC-3: Develop strategies to understand and address ocean acidification.

Tracking progress toward meeting these objectives will require the following types of monitoring data and analyses:

- Objective WQ-1: Monitoring of ambient WQ in surface water (fresh, estuarine and marine) and ground water will be necessary, including all WQ parameters needed to characterize status and trends in “nutrient pollution.” If tracking of nutrient contributions from individual source categories is desired, annual nutrient loads (based on flows and concentrations) from those source categories will also be needed.
- Objective WQ-2: Groundwater discharge will need to be monitored or estimated, and the nutrient levels contributed by historical sources (e.g., historical duck farms) will need to be quantified in order to track current and future nutrient loads entering the estuary from those sources.
- Objective WQ-3: Regular monitoring of HABs will be needed to track the frequency, magnitude and severity of blooms.
- Objective WQ-4: This will require the same types of monitoring and analysis as Objective 1, with pathogen-related WQ parameters substituted for nutrients.
- Objective WQ-5: High-quality waters will need to be identified, and WQ status and trends in those waters monitored and reported on a regular (preferably annual) basis. Periodic pollutant loading estimates (e.g., comprehensive estimates that are updated every 3-5 years), and a ‘decision matrix’ outlining actions that will be taken by PEP partners if significant declining WQ trends are observed in a high-quality waterbody, would also be helpful for management purposes.
- Objective WQ-6: This appears to be a research-oriented rather than a monitoring-oriented objective, although existing toxics monitoring programs may need to be adjusted to include the contaminants of greatest management concern.
- Objective WQ-7: This will require monitoring efforts similar to those needed to support Objectives 1 and 4, with a focus on macro- and micro-plastic pollution.
- Objectives HE-3, HE-4 and HE-6: These will require monitoring to track status and trends in key water quality attributes that determine habitat suitability for eelgrass, healthy wetlands, and diadromous fish spawning and maturation

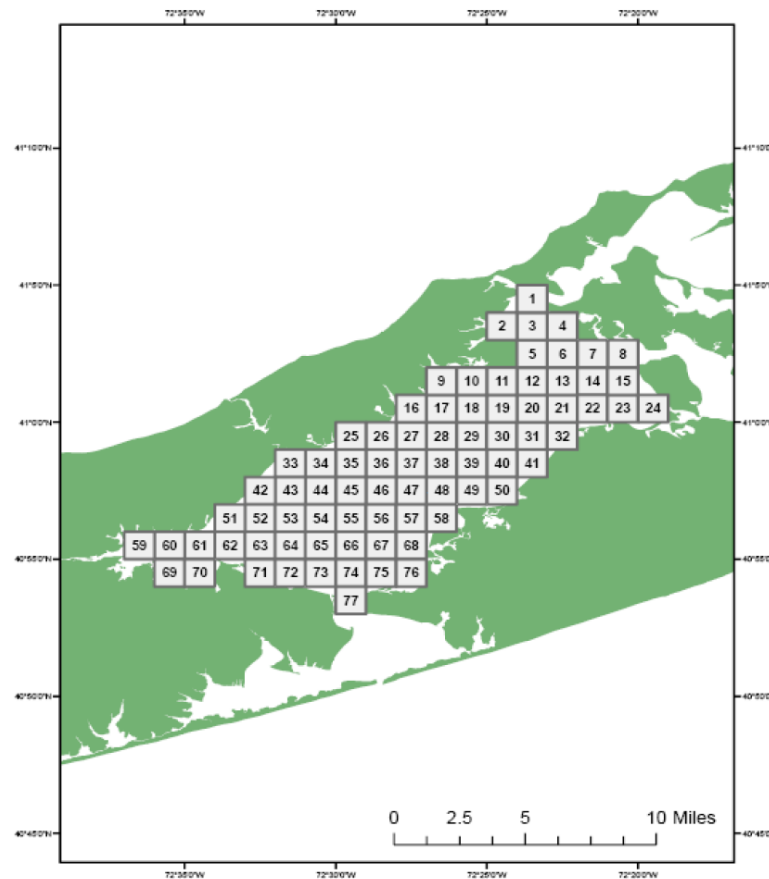
- Objective CC-3: Current EPA guidelines¹ recommend monitoring of $p\text{CO}_2$, pH, dissolved inorganic carbon (DIC) and total alkalinity (TA) to track water column acidification processes and changes in the coastal carbonate system.

The tables that follow present a summary of monitoring programs that are currently active in the PEP project area.

¹ Pimenta, A.R. and J.S. Gear. 2018. Guidelines for measuring changes in seawater pH and associated carbonate chemistry in coastal environments of the eastern United States. EPA/600/R-17/483. Washington, DC.

I. New York State Department of Environmental Conservation (NYSDEC), Division of Marine Resources, Fishery-Independent Trawl Survey

Category	Water Type	Monitoring Entity	Parameters	Sampling Frequency	No. Stations	Period of Record	Notes/Comments
Surface Water Quality	Estuarine/Marine	NYSDEC	Water Temperature (°C) – surface and bottom Salinity (psu) – surface and bottom DO (mg/l) – surface and bottom Secchi depth Water depth (at beginning and end of trawl)	Weekly, from May through October Stations in 16 randomly chosen blocks are sampled per week.	77 1-minute latitude and longitude survey blocks (see map below)	1987 – present (with data gaps in 2005, 2006, 2008, 2010)	Data, reports and other information on this monitoring program are available from PEP staff



Peconic Estuary survey blocks used in the NYSDEC fishery-independent trawl survey, based on 1' latitude by 1' longitude grid cells. Trawls begin near the center of each randomly-selected block. (Source: NYSDEC)

