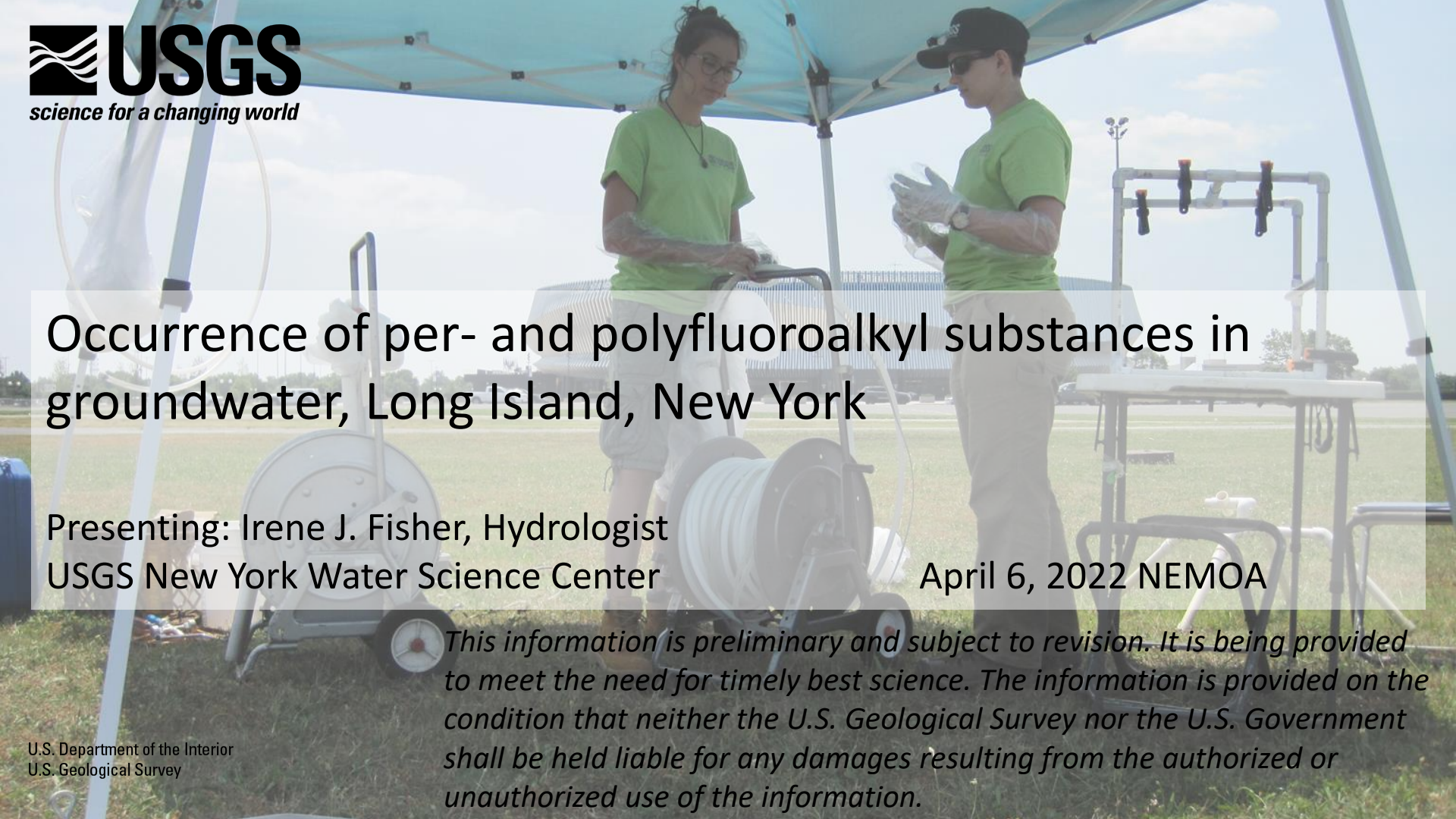


USGS
science for a changing world

Occurrence of per- and polyfluoroalkyl substances in groundwater, Long Island, New York

Presenting: Irene J. Fisher, Hydrologist
USGS New York Water Science Center

April 6, 2022 NEMOA

U.S. Department of the Interior
U.S. Geological Survey

Police & Fire

Hampton Bays Fire Department Listed As Superfund Site

The site "poses a significant threat to public health and/or the environment;" DEC says.

By Lisa Finn, Patch Staff | Mar 1, 2019 7:31 pm ET

Like 277 Share

A remedial investigation of the newly designated Superfund site is expected to begin this month. (Patch file photo.)

Politics & Government

Water Quality Advisory For Private Well Owners In East Quogue

The former Damascus Road landfill, located at the end of Damascus Road in East Quogue, is currently being evaluated.

