Annual Drinking Water Symposium 2023

Welcoming Remarks and Introduction of Keynote Speaker

John Kilpatrick, P.E.

Chairman, Long Island Water Conference &
Engineering Manager, Liberty New York Water

Keynote Speaker

Dr. Christopher Gobler

Director, Center for Clean Water Technology, Stony Brook University

Stony Brook University

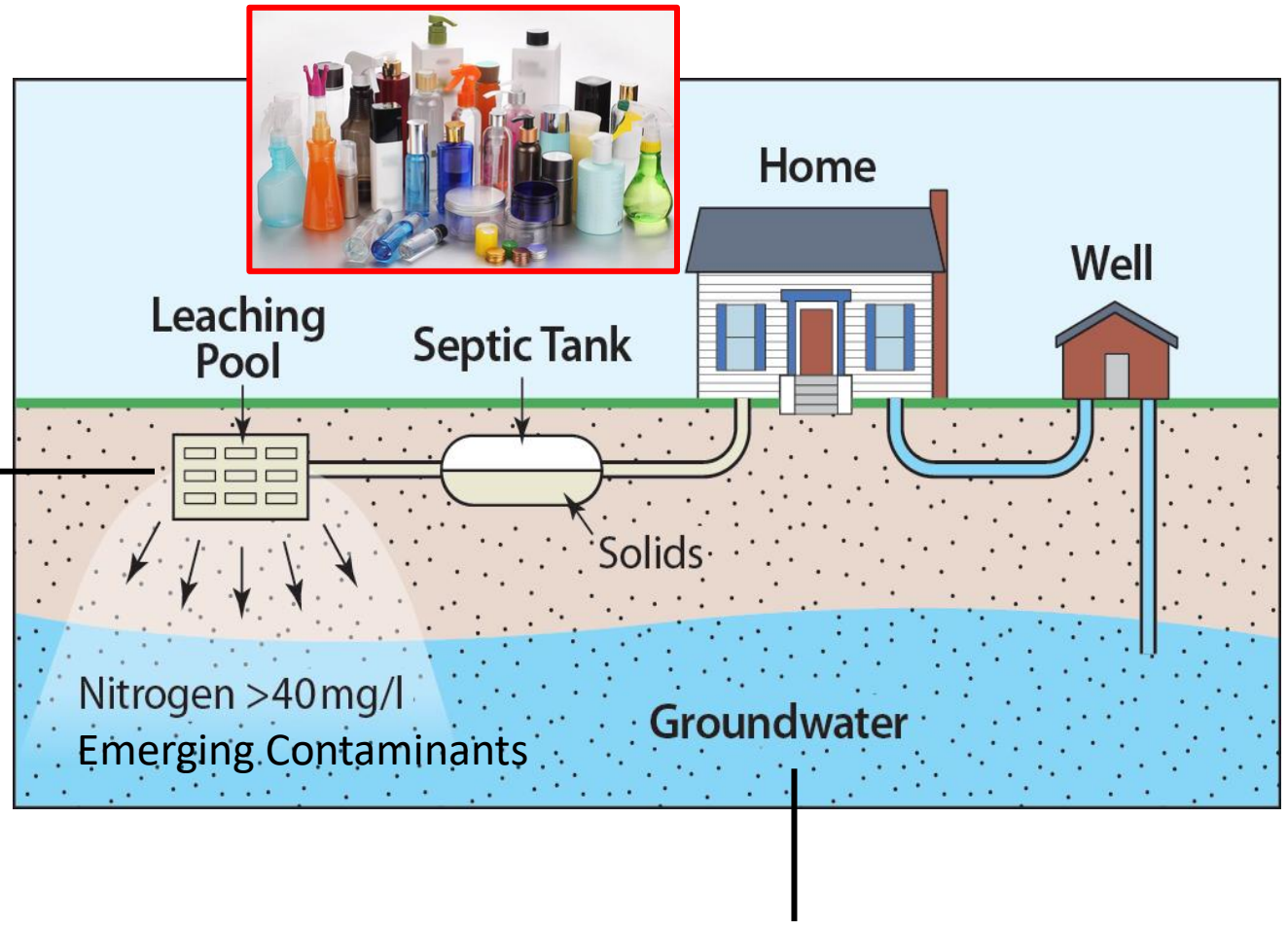
The New York State Center for Clean Water Technology:

Harnessing science to engineer clean water for the protection of public health and the environment in New York and beyond.