II. New York State Department of Environmental Conservation (NYSDEC), Division of Water, RIBS Program

Category	Water Type	Monitoring Entity	Parameters	Sampling Frequency	No. Stations	Period of Record	Notes/Comments
Surface Water Quality	Fresh	NYSDEC	Alkalinity, Total (As CaCO ₃) (total,mg/l) Aluminum (dissolved,ug/l) Aluminum (total,ug/l) Arsenic (total,ug/l) Calcium (total,ug/l) Chloride (As Cl) (total,mg/l) Copper (dissolved,ug/l) Copper (total,ug/l) Dissolved Organic Carbon (dissolved,mg/l) Hardness (As CaCO ₃) (total,mg/l) Iron (total,ug/l) Lead (dissolved,ug/l) Lead (total,ug/l) Magnesium (total,ug/l) Manganese (total,ug/l) Mercury (total,ng/l) Nickel (dissolved,ug/l) Nickel (total,ug/l) Nitrogen, Ammonia (As N) (total,mg/l) Nitrogen, Kjeldahl, Total (total,mg/l) Nitrogen, Nitrate-Nitrite (total,mg/l) Nitrogen, Nitrate (As N) (total,mg/l) pH (total,ph units) Phosphorus (total,mg/l) Potassium (total,ug/l) Silver (total,ug/l) Sodium (total,ug/l) Specific Conductance (total,umhos/cm) Sulfate (As SO ₄) (total,mg/l) Total Dissolved Solids (Residue, Filterable) (total,mg/l) Total Organic Carbon (total,mg/l) Total Solids (total,mg/l) Total Suspended Solids (total,mg/l) Total Volatile Solids (total,mg/l) Turbidity (total,ntu) Zinc (dissolved,ug/l) Zinc (total,ug/l)	Monthly, from April through November, at 5-year intervals	1 (Peconic River)	2004 – present (2004, 2009, 2014)	In addition to the water chemistry parameters listed here, the RIBS program also includes taxonomic and habitat quality data. (See program summary below.)

Note: **Rotating Integrated Basin Studies (RIBS)** (<http://www.dec.ny.gov/chemical/30951.html>)

“The objectives of the Rotating Integrated Basin Studies (RIBS) program are to assess water quality of all waters of the state, including the documentation of good quality waters and the identification of water quality problems; identify long-term water quality trends; characterize naturally occurring or background conditions; and establish baseline conditions for use in measuring the effectiveness of site-specific restoration and protection activities. The program is designed so that all major drainage basins in the state are monitored [every five years](#).

To address the objectives and the rotating cycle, the program is designed around three related monitoring schemes:

The Screening Network provides a narrative assessment of water quality at a large number of sampling sites based on biological assessment using macroinvertebrate community analysis, measures of acute toxicity in the water, physical habitat evaluation and water chemistry. Locations identified during the screening year may be selected for additional sampling during the following year.

Special Surveys are designed to answer specific questions regarding habitat and water quality and may employ multi-media sampling-depth integrated water chemistry, bottom sediment and invertebrate tissue chemistry, toxicity testing, macroinvertebrate or fish community assessments, habitat assessment--depending on the focus of the survey.

The Routine Trend Monitoring Network provides information for establishing basic water quality characteristics and baseline conditions, and for identifying long-term trends by sampling at fixed sites across the state, conducted each year, regardless of the rotating cycle. RIBS program water quality data and information are used to support assessment and management functions within NYSDEC Division of Water (DOW), including the Waterbody Inventory/Priority Waterbodies List (WI/PWL), New York State's Clean Water Act Section 305(b) Water Quality Report, and Section 303(d) List of Impaired Waters of the state.

More details on methods, assessment criteria and their application in the RIBS program are contained in the Quality Assurance Program Plans and Standard Operating Procedures for each of the sampling media. These documents are available from NYSDEC on request.”

III. NYSDEC, Division of Marine Resources, Shellfish Growing Area Classification Unit

Category	Water Type	Monitoring Entity	Parameters	Sampling Frequency	No. Stations	Period of Record	Notes/Comments
Surface Water Quality	Estuarine/Marine	NYSDEC Bureau of Marine Resources	Fecal coliforms (MPN/100ml) Salinity (psu) Water Temperature (°C)	Variable, depending on station requirements (typically 2-15+ per year)	Variable, based on potential pollution sources	Varies between stations	Data from some stations extends back to the 1970s Information on current shellfish growing area closures is available at https://nysdec.maps.arcgis.com/apps/webappviewer/index.html?id=d98abc91849f4ccf8c38dbb70f8a0042

Notes:

- Current monitoring in the Peconic Estuary includes 20+ growing areas, with an average of ~20 sampling sites per area. (M. Richards, NYSDEC, pers. comm.)
- To help determine and quantify sources of the fecal indicator bacteria detected in growing areas, NYSDEC is collaborating with the USGS on a microbial source tracking project (<https://www.sciencebase.gov/catalog/item/593aa553e4b0764e6c602044>) that uses several analytical techniques to identify the host organisms (e.g., humans, pets, livestock, birds and other wildlife) and hydrologic transport mechanisms (e.g., wastewater, stormwater, groundwater) involved in the discharging fecal contaminants.
- As part of its ongoing shellfish monitoring program, NYSDEC is also collaborating with a number of federal, state and local government agencies to and NGOs to identify shellfish harvesting areas impacted by marine biotoxins associated with harmful algal blooms, such as PSP, ASP and DSP, and initiate emergency closures in those areas to protect public health (see <https://www.dec.ny.gov/outdoor/64824.html>).