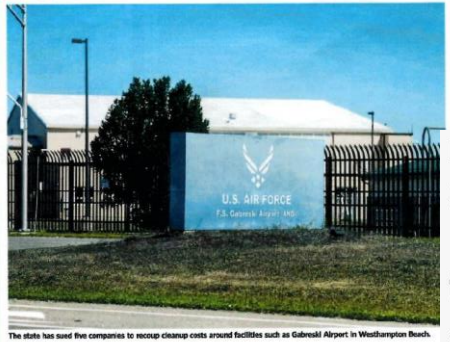
By Lisa Finn, Patch Staff | Apr 11, 2018 5:11 pm ET [Westhampton-Hampton Bays Patch]

LONG ISLAND

Chemical from Brookhaven lab may have spread to residential wells

Brookhaven National Laboratory's advisory council has recommended 97 properties in East Yaphank south of the Upton lab be tested for a chemical that was in firefighting foams once used at the lab.

High levels … al Laboratory. This photo is fro…



The state has sued five companies to recoup cleanup costs around facilities such as Gabreski Airport in Westhampton Beach.

tainted water

Chemicals in groundwater seen as serious health threat

GORDON M. GRANT

Traces of two cancer-linked chemicals have been detected.

New tests for

FACT SHEET … Program

Receive Site Fact Sheets by *Email*. See "For More Information" to Learn

Suffolk County Firematics
152246
676 Maple Street
Yaphank, NY 11980

Have ques… See "Who to Co… Below

LONG ISLAND / SUFFOLK

Well testing ordered in Islip after contaminant found

MacArthur Airport was listed as a possible Superfund site in January, shortly after perfluorooctane sulfonate, or PFOS, was found in a nearby well.

LONG ISLAND / SUFFOLK

State: Dozens of well owners in East Patchogue, Medford should have wate… tested

Suffolk County announced the new tests two days after a state panel missed a deadline in state law to recommend safe drinking level standards for the contaminants.

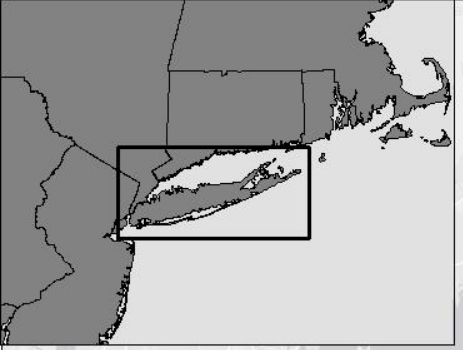
PFAS in Long Island Groundwater

Photo credit: wellversedfamily.tateauthor.com

- Long history of land development—agriculture, industry, residential density, urban sprawl from NYC
- Reconnaissance study of occurrence in GW; not focused on highly contaminated sites
- Water-resource managers are concerned over wastewater as a source of PFAS
- Can we use other CECs (pharms or pests) as source identifiers?
- We live on top of our sole-source aquifer

USGS

2018-2020 PFAS monitoring well locations



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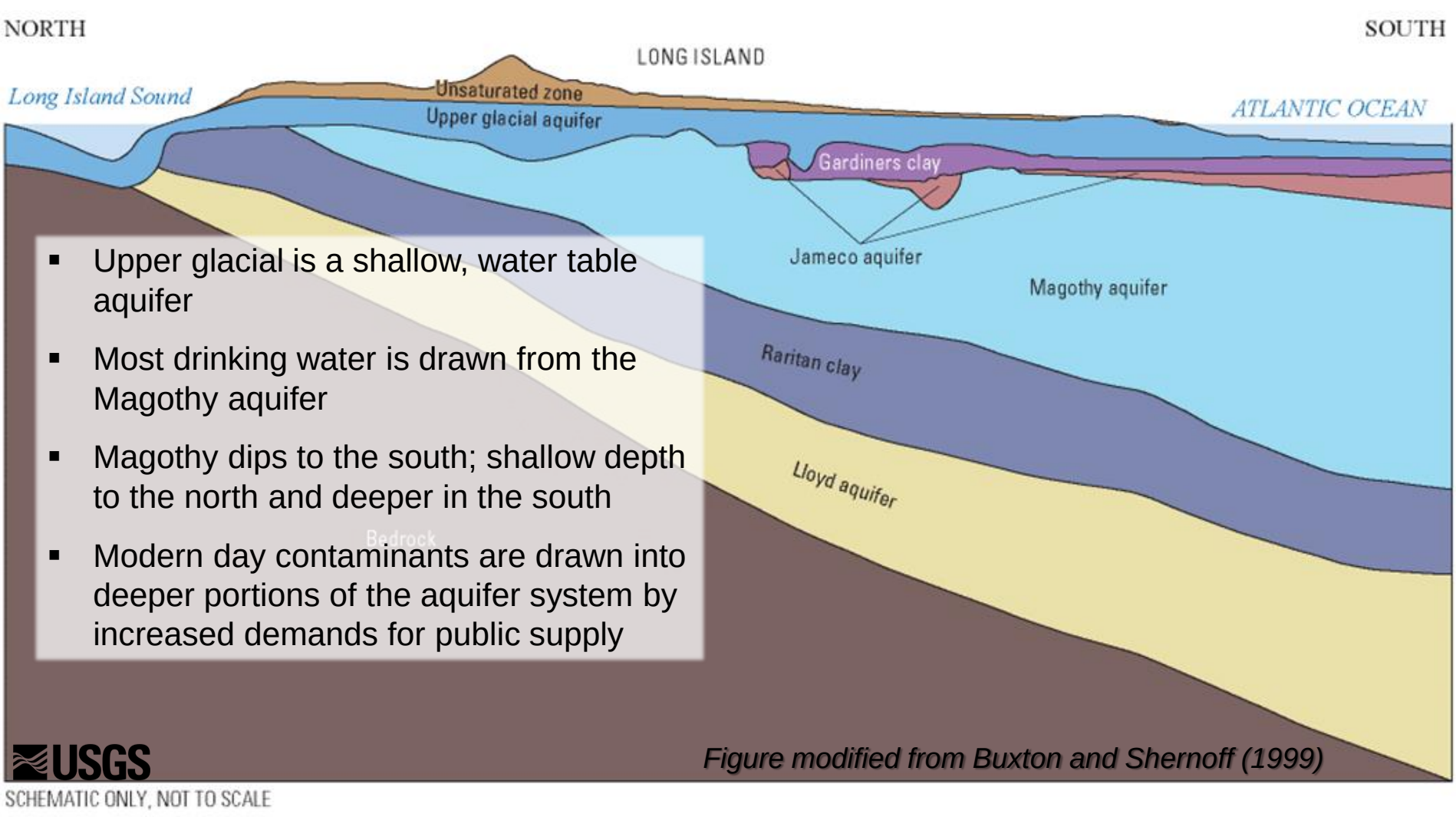


