



***Shallow groundwater quality of Shelter Island,
2016-2018***

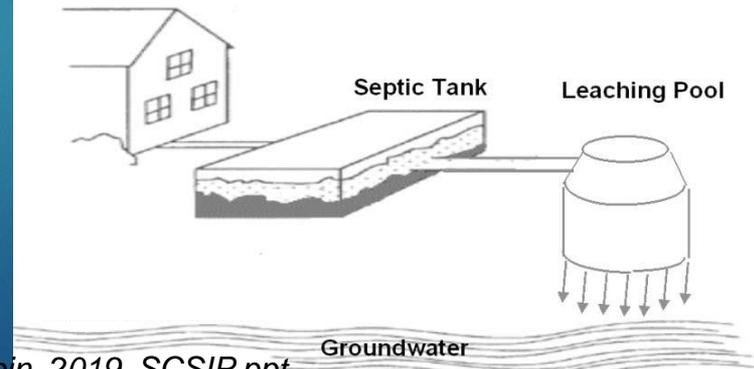
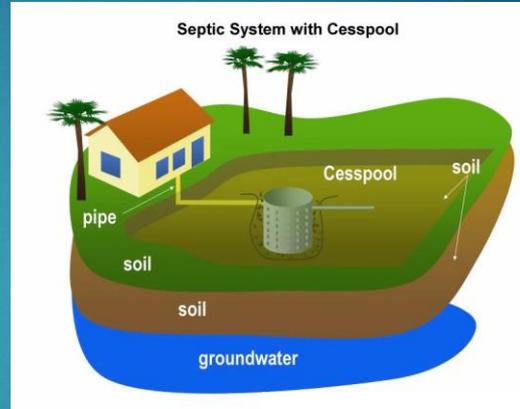
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USGS NY Water Science Center

June 25, 2019

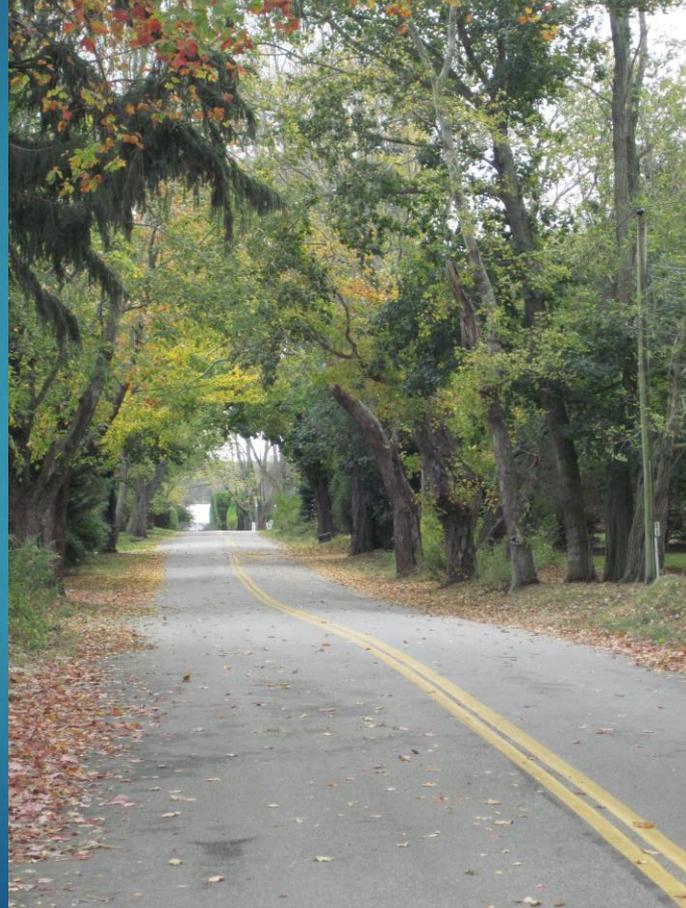
2018 Study: *Enhance the most recent water-quality groundwater network*