IV. **PEP Long-Term Eelgrass Monitoring Program (PEP LTEMP)**

Category	Water Type	Monitoring Entity	Parameters	Sampling Frequency	No. Stations	Period of Record	Notes/Comments
Surface Water / Eelgrass Habitat	Estuarine/ Marine	Cornell University, Cooperative Extension of Suffolk County	Eelgrass shoot density (per m ²) Water temperature (°C) Light availability (PAR) Macroalgae cover (%)	Annually or every 3 years (see note below)	Variable	1997 - present	<p>Data are summarized in annual reports, available on request from the PEP program office.</p> <p>2017-2022 (13 in 2017, 2019, 2022/ 9 in 2018-2022) Bullhead Bay (annually) Gardiners Bay (annually) Coecles Harbor (annually) Fort Pond (annually) Napeague Harbor (annually) Sag Harbor (annually) New Three Mile Harbor (annually) Cedar Point (annually) Orient Point (annually) Northwest Harbor (2017, 2019, 2022) Orient Harbor (2017, 2019, 2022) Three Mile Harbor (2017, 2019, 2022) Southold Bay (2017, 2019, 2022)</p> <p>2012-2016 (8) Bullhead Bay, Gardiners Bay, Northwest Harbor, Orient Harbor, Three Mile Harbor, Cedar Point, Orient Point, Southold Bay</p> <p>1999-2011 (6) Bullhead Bay, Gardiners Bay, Northwest Harbor, Orient Harbor, Three Mile Harbor, Southold Bay</p> <p>1997 & 1998 (3) Bullhead Bay, Northwest Harbor, Orient Harbor</p>

Note: For the 2017 monitoring season, it was agreed that all of the LTEMP sites, original and new, would be monitored, but for future seasons, the LTEMP sites that no longer support eelgrass (Northwest Harbor, Orient Harbor, Southold Bay, and the original Three Mile Harbor) would be monitored once every 3 years.

V. **Stony Brook University, School of Marine and Atmospheric Sciences (SBU/SOMAS)**

Category	Water Type	Monitoring Entity	Parameters	Sampling Frequency	No. Stations	Period of Record	Notes/Comments
Surface Water Quality	Fresh/ Estuarine/ Marine	Stony Brook University, SOMAS, LIMMN Program	Min. DO (mg/l) Secchi depth (m) Site depth (m) Fecal coli. (per 100ml) Chl-a (ug/l) HABs (cells/ml)	Weekly from the Monday after Memorial Day to the Monday before Labor Day	6 in Peconic system	2014 - present	During active sampling periods, real-time data are available at https://you.stonybrook.edu/goblerlab/real-time-water-quality-data/

VI. Suffolk County Department of Health Services (SCDHS), Office of Ecology

Category	Water Type	Monitoring Entity	Parameters	Sampling Frequency	No. Stations	Period of Record	Notes/Comments
Surface Water Quality	Estuarine/ Marine	SCDHS, Ecology	N forms (mg N/l) NHx-N NO2-N & NO3-N NOx-N Urea-N TKN/DKN TN/DN P forms (mg P/l) TPO4/DPO4-P TP/DP o-PO4-P Chlorophyll-a (ug/l) Total Fractionated (<10 um) Organic Carbon (mg C/l) TOC & DOC SiO3 (mg Si/l) Aureococcus counts (cells/ml) Coliforms (MPN/100 ml) Total & Fecal Secchi Depth (ft) Water Temp (°C) DO (mg/l) Salinity (PSU) Spec. Conduct. (uS/cm) pH (unitless) Other (Tide, Weather, Water Depth, Color)	Approx. Monthly (see notes)	Variable (see notes and map below)	1976-2018 1976-1989 1989-2018 1994-2003 1976-2000 2000-2018 1976-2000 2000-2018 1977-2018 1988-2018 1988-2009 1988-2002, 2007 1988-2003 (1995 missing) 1985-2018 1976-2016 (1978, 1981, and 1982 missing) 1976-2016 (1983 and 1984 missing) 1976-2018 1987-2018 1976-2018 2001, 2011 (2016 missing) 2010-2018 2012-2018	Numbers of stations vary from year to year: <ul style="list-style-type: none"> Min=10 (1992-1993) Mean=31 Max=49 (2016) 46 stations sampled in 2018 Data and metadata are available at https://gisportal.suffolkcountyny.gov/gis/home/item.html?id=8107f192ffac406380b6d61d3d3dbf7d For all parameters, some years included in POR may have months with missing data.