- Upper glacial is a shallow, water table aquifer
- Most drinking water is drawn from the Magothy aquifer
- Magothy dips to the south; shallow depth to the north and deeper in the south
- Modern day contaminants are drawn into deeper portions of the aquifer system by increased demands for public supply

Figure modified from Buxton and Shernoff (1999)

2018-2020
PFAS monitoring in Long Island GW

Upper Glacial, shallow: 45 shallow monitoring wells
- Screen zone is within 50 feet of the water-table
- Residential, mix-use land settings
- Onsite wastewater disposal systems (OWDS)

Magothy, intermediate: 20 monitoring wells
- Primary drinking water aquifer
- *All collected from Nassau County*; more urban than Suffolk County
- Screen zone anywhere between 54-525 ft below LSD

Sewage Treatment Plant network: 3 different plants
- STPs discharge to groundwater
- 7 monitoring wells surrounding leach fields of STPs
- Screened 20 to 40 feet below land-surface

USGS

Photo credit: I. Fisher, USGS

- Approximately 75% of residents in Suffolk County use an OWDS
- Many homes use a simple series of leaching pools for waste disposal
- Updated systems include a septic tank and a series of leaching pools or a drain field

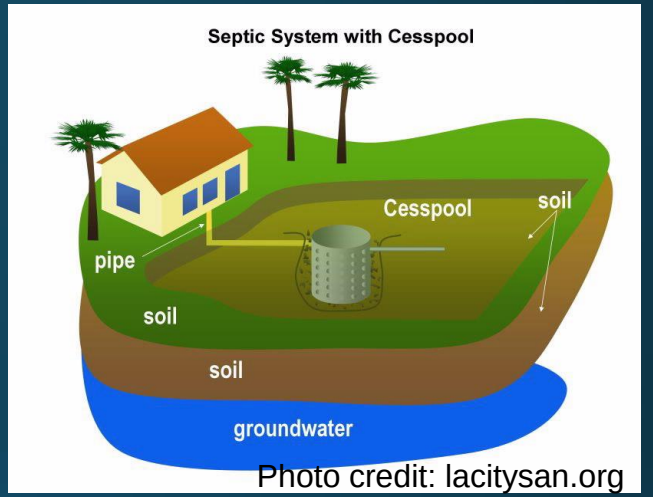


Photo credit: lacitysan.org

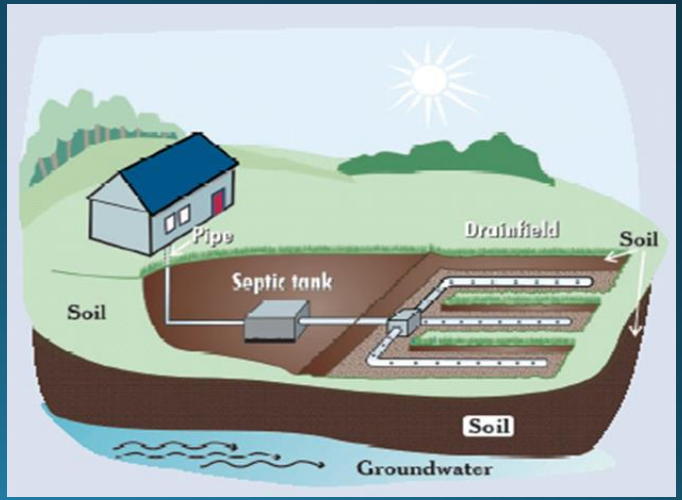


Photo from: co.Thurston.wa.us/health/ehoss/se[tic_basics.html

USGS

Decentralized wastewater treatment effluent is reflective of the population served