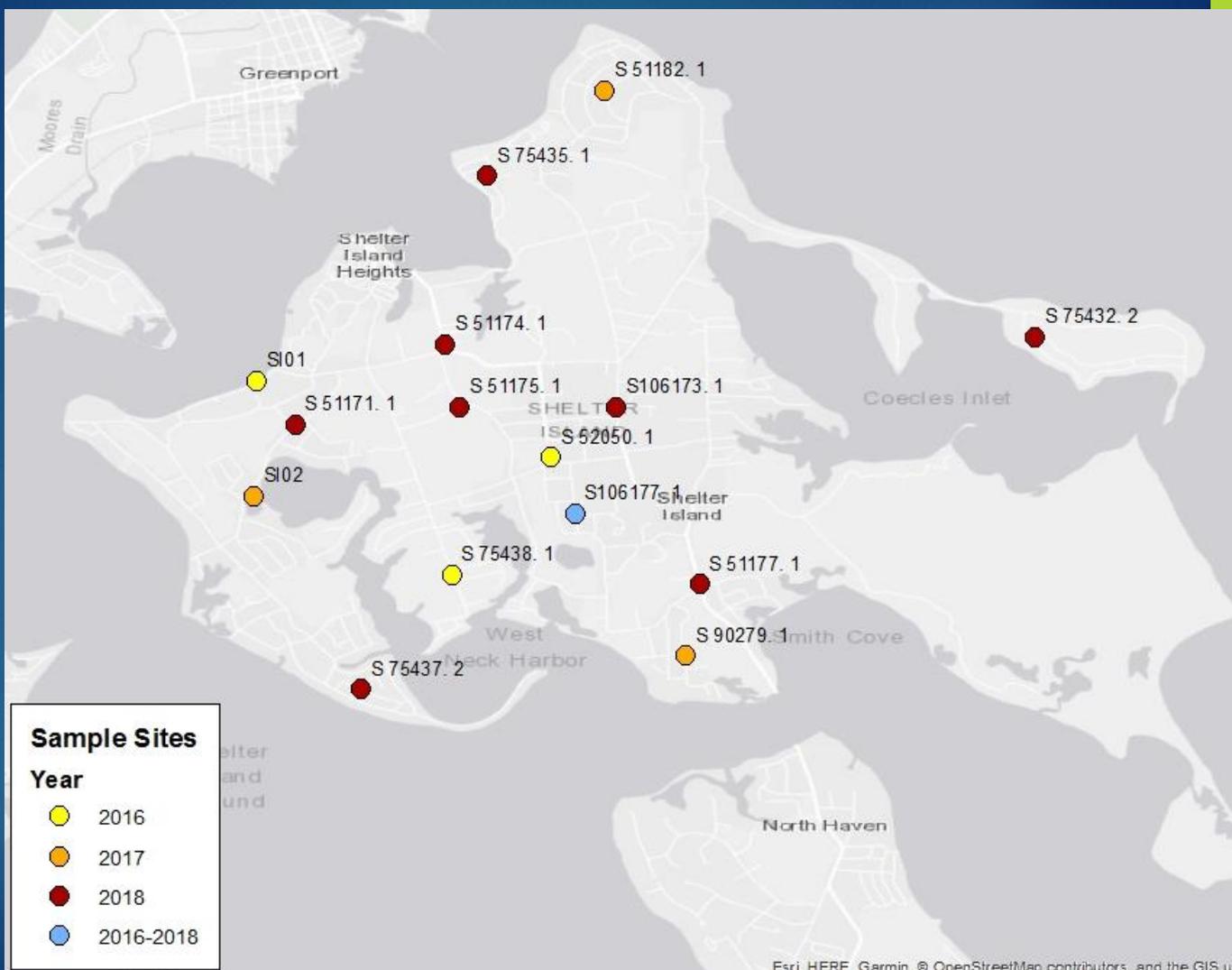
- ▶ Provide groundwater-quality data needed to evaluate and manage the groundwater resource for the Island
- ▶ Summary of current baseline conditions to be used to assess the success of future water-quality improvement programs