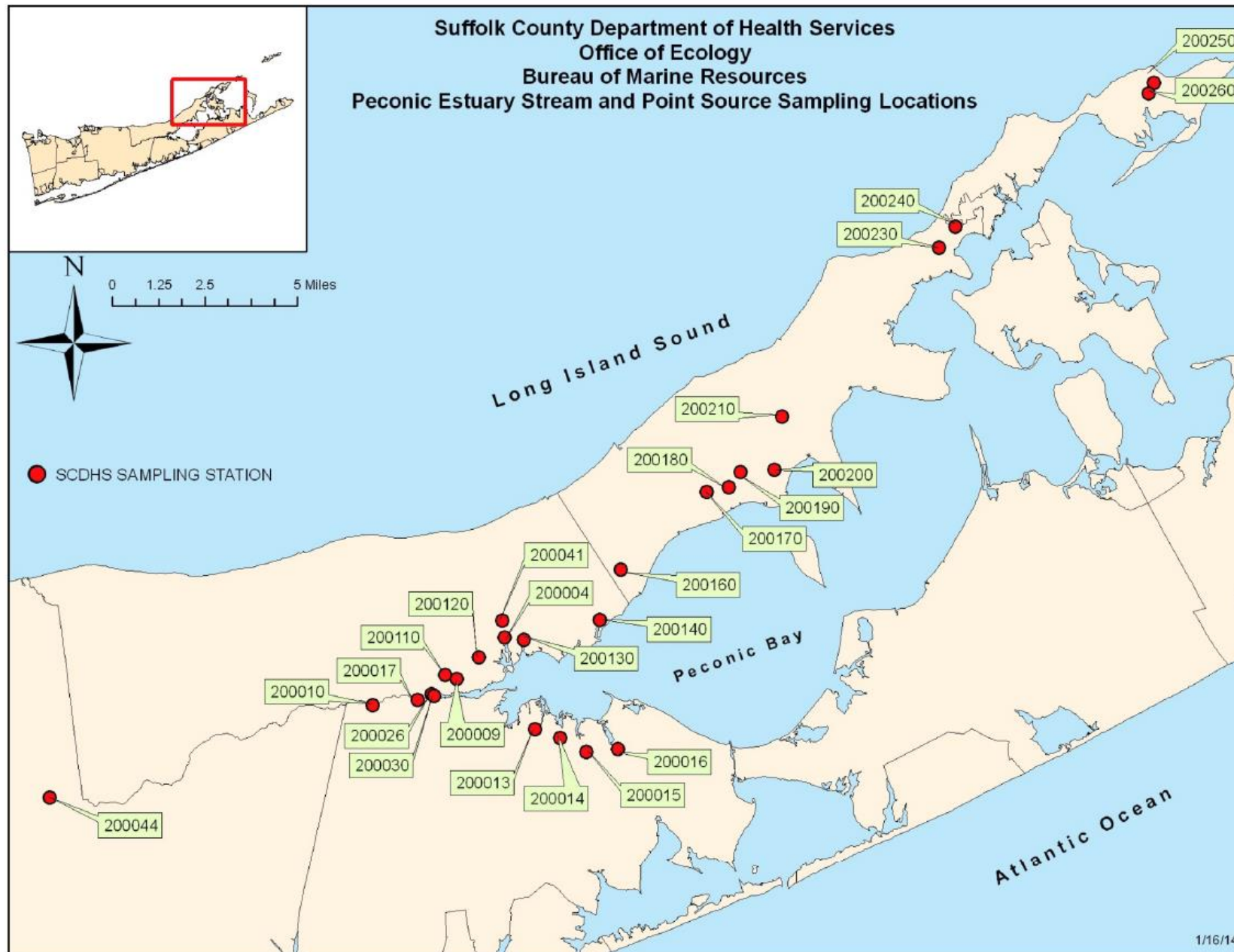
(Source: SCDHS)

Current (2017) SCDHS estuarine/marine monitoring stations in the Peconic Estuary. (Source: SCDHS)

Station Number	Station Name	Lat.	Lon.	Description	Mean Depth (ft)	Initial Year Sampled
60101	East Creek (South Jamesport)	40.944	-72.571	In East Creek, S. Jamesport, off the state boat ramp	6.2	1994
60102	Cutchogue Harbor	41.002	-72.460	In Cutchogue Harbor, midway between ent. to Wickham Ck & Little Hog Neck, 0.5 mi S of ent. to East/Mud Cks.	11.5	1994
60103	East Creek (Cutchogue)	41.009	-72.460	In East Creek, Cutchogue, at the confluence of East Creek and Mud Creek	6.9	1994
60104	North Sea Harbor	40.943	-72.415	In North Sea Harbor, where the entrance channel from Little Peconic Bay meets the main harbor	10.2	1994
60105	Hog Neck Bay North	41.028	-72.433	In Hog Neck Bay, 0.4 mi SSE of the entrance to Richmond Creek and 0.5 mi WSW of the entrance to Corey	19.1	1994
60106	Goose Creek	41.053	-72.414	In Goose Creek, just E of the Bayview Bridge	8.3	1994
60107	Town Creek	41.059	-72.414	At the confluence of Town Creek and Jockey Creek	9.7	1994
60109	Mill Creek (Hashamomuck Pond)	41.076	-72.401	At the entrance to Mill Creek (S of Hashamomuck Pond), on the S side of the Route 25 bridge	7.7	1994
60111	Greenport Harbor	41.106	-72.355	In Greenport Harbor, just SE of the entrance to Stirling Basin	26.7	1994
60113	Little Peconic Bay	40.976	-72.429	In Little Peconic Bay, S of Nassau Point, at buoy R "22"	33.8	1985
60114	Paradise Point	41.050	-72.377	In Shelter Island Sound, E of Paradise Point, at buoy R "12"	71.9	1985
60115	Orient Harbor	41.114	-72.317	At the entrance to Orient Harbor, at buoy R "6"	22.7	1985
60116	Gardiner's Bay West	41.081	-72.273	On the E side of Shelter Island in western Gardiner's Bay, approximately 0.3 mi E of Ram's Head	14.1	1986