- Apartment complex
- Strip mall
- Assisted living & hotel

Photo from: https://blog.epa.gov/tag/wastewater-treatment/ accessed on April 19, 2018

USGS

2018-2020 Long Island PFAS monitoring results

Photo credit: USGS

nanogram per liter = parts per trillion

USGS

Up to 28 different PFAS compounds analyzed

Upper glacial well network:

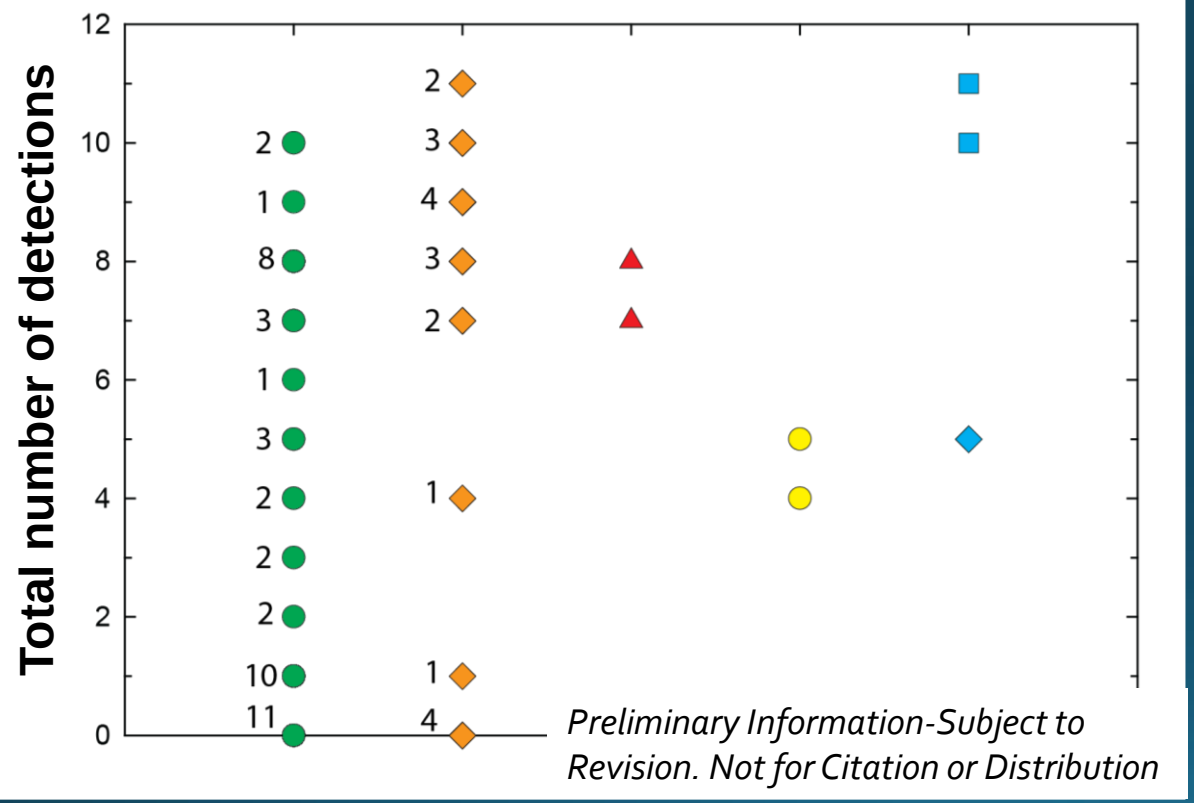
- 34 of 45 wells had at least 1 PFAS detected
- Range: 1.1 (PFBS) to 93 ng/L (PFHxA)

Magothy well network:

- 16 of 20 wells had at least 1 PFAS detected
- Range: 1.0 (PFDA & PFPeS) to 52 ng/L (PFOS)

STP well network:

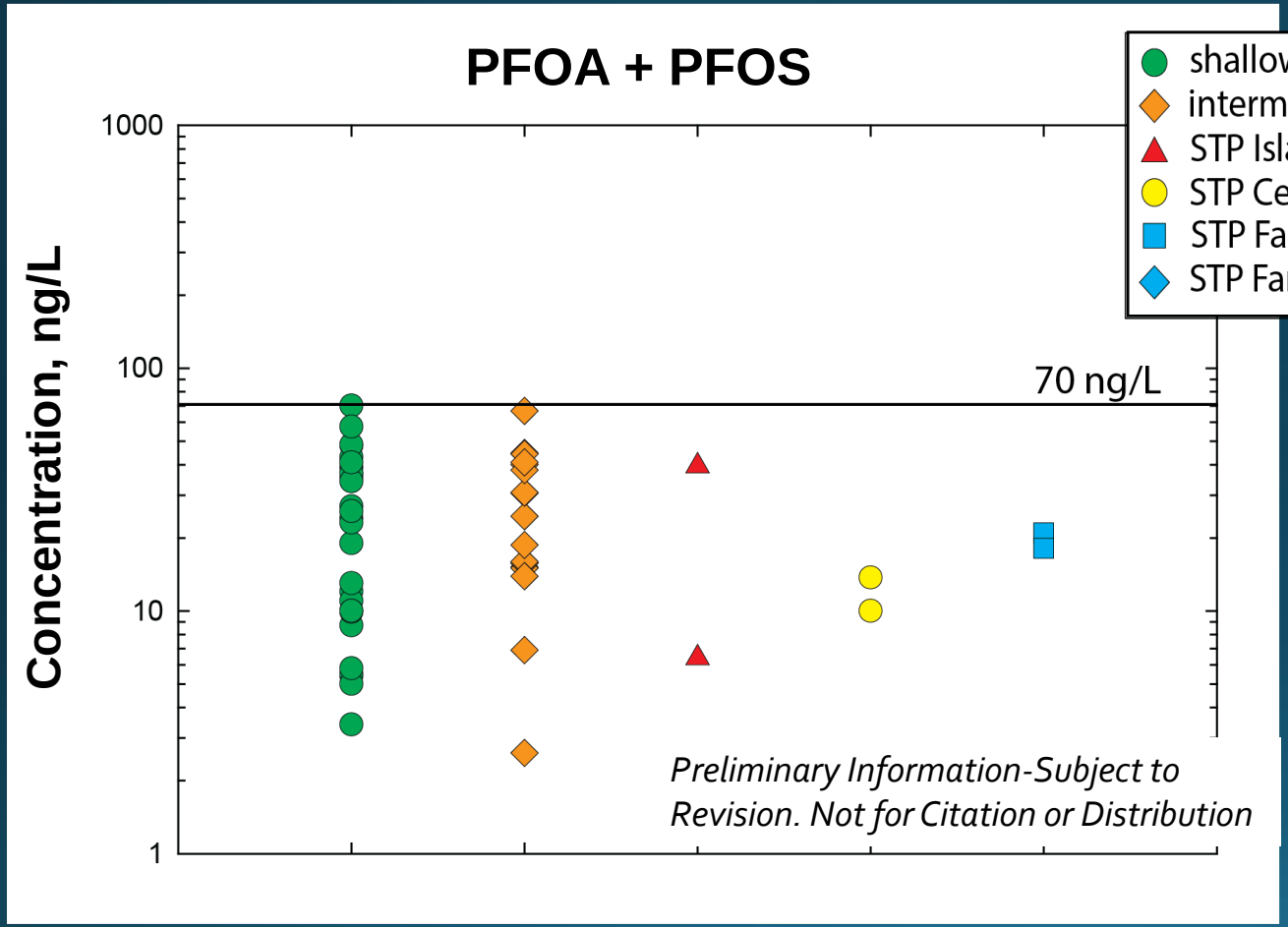
- At least 4 PFAS detected in each well
- PFBA, PFPeA & PFHxA detected in each STP monitoring well
- Range: 5 (PFDA) to 620 ng/L (PFPeA)



3 number of sites
shallow, upper glacial aquifer
intermediate, Magothy aquifer
STP Islandia - commercial
STP Central Islip - residential
STP Farmingville - assisted living & hotel
STP Farmingville - upgradient

- Ambient GW in Long Island aquifers ranged in 0 to 11 detects of PFAS
- STP Farmingville had the greatest variety in PFAS detections of the 3 STPs

USGS



- Most samples are below the 70ng/L EPA HAL for PFOA + PFOS
- Ambient GW in Long Island urban/suburban settings are close to EPA HAL