2018 Study: *Enhance the most recent water-quality groundwater network*

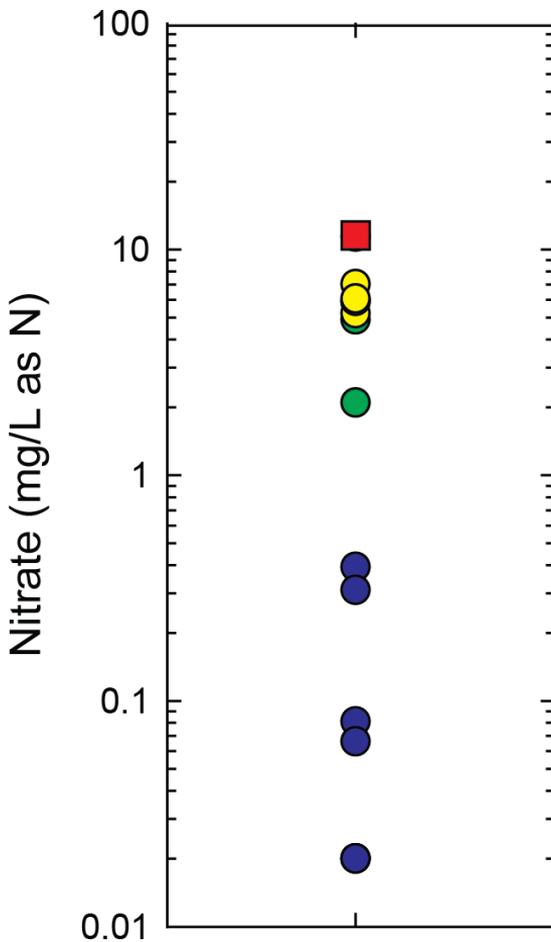
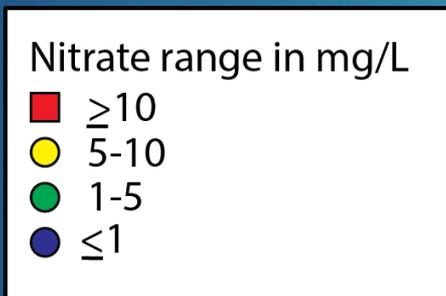
- ▶ Sample collection at 8 sites
- ▶ All sampling occurred in the fall, after peak loading of wastewater to GW from the summer tourist season
- ▶ Analysis included:
 - ▶ nutrients
 - ▶ pharmaceuticals
 - ▶ wastewater compounds