60118	Northwest Harbor	41.028	-72.260	In Northwest Harbor, midway between Cedar Pt. and Barcelona Pt.	23.6	1986
60119	West Neck Bay	41.064	-72.359	In the center of West Neck Bay, Shelter Island	12.0	1987
60121	Noyac Bay	41.013	-72.344	In the center of Noyac Bay, approximately 0.8 mi N of Pine Neck	24.2	1987
60122	Coecles Harbor	41.078	-72.312	In Coecles Harbor, midway between Little Ram Island and Shelter Island, approximately 1.0 mi S of Ram Island Dr.	7.9	1992
60124	West Neck Harbor	41.045	-72.347	In the center of West Neck Harbor	10.5	1994
60126	Sag Harbor	41.009	-72.293	At the entrance to Sag Harbor, inside the jetty, 0.2 mi N of the shoreline	11.3	1994
60127	Sag Harbor Cove	41.008	-72.308	In the main channel, 0.6 mi W of the North Haven bridge	7.2	1994
60130	Great Peconic Bay	40.936	-72.512	In Great Peconic Bay, approx. 2.5 mi. N of Shinnecock Canal and E of the mouth of East Creek	21.3	1976
60131	Northwest Creek	41.010	-72.253	In Northwest Creek, just S of the opening to Northwest Harbor	9.9	1994
60132	Three Mile Harbor	41.021	-72.182	In the main channel on the E side of the harbor.	12.5	1994
60133	Acabonac Harbor	41.025	-72.139	In Acabonac Harbor, on the N side of Wood Tick Island.	6.9	1994
60134	Napeague Harbor	41.010	-72.054	On the eastern side of Napeague Harbor, midway between the opening to Napeague Bay and the southern shoreline	7.7	1994
60135	Lake Montauk	41.064	-71.928	In the center of Lake Montauk	8.9	1994
60137	Gardiner's Bay Central	41.098	-72.204	In central Gardiners Bay at sediment flux station "6A"	32.3	1996
60148	Bullhead Bay	40.912	-72.444	Approximately in the center of Bullhead Bay	4.5	1998
60170	Flanders Bay	40.923	-72.587	In Flanders Bay, NE of Goose Creek Pt., at buoy R "8"	9.0	1976
60210	Reeves Bay	40.914	-72.615	In the center of Reeves Bay	6.8	1976
60220	Meetinghouse Creek	40.938	-72.619	In Meetinghouse Creek, just downstream from Hubbard Ave.	8.9	1976
60230	Terrys Creek	40.929	-72.620	In Terrys Creek at the confluence of two channels, west-northwest of Indian Island	8.1	1976

60240	Peconic River Mouth	40.922	-72.619	At the mouth of the Peconic River, at FL R"4" daymarker buoy, east of the entrance to Sawmill Creek	7.2	1976
60250	Sawmill Creek	40.924	-72.632	In Sawmill Creek, 0.5 mi upstream from the confluence with the Peconic River	5.1	1976
60260	Peconic River	40.918	-72.632	In the Peconic River, 0.3 mi southwest of the entrance to Sawmill Creek	7.8	1976
60265	Peconic River	40.918	-72.639		8.0	2015
60266	Peconic River	40.918	-72.639		7.8	2015
60270	Peconic River	40.918	-72.646	In the Peconic River, halfway between FL G "13" and FL R "14" daymarker buoys	9.3	1976
60275	Peconic River	40.917	-72.651		9.2	2015
60280	Peconic River	40.917	-72.656	In the Peconic River just below dam at FL G "17" daymarker buoy	7.9	1976
60290	Cold Spring Pond	40.900	-72.459		6.3	2002
60300	Wooley Pond	40.955	-72.399		8.5	2002
60310	Noyac Creek	40.994	-72.368		8.9	2002
60320	Mill Creek	40.996	-72.350		8.2	2002
60330	Hallocks Bay	41.134	-72.271		6.9	2001
60340	Hashamomuck Pond 1	41.082	-72.403		7.6	2001



SCDHS freshwater stream and point source monitoring in the Peconic Estuary watershed

Category	Water Type	Monitoring Entity	Parameters	Sampling Frequency	No. Stations	Period of Record	Notes/Comments
Surface Water Quality	Fresh (streams and point sources)	SCDHS, Ecology	N forms (mg N/l) NHx-N NO2-N & NO3-N NOx-N Urea-N TKN/DKN TN/DN P forms (mg P/l) TPO4/DPO4-P TP/DP o-PO4-P Organic Carbon (mg C/l) TOC & DOC SiO3 (mg Si/l) Coliforms (MPN/100 ml) Total & Fecal Chloride (mg/l) Sulfate (mg/l) Water Temp (°C) Water Depth (ft) Streamflow (cfs, at 10 stream/river stations) DO (mg/l) Salinity (PSU) Spec. Conduct. (uS/cm) pH (unitless)	Approx. Quarterly (see note)	Variable (see notes and map below)	1976, 1987-2018 1976, 1987-2018 1988-2018 2001-2003 1976, 1987-2000 2000-2018 1976, 1987-2000 2000-2018 1987-1996, 2001-2018 Partial data 1976, 1987-1989, 2001 Partial data 1988-1993 and 2001-2003 1976, 1987-2018 1987-1990, 2000-2018 2000-2018 1976, 1987-2018 2002, 2008-2018 1976, 1987-1998 1976, 1987-1989, 1999-2018 2000-2018 1976, 1987-2018 1987-1989, 2002-2018	Numbers of stations vary from year to year: <ul style="list-style-type: none"> • Min=8 (1990-1994) • Mean=22 • Max=39 (2002) • 25 stations sampled in 2018 Data and metadata available at https://gisportal.suffolkcountyny.gov/gis/home/item.html?id=8107f192ffac406380b6d61d3d3dbf7d For all parameters, some years included in POR may have months with missing data. An extensive metals and organics data set is also available for stream and point source stations from SCDHS