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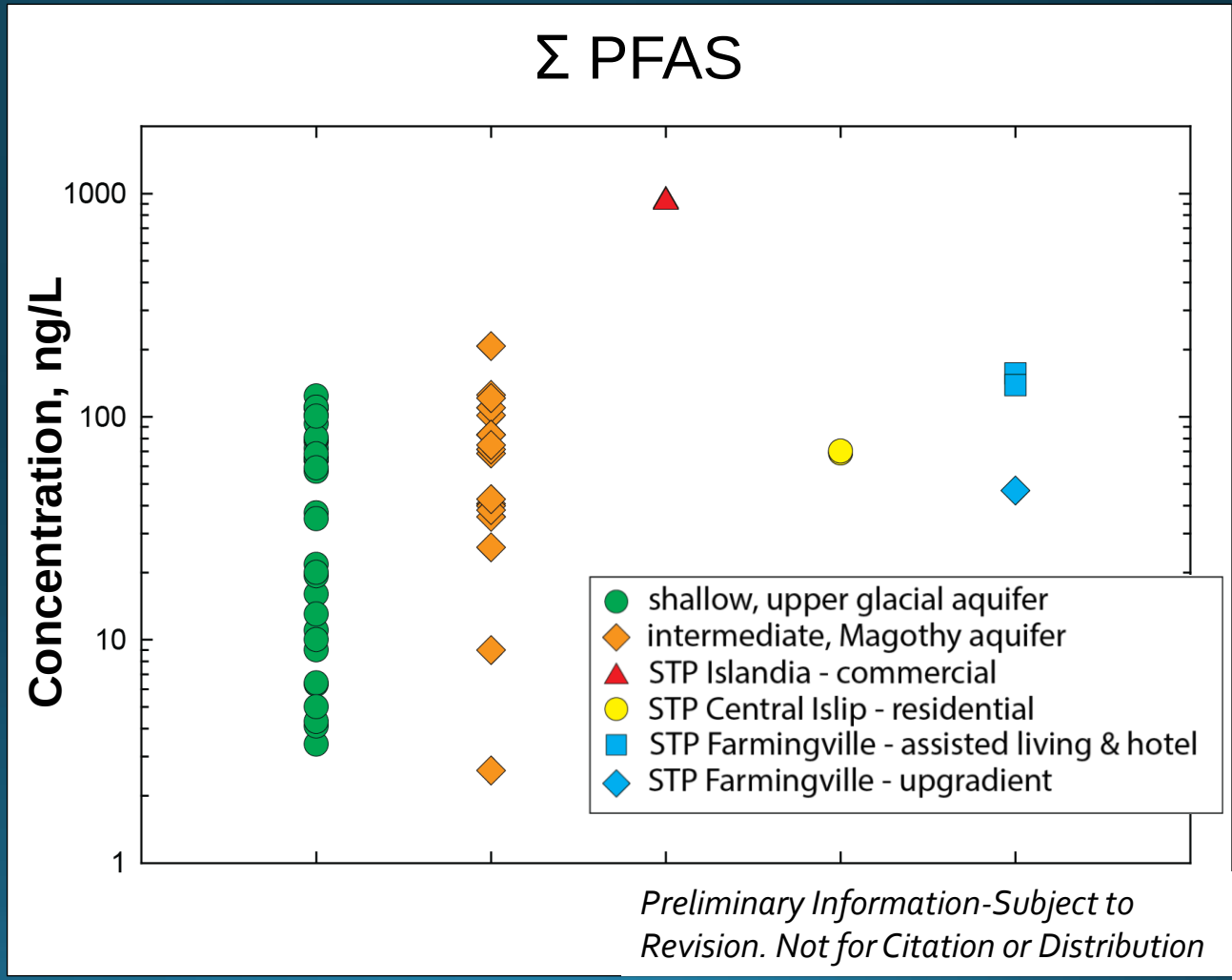
STP Farmingville – assisted living & hotel
upgradient
downgradient
rehabilitation
assisted living
hotel
USGS


STP Farmingville – assisted living & hotel
upgradient
downgradient
leach field
STP
rehabilitation
hotel
assisted living
USGS

- Σ [PFAS] downgradient for commercial property > 900 ng/L
- Concentrations vary with land use applications
- Screening for a variety of PFAS is an important approach to understand the source and breadth of contamination



Preliminary Information-Subject to Revision. Not for Citation or Distribution

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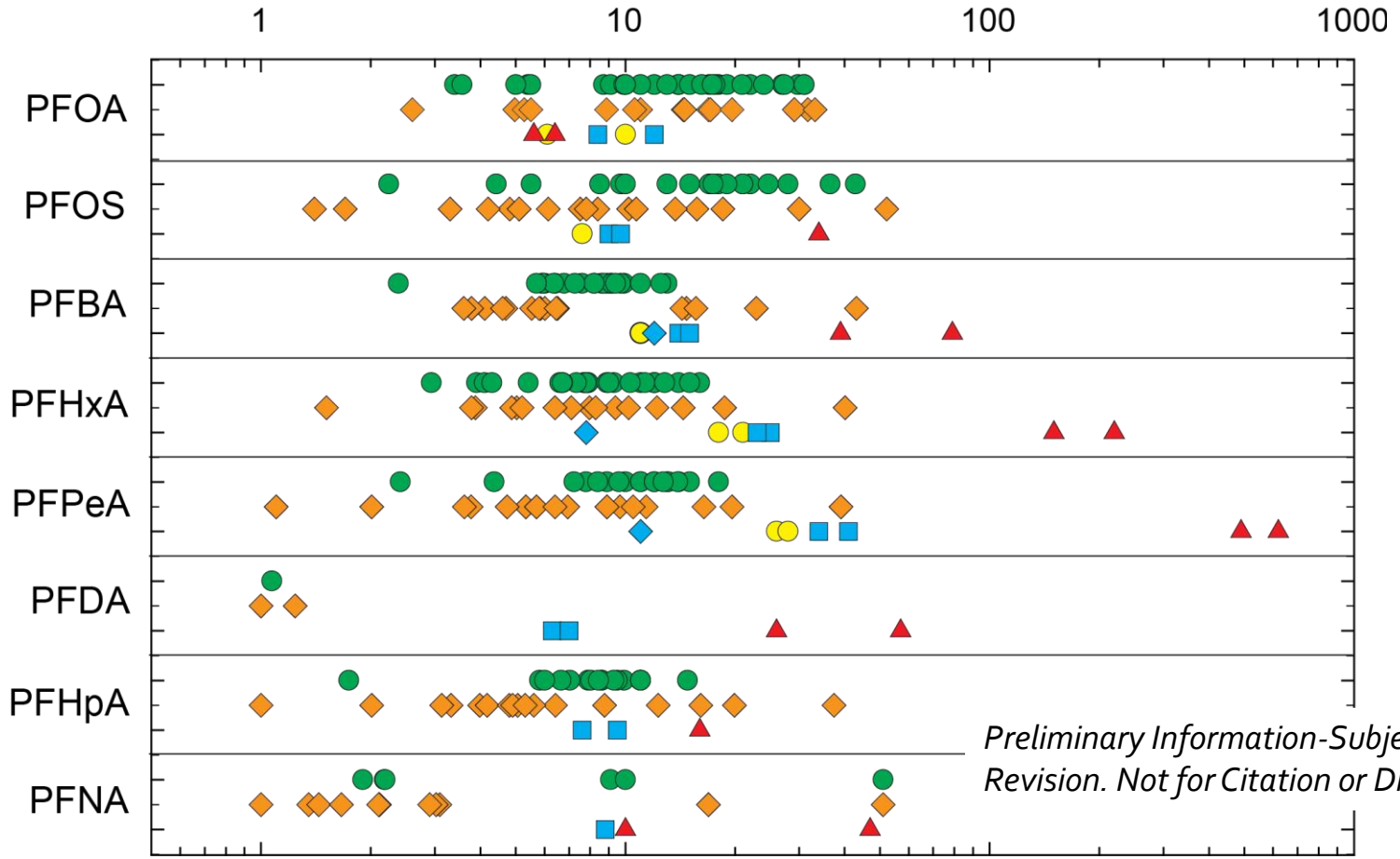
2018-2020 PFAS Concentrations, ng/L