Director: Christopher J. Gobler

The Urban Water Cycle in Long Island, NY

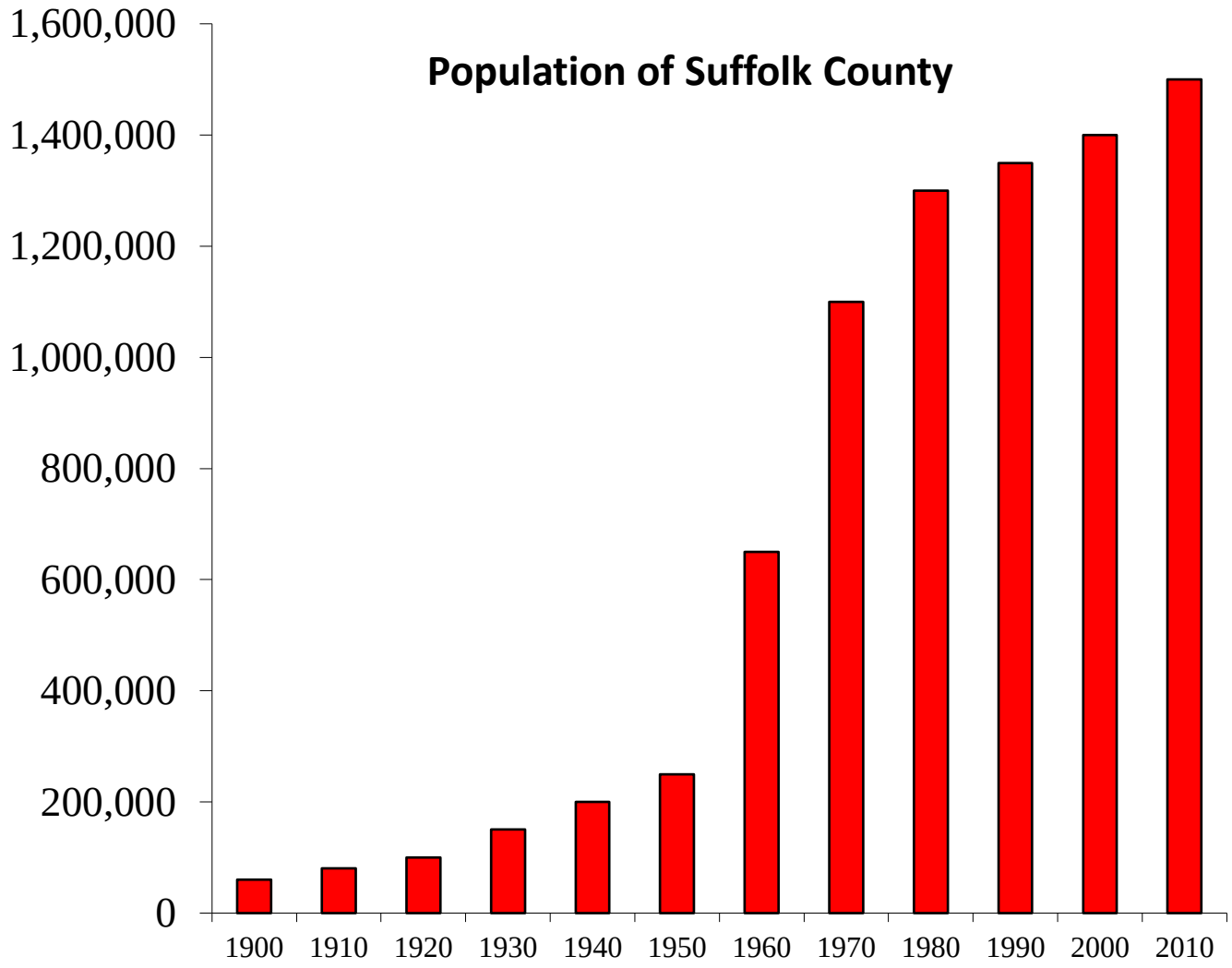
~500,000 septic tanks/cesspool in Suffolk and Nassau County; two dozen superfund sites; dozens of sewage treatment plants discharging to groundwater.