SCDHS bathing beach monitoring program. (Source: SCDHS)

Category	Water Type	Monitoring Entity	Parameters	Sampling Frequency	No. Stations	Period of Record	Notes/Comments
Surface Water Quality	Fresh/Estuarine/Marine Bathing Beaches	SCDHS, Ecology	<i>E. coli</i> (freshwater beaches) <i>Enterococcus</i> (estuarine/marine beaches)	Risk-based; twice per week at higher-risk beaches, less frequently at lower-risk beaches	187 stations in County; 30+ in Peconic system. Sampling performed mid-May through mid-September	2000 - present	Data and metadata available at https://gisportal.suffolkcountyny.gov/gis/home/item.html?id=025cb4dadb57413980dbd7e760b94da8

Note: SCDHS also collaborates with NYSDEC and SBU/SOMAS to identify shellfish harvesting areas impacted by marine biotoxins associated with harmful algal blooms, such as PSP, ASP and DSP, so that NYSDEC can initiate emergency closures in those areas when necessary to protect public health (see <https://www.dec.ny.gov/outdoor/64824.html>).

VII. Suffolk County Department of Health Services (SCDHS), Office of Water Resources

Category	Water Type	Monitoring Entity	Parameters	Sampling Frequency	No. Stations	Period of Record	Notes/Comments
Community Public Supply Wells	Groundwater	SCDHS, Water Resources	A,B,C,Da,Di,H M,Si,Sv,V (All parameters may not have been analyzed every year.)	Annual	77	Variable	Readily available data for some wells goes back to 1998, while other, newer wells, only have data going back to the year they went on-line. Some historic data goes back to 1980s.
Non-Community Public Supply Wells	Groundwater	SCDHS, Water Resources	A,B,C,Da,Di,H M,Si,V (All parameters may not have been analyzed every year.)	Annual	87	Variable	Readily available data for some wells goes back to 1998, while other, newer wells, only have data going back to the year they went on-line. Some historic data goes back to 1970s
Monitoring Wells	Groundwater	SCDHS, Water Resources	Variable	Variable	~400	Variable	Readily available data for some wells goes back to 2011. Earlier data (paper copies) goes back to 1970s. Parameters will vary depending on sample year (older samples generally have less parameters). Some stations were only sampled one or time times, Some wells have a longer sampling history.
Freshwater Streams	Surface Water	SCDHS, Water Resources	Variable	Variable	47	Variable	Data for some streams goes back to 1970s. Parameters will vary depending on sample year. Some stations were only sampled one or time times, fewer have a long sampling history

Parameter codes:

A = Carbamate Pesticides

Da = Dacthal & Metabolites

M = Metals

V = Volatile Organic Compounds

B = Bacteria

Di = 1,4-Dioxane

Si = Standard Inorganics

C = Chlorinated Pesticides

H = Herbicide Metabolites

Sv = Semi-volatiles

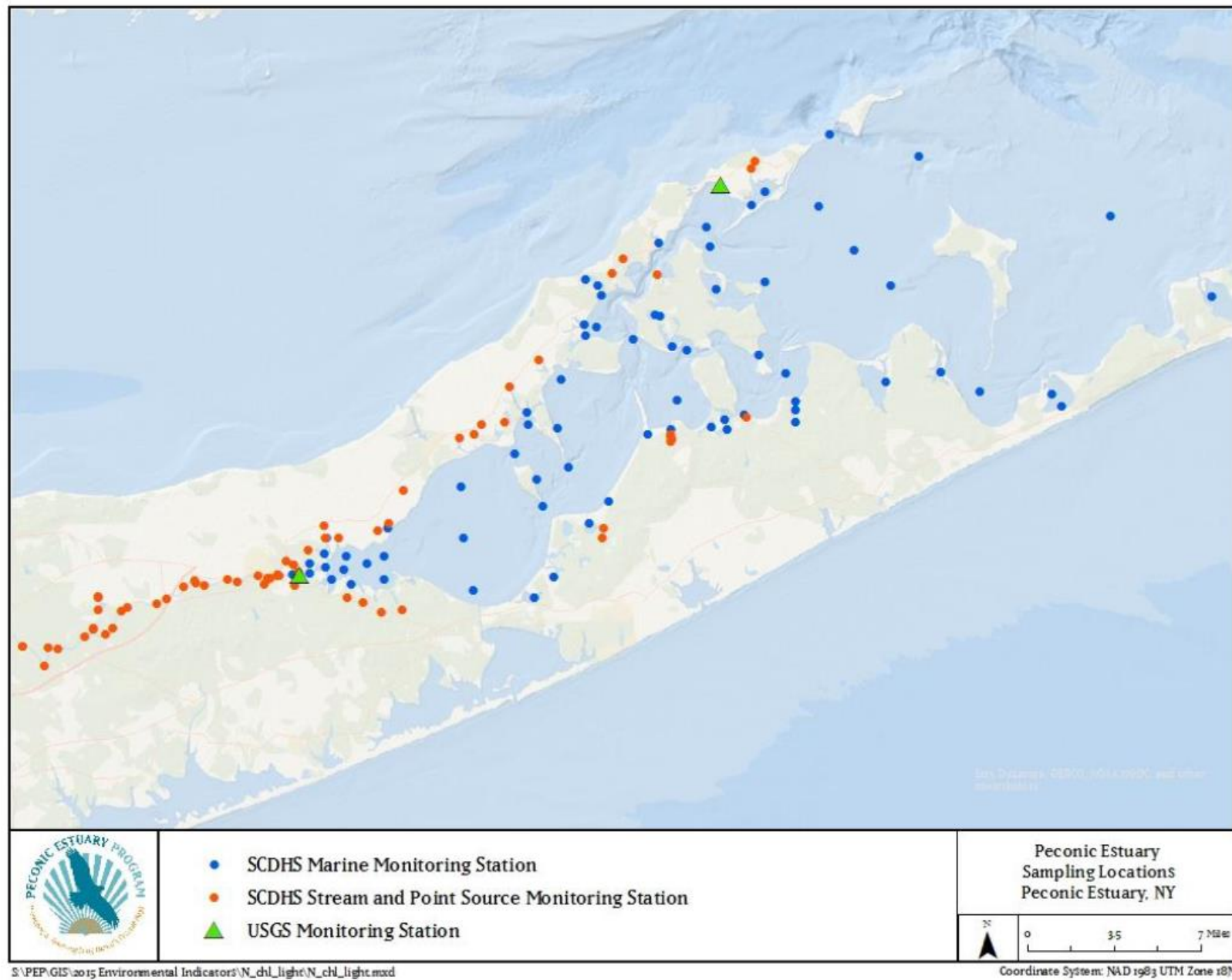
VIII. Surf Rider Foundation / Blue Water Task Force