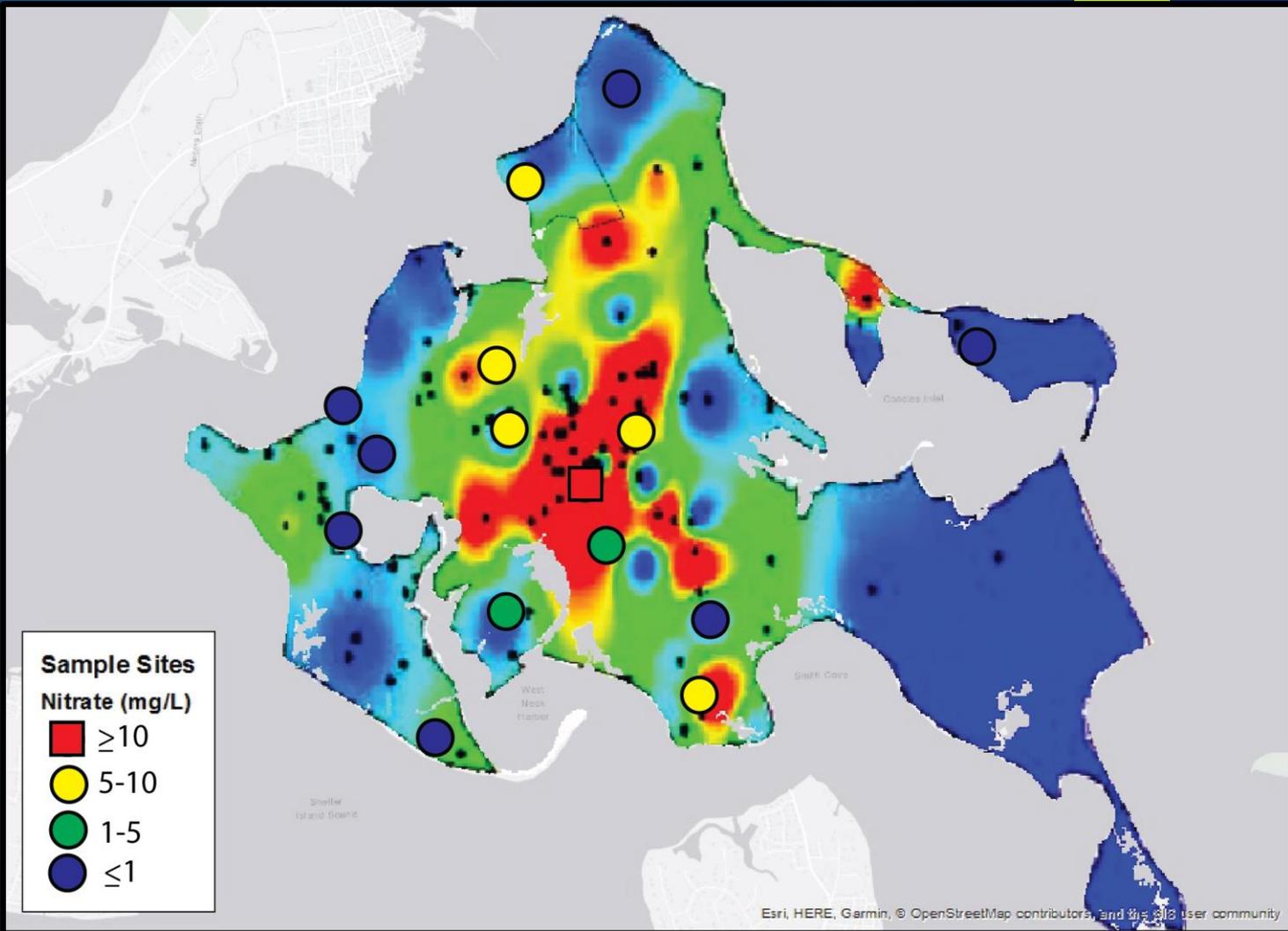
Focus on nitrate

8 of the 15 sites have nitrate concentration >5 mg/L

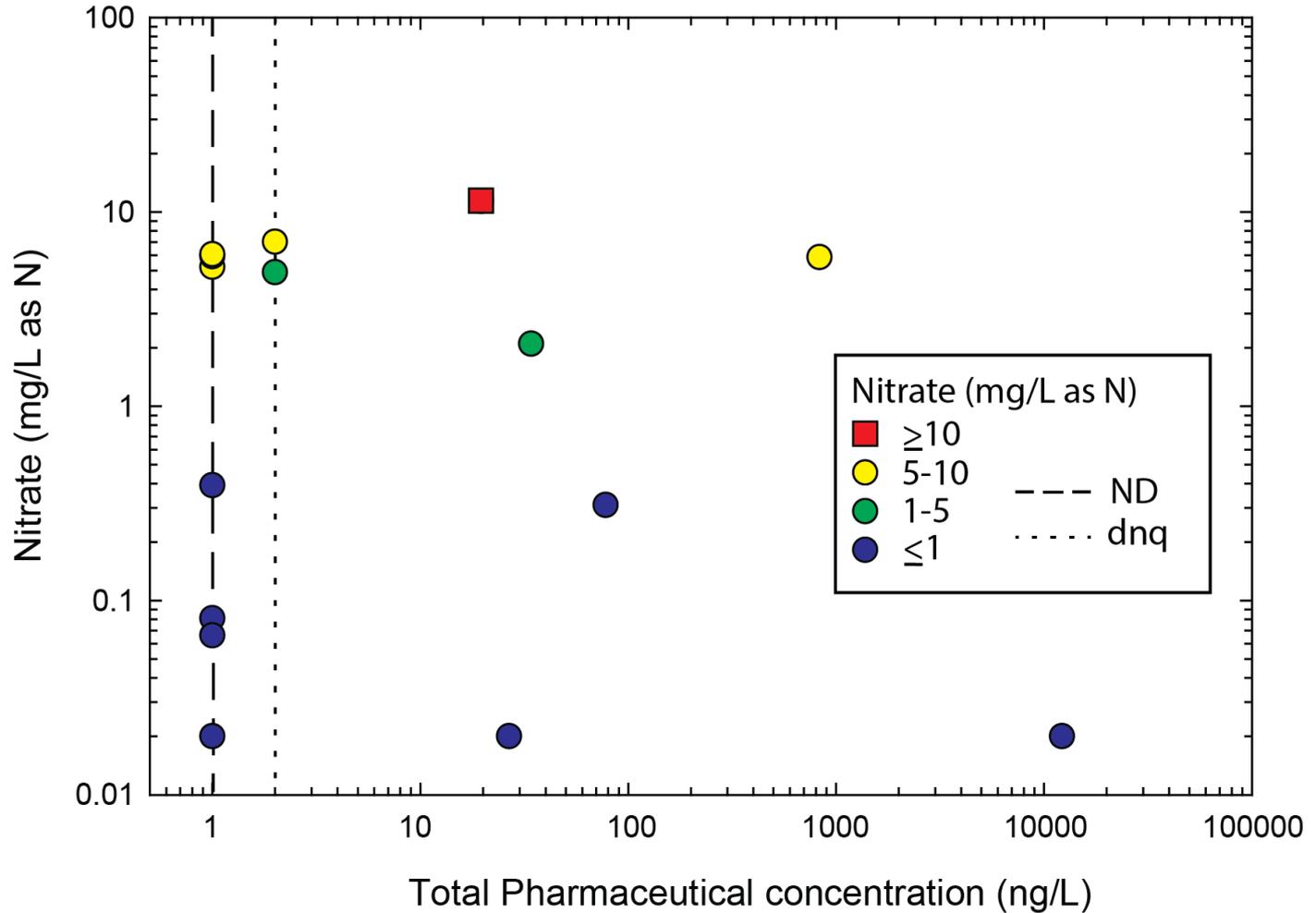


Recent nitrate concentrations plotted with NP&V nitrate model