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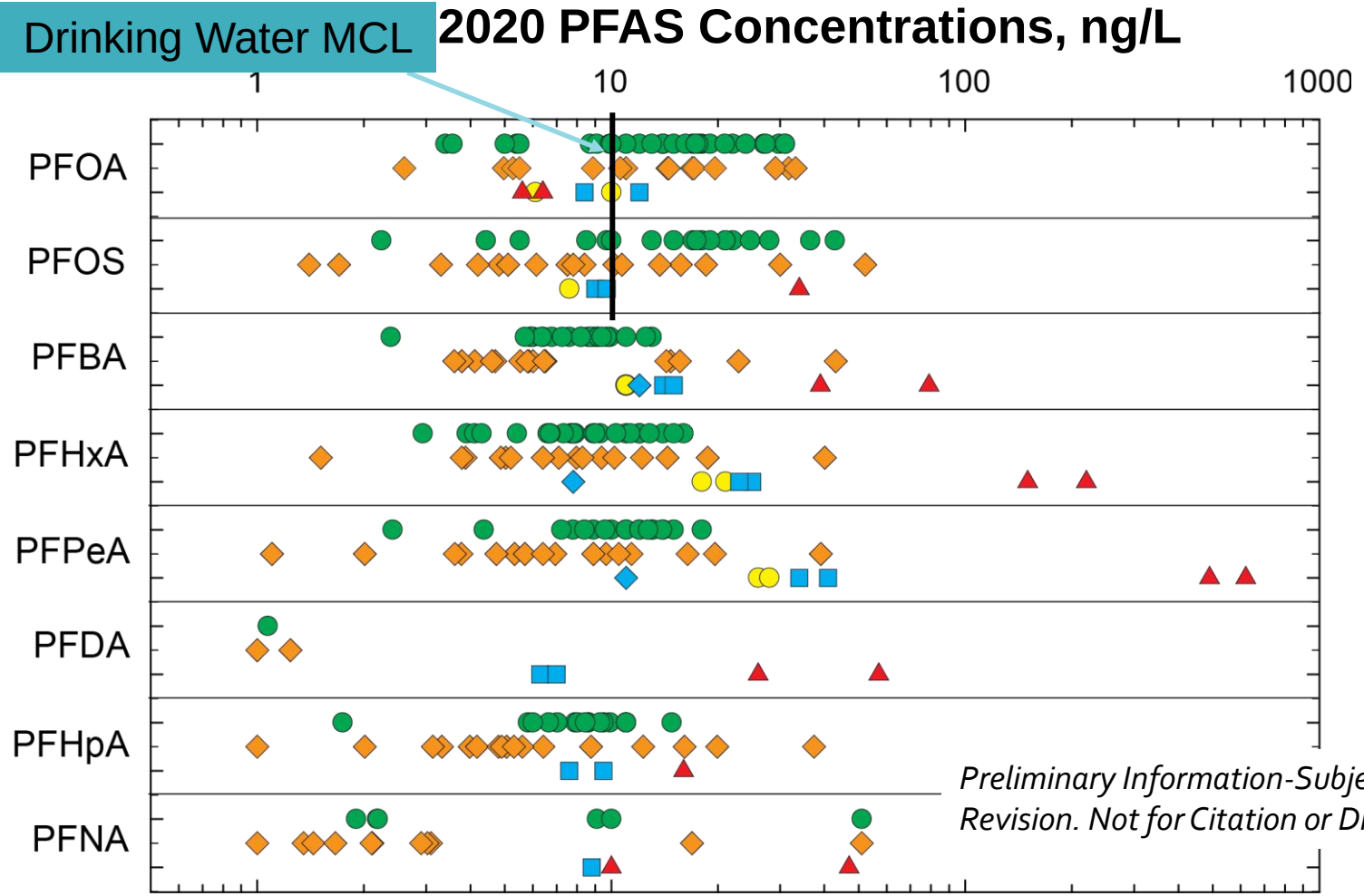
NYS Drinking Water MCL