Category	Water Type	Monitoring Entity	Parameters	Sampling Frequency	No. Stations	Period of Record	Notes/Comments
Surface Water Quality	Fresh/Estuarine/ Marine Waters; Stormwater Ponds and Discharges	Surf Rider Foundation/ BWTF	<i>Enterococcus</i>	Weekly in summer, bi-weekly in spring and fall, monthly during winter	50 stations in 2017 (number in Peconic Estuary not yet known)	2013-present	Data available at https://easternli.surfrider.org/wp-content/uploads/2018/06/2017_ELI-BWTF_WaterQualityAnalysis.pdf

IX. USGS continuous monitoring stations

Category	Water Type	Monitoring Entity	Parameters	Sampling Frequency	No. Stations	Period of Record	Notes/Comments
Surface Water Quality	Estuarine/ Marine	USGS	Water stage (ft.) Water temp. (°C) Spec. Cond. (uS/cm) Salinity (psu) DO (mg/l) Turbidity (FNU) Chlorophyll-a (ug/l) Nitrate (mg N/l) pH (standard units)	WQ monitoring at 6 to 30-min. intervals, depending on parameter	1 (Peconic River at County Highway 105 at Riverhead, NY)	August 2012 - present June 2017 – present	USGS site no. 01304562; data and metadata available at https://waterdata.usgs.gov/nwis/uv/?site_no=01304562 For location, see map below
	Estuarine/ Marine	USGS	Water stage (ft.) Water temp. (°C) Spec. Cond. (uS/cm) Salinity (psu) DO (mg/l) Turbidity (FNU) Nitrate (mg N/l) pH (standard units)	WQ monitoring at 6 to 30-min. intervals, depending on parameter	1 (Orient Harbor at Orient, NY)	August 2012 - present	USGS site no. 01304200; data and metadata available at https://waterdata.usgs.gov/ny/nwis/inventory/?site_no=01304200&agency_cd=USGS For location, see map below

Note: USGS has also collected a large quantity of shorter-term (project-specific) surface and ground water quality data at numerous sites in the Peconic Estuary and its watershed. These historical data sets are available from the agency's NWIS website <https://waterdata.usgs.gov/nwis>.



Locations of USGS continuous monitoring stations with respect to SCDHS estuarine and freshwater water quality stations. (Source: PEP)