Nitrate model data is from SCDHS, late 2000's

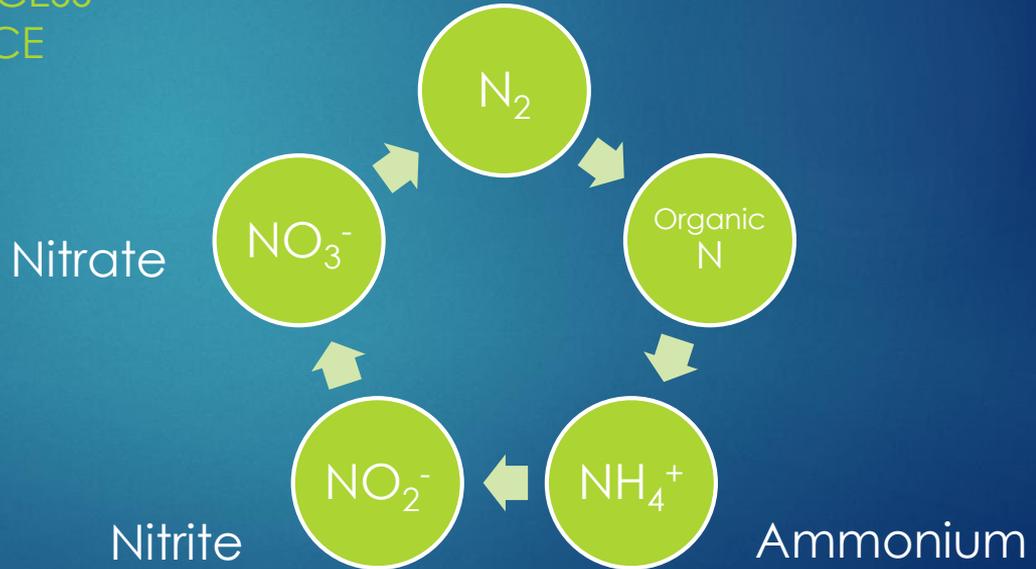


Elevated nitrate concentrations can be related to pharmaceutical concentrations in some locations