Preliminary Information-Subject to Revision. Not for Citation or Distribution

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Quality Assurance/Quality Control

- Each network required some modification to traditional sampling methods

- Extra QAQC samples collected to build confidence in sampling methods – insure we are collecting an accurate representation of PFAS contamination within the environment

Photo credit: I. Fisher, USGS

USGS

Quality Assurance/Quality Control – *shallow network*

- Submersible pump outfitted with HDPE tubing
- PTFE ware rings soaked 2 weeks in PFAS-free water

- 3 equipment blanks; start, midway & end
  - DIW source solution
  - PFAS-free water source solution
- 7 field blanks; ~ 5th environmental sample
  - DIW source solution
  - PFAS-free water source solution

Photo credit: I. Fisher, USGS

USGS

Quality Assurance/Quality Control – *shallow network*

- Submersible pump outfitted with HDPE tubing
- PTFE ware rings soaked 2 weeks in PFAS-free water

- 3 equipment blanks; start, midway & end
  - DIW source solution
  - PFAS-free water source solution
- 7 field blanks; ~ 5th environmental sample
  - DIW source solution
  - PFAS-free water source solution

Photo credit: I. Fisher, USGS

All clean

USGS

Quality Assurance/Quality Control – *intermediate network*

Photo credit: I. Fisher, USGS

- Submersible pump outfitted with PVC pipe
- Equipment blanks before and after field season
  - Tap water from garden hose
  - DIW source solution
  - PFAS-free water source solution
- Replicate samples to quantify variability in samples
- Scrutinized review of laboratory QAQC
  - IDS recoveries
  - Lab blanks
  - Matrix spikes
  - Lab duplicates

USGS

Tap water has minor PFAS contamination, likely from garden hose

2018-2020 Long Island groundwater PFAS Summary

- PFOA, PFOS, and other PFAS are present in Long Island shallow GW
- Most PFOA & PFOS concentrations are below the EPA health advisory of 70 ng/L for drinking water
- Some monitoring sites exceed NYS Drinking Water MCL of 10 ng/L for PFOA & PFOS
- The variety and concentration of detected PFAS is related to land use
- Greatest variety in PFAS was found at the STP site for assisted living & hotel properties and in urban land-use settings in Nassau County
- Highest ΣPFAS was found at the STP for a strip mall (commercial property)

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LICAP
Long Island Commission for Aquifer Protection

NEW YORK STATE OF OPPORTUNITY
Department of Environmental Conservation

NASSAU COUNTY · STATE OF NEW YORK ·

SUFFOLK COUNTY SEAL · NEW YORK ·

2018 PFAS data are available online:

- Search terms: **USGS NY PFAS**

Data and Tools; download spreadsheet

https://www.sciencebase.gov/catalog/item/5ce83a73e4b0b069203704d6

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Occurrence of per- and polyfluoroalkyl substances, Long Island and New York City, New York

View

Dates

Publication Date : 2019-08-14
Start Date : 2018-04-01
End Date : 2018-10-31

Citation

Fisher, I.J., and Phillips, P.J., 2019, Occurrence of per- and polyfluoroalkyl substances, Long Island and New York City, New York: U.S. Geological Survey data release, https://doi.org/10.5066/P9CJ22DU.

Summary

State and local county health departments have detected per- and polyfluoroalkyl substances (PFAS) in groundwater downgradient of airports and military and firefighting training areas in Long Island, New York. However, the occurrence

Monitoring groundwater physical parameters prior to sampling.

USGS

Continued Monitoring—quantifying the presence, variability and concentration of PFAS

- Continued focus on Nassau County drinking water aquifer (well depth > 200 ft)
- Alternative sampling methods for deep wells in urban settings
  - Dual-membrane passive samplers

Photo credit: I. Fisher, USGS

Photo credit: USGS

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NASSAU COUNTY · STATE OF NEW YORK

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Additional PFAS Monitoring—quantifying the presence, variability and concentration of PFAS

Photo credit: I. Fisher, USGS

- Suffolk County; Assess more STPs, including fate within treatment plant
- Raw water in supply wells

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USGS NY PFAS team:
past & current

- Banu Bayraktar
- Alaina Tocci
- Pat Phillips
- Riley Behrens
- Devin Gaige
- Natalie Cheung
- Ashley Smith
- Shirley Chen
- Kate Finkelstein
- Amanda May
- Brendan McCarthy

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Photo credit: A. Tocci, USGS

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