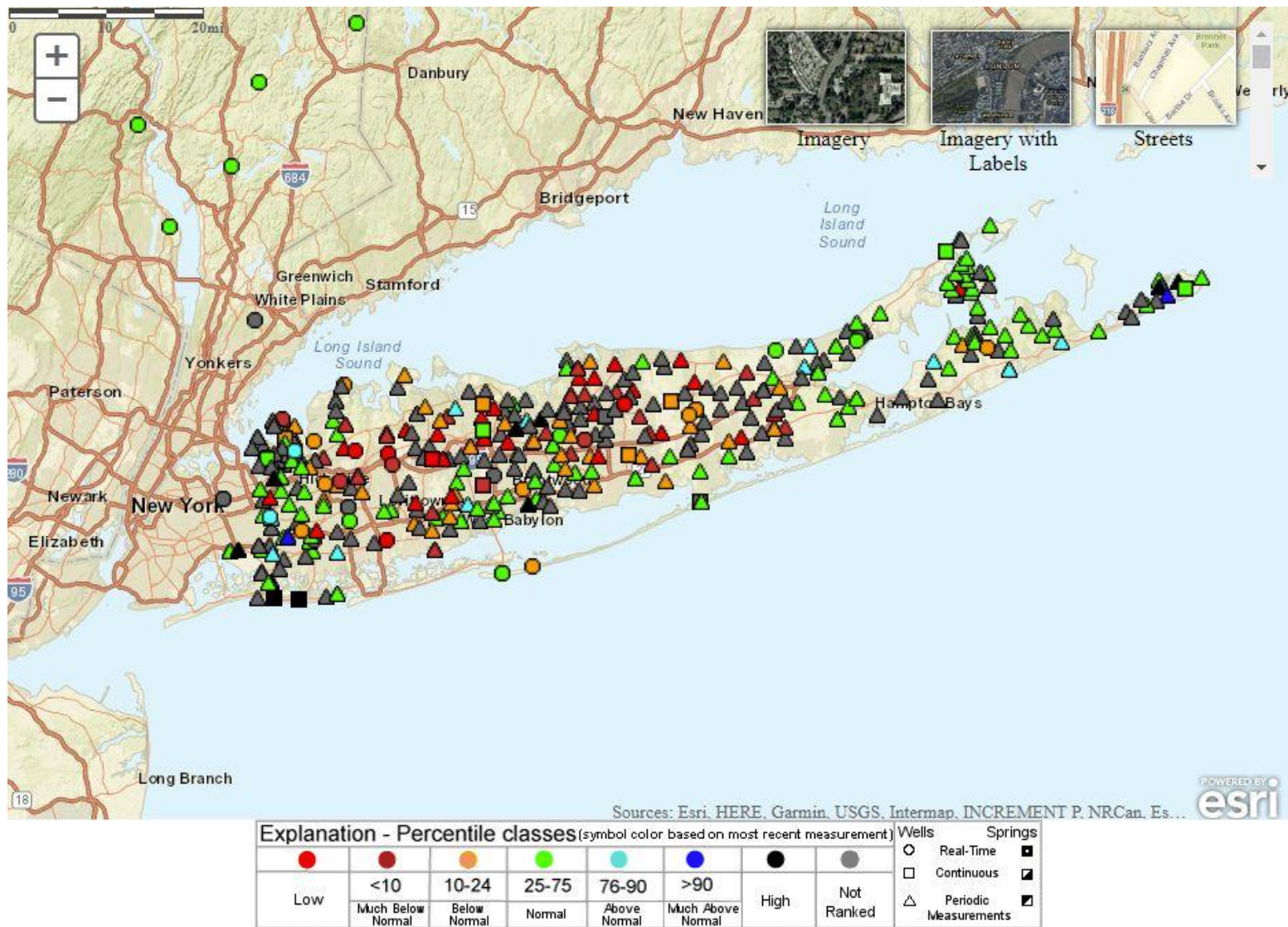
X. Data to support calculation of pollutant loading estimates:

Category	Source Type	Monitoring Entities	Parameters	Sampling Frequency	No. Stations	Period of Record	Notes/Comments
Pollutant Loadings	Atmospheric Deposition	SCDHS through the National Atmospheric Deposition Program (NADP) Office (Wisconsin State Laboratory of Hygiene)	National Trends Network (NTN): pH conductance sulfate chloride nitrate, orthophosphate ammonium calcium magnesium sodium potassium	Continuous (wet deposition only)	1	2003 to present	<p>Data available at http://nadp.slh.wisc.edu/data/sites/siteDetails.aspx?net=NTN&id=NY96</p> <p>NADP also provides calculated estimates of annual TN deposition (for the years 2000 – present) at http://nadp.slh.wisc.edu/committees/tdep/tdepmaps/</p>
			Clear Air Status and Trends Network (CASTNET): nitric acid nitrate ammonium sulfur forms chloride base cations	Continuous (dry deposition only)	4	1993 to present	
			Ambient Ammonia Monitoring Network (AMoN): ammonia gas (NH ₃)	Continuous	1	2014 to present	

Category	Source Type	Monitoring Entities	Parameters	Sampling Frequency	No. Stations	Period of Record	Notes/Comments
Pollutant Loadings	Surface Water (point sources)	SCDHS USEPA and individual facilities	Flows and constituent concentrations	Variable	Variable	Variable	Data sources and methods for estimating point source loads for the Peconic Estuary are described in Lloyd (2014) ²
Pollutant Loadings	Surface Water (streams)	USGS	Flow	Continuous	1	6/1942 – present	USGS gage 01304500, Peconic River at Riverhead, NY (partial-record flows, measured periodically, are also available from NWISWeb or on request from the USGS for several smaller tributaries to the Peconic Estuary)
		USGS SCDHS NYDEC	Constituent concentrations measured at or near stream gages	Variable	Variable	Variable	See previous listings for these WQ monitoring programs
Pollutant Loadings	Ground Water	USGS	Flow	Variable	Variable	Variable	Available data describing the rate of direct groundwater discharge consist of records of water table altitude, which document the hydraulic gradient to the Peconic Estuary (see p. 27 of Schubert, 1998³) and are available from NWISWeb.
		USGS	Constituent concentrations	Variable	Variable	Variable	Historical and recent ground water quality data are available from NWISWeb for many sites within the Peconic Estuary watershed.
		SCDHS	Constituent concentrations	Variable	Variable	Variable	Historical and recent ground water quality data are available from County monitoring programs for many sites within the Peconic Estuary watershed (see previous listing).

² Lloyd, S. 2014. Nitrogen load modeling to forty-three subwatersheds in the Peconic Estuary. The Nature Conservancy in partnership with the Peconic Estuary Program. (<https://www.conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/edc/Documents/Nitrogen%20load%20modeling%20to%20the%20Peconic%20Estuary%20-%20TNC%20May%202014.pdf>)

³ Schubert, C.E. 1998. Areas contributing ground water to the Peconic Estuary, and ground-water budgets for the North and South Forks and Shelter Island, eastern Suffolk County, New York. U.S. Geological Survey Water Resources Investigations Report 97-4136. Coram, NY.



Example of USGS groundwater monitoring network: a July 2018 snapshot from the USGS Groundwater Watch interactive mapper that provides information on hydrologic monitoring locations and groundwater levels for Long Island. (Source: https://www.usgs.gov/centers/ny-water/science/long-island-groundwater-network?qt-science_center_objects=0#qt-science_center_objects)