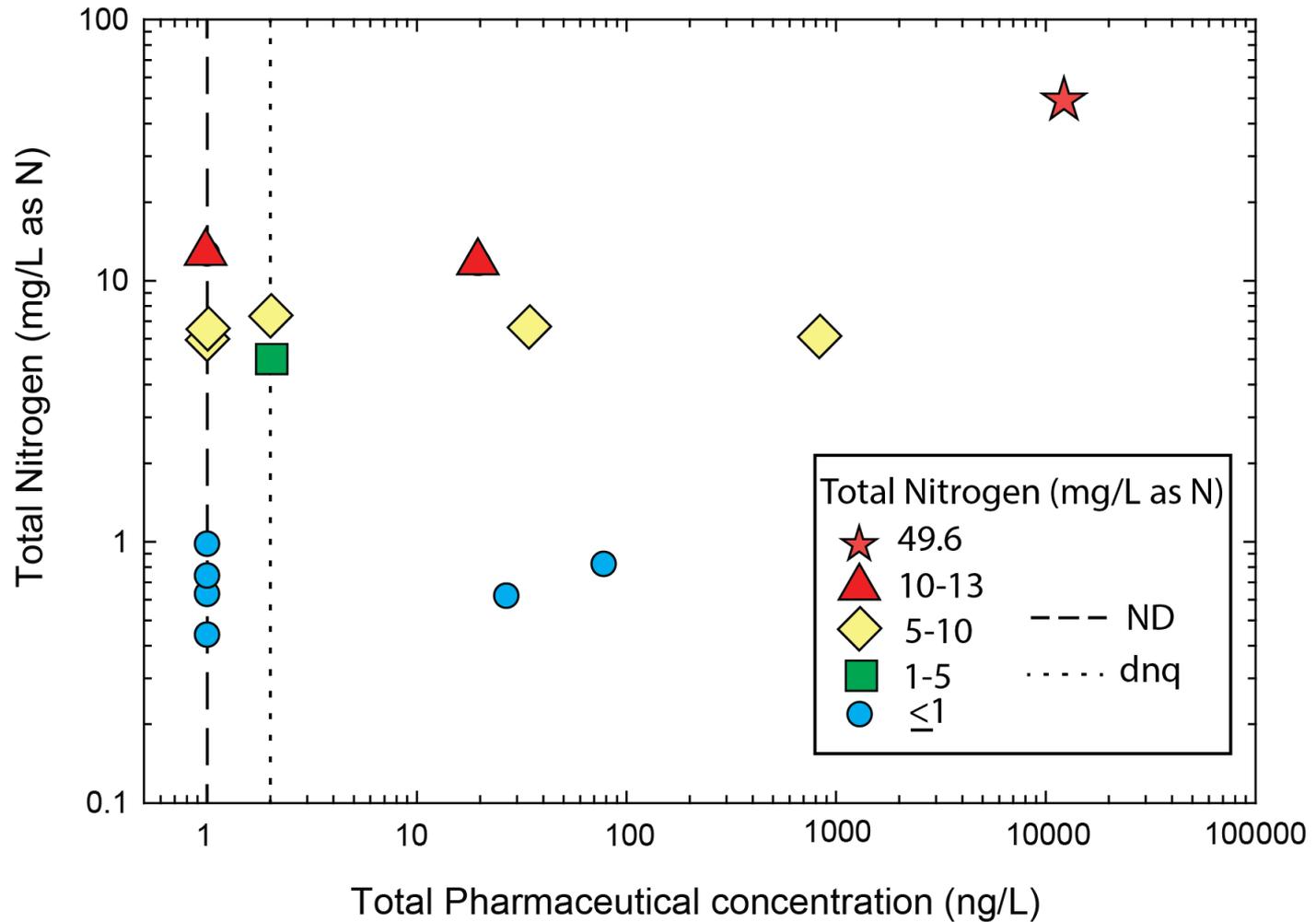


Understanding Total Nitrogen as a water-quality impairment

WASTEWATER CAN LEAD TO EXCESS LEVELS OF NITROGEN IN SURFACE AND GROUNDWATER

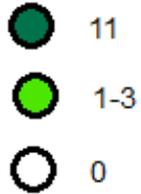


Total Nitrogen is better correlated to Total Pharmaceutical concentrations

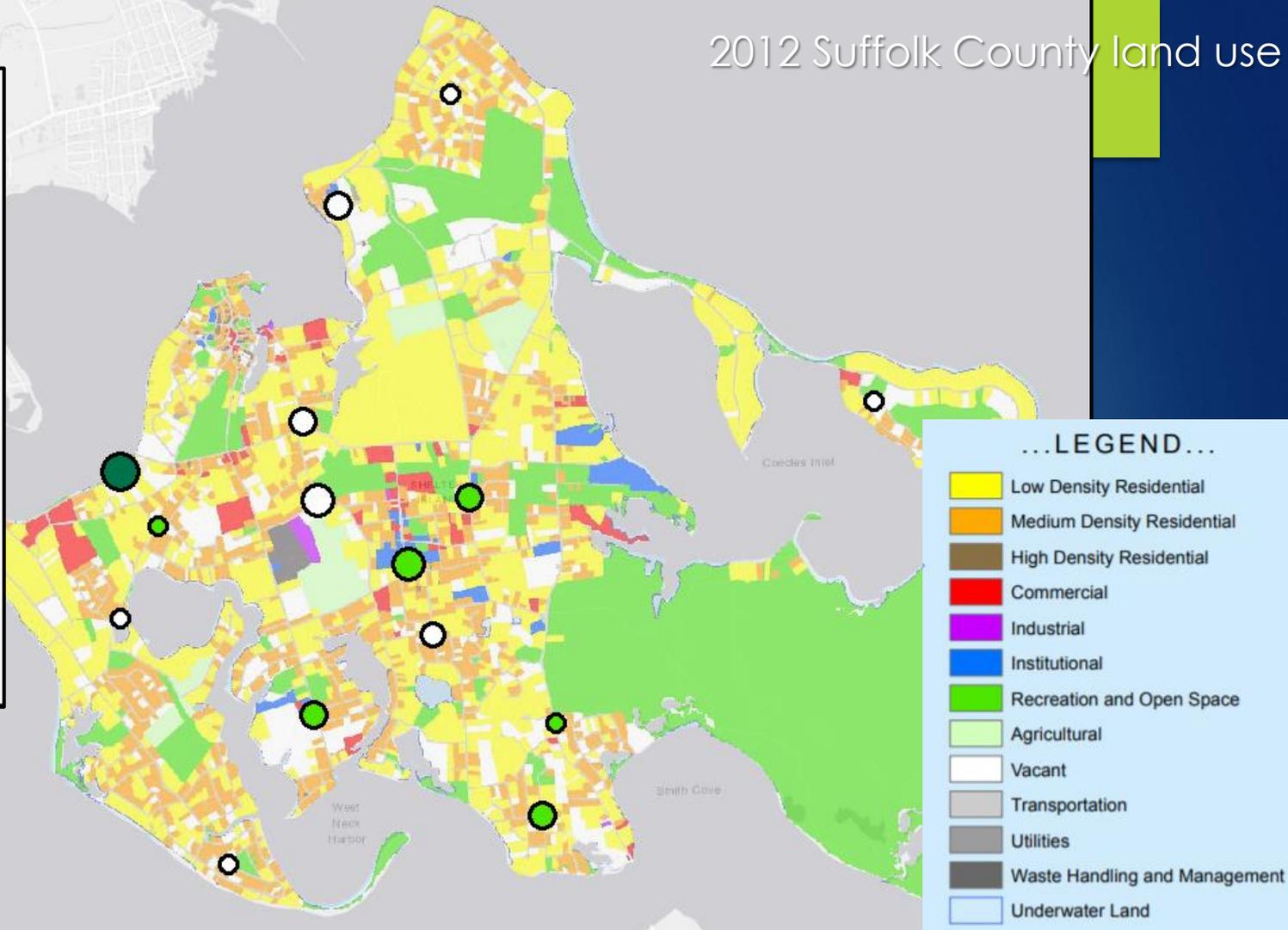


Sample Sites

Pharm Detections



Total Nitrogen (mg/L)



...LEGEND...



Analytes Detected

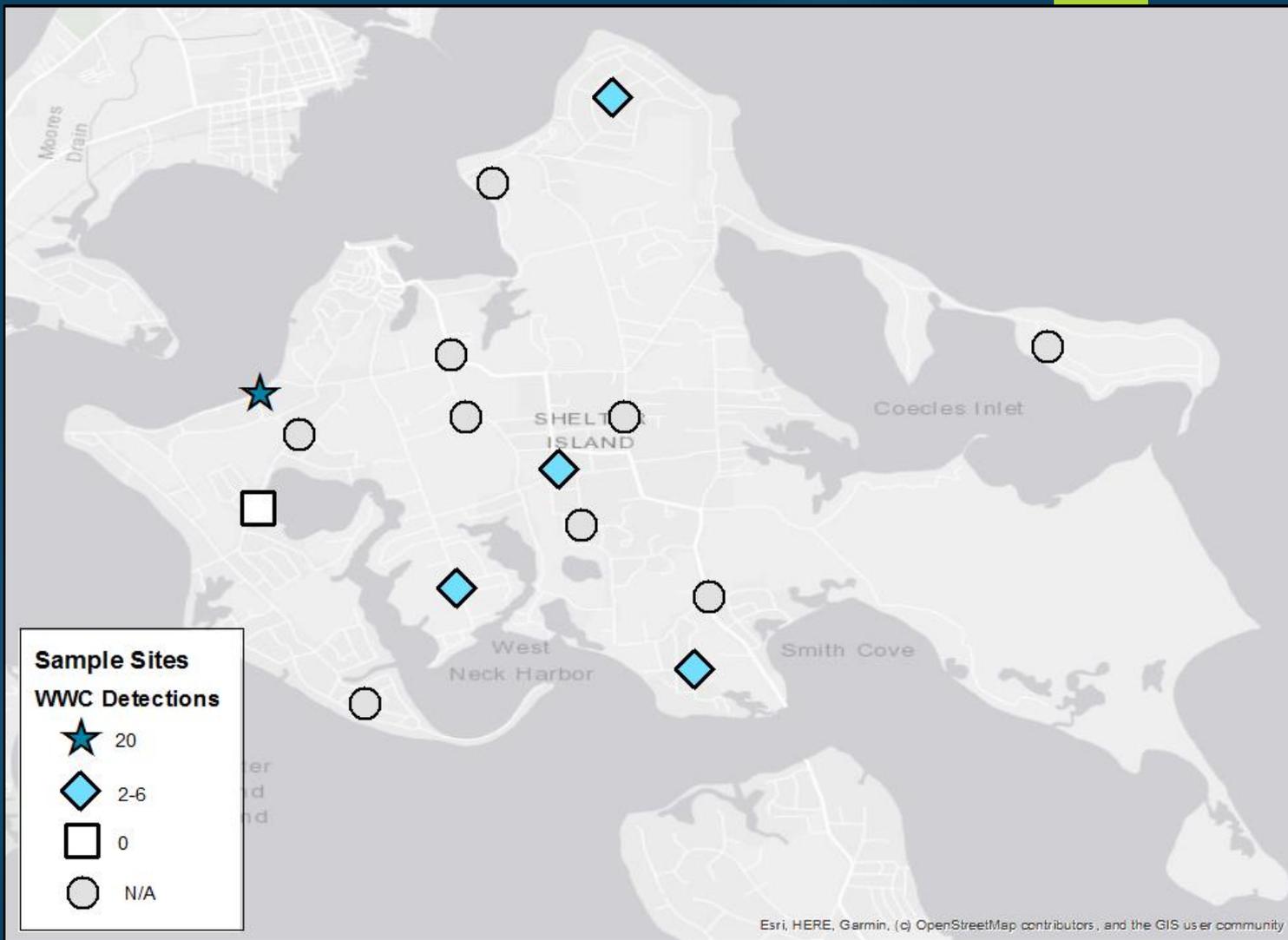
- 37 analytes detected
- 31 quantifiable detections

Pharmaceutical Compound	Use	Number of Detections (Out of 15)	Highest Detection (ng/L)
Acyclovir	Antiviral	1	10,400
Sulfamethoxazole	Antibiotic	3	833.42
Acetaminophen	Analgesic/Antipyretic	2	23.51
Carbamazepine	Anticonvulsant	3	4.25
Cotinine	Tobacco	3	393
Caffeine	Stimulant	1	93.7

Wastewater Compound	Use	Number of Detections (Out of 6)	Highest Detection (ng/L)
Camphor	Topical analgesic and anesthetic	2	376
<i>p</i> -Cresol	Found in gut bacteria and wood preservatives	5	11,600
Indole	Occurs naturally in human feces, constituent of perfume	3	220
4- <i>t</i> -Octylphenol	Used in plasticizers, dyes, fungicides	1	42,600

Wastewater Compound Detections

2018 data still to come



Other Shelter Island WQ data - *highlights*

- ▶ Strawberry Ln well is part of larger Long Island monitoring network (Sentinel)
- ▶ 2016 - 2018 collection period
- ▶ Inorganics, pesticides, some VOCs, and PFAS
- ▶ Detections include:
 - ▶ Bromacil (weed killer); 1 detection below MDL
 - ▶ No VOCs (1,4-dioxane or MTBE)
 - ▶ PFHxA; 9 ng/L

Shelter Island shallow groundwater quality summary

- ▶ Current baseline conditions indicate most wells have some anthropogenic influence (elevated nitrogen, pharmaceutical detections)
- ▶ Most recent nitrate water-quality analysis (2016-2018) agrees with SCDHS/NP&V nitrate model
- ▶ Total nitrogen concentrations, number of pharmaceutical detections, and land-use are relatable.
- ▶ Areas with elevated nitrogen concentrations but no pharmaceutical detections may be affected by other land-use applications or atmospheric sources.

For more information:

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