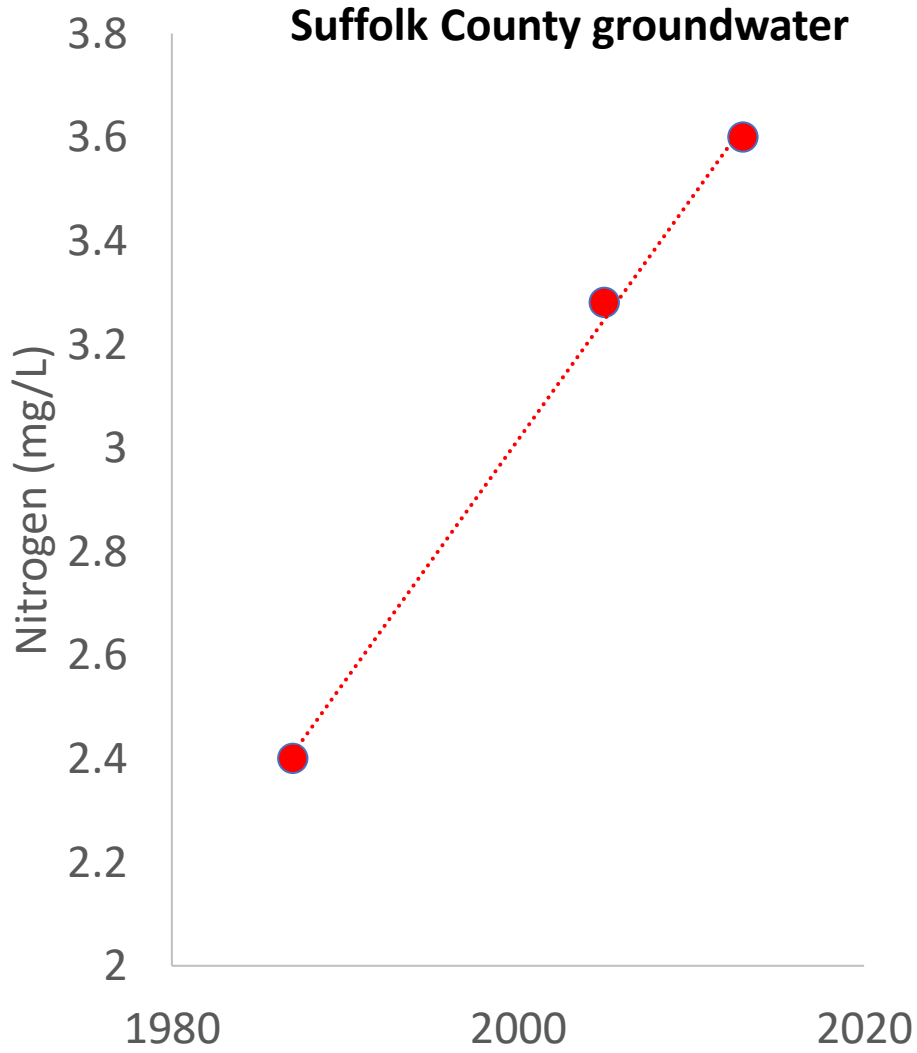


Unintentional Wastewater Reuse

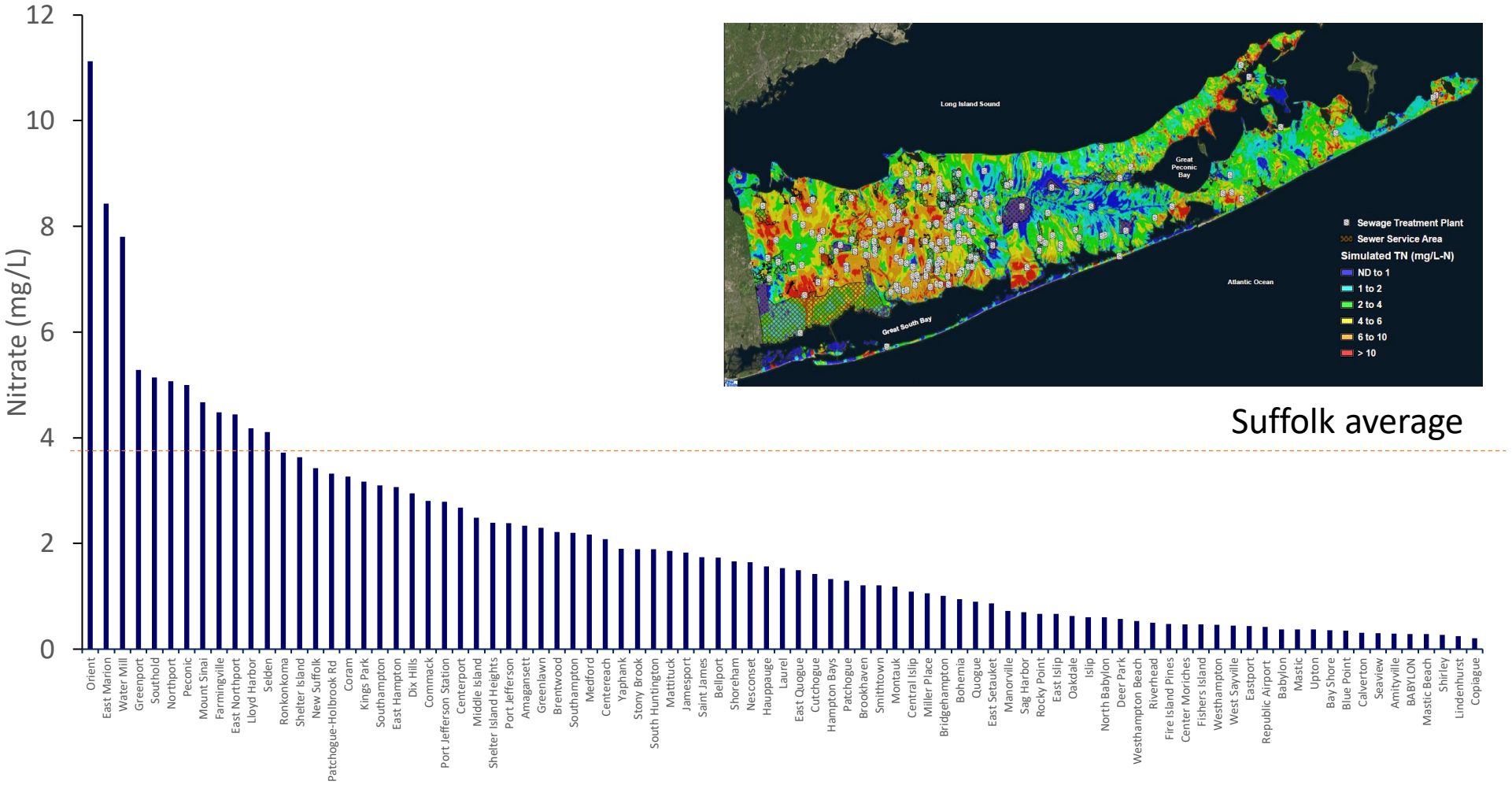
Sole source aquifer
(only source of drinking water)

Expanding population, nitrogen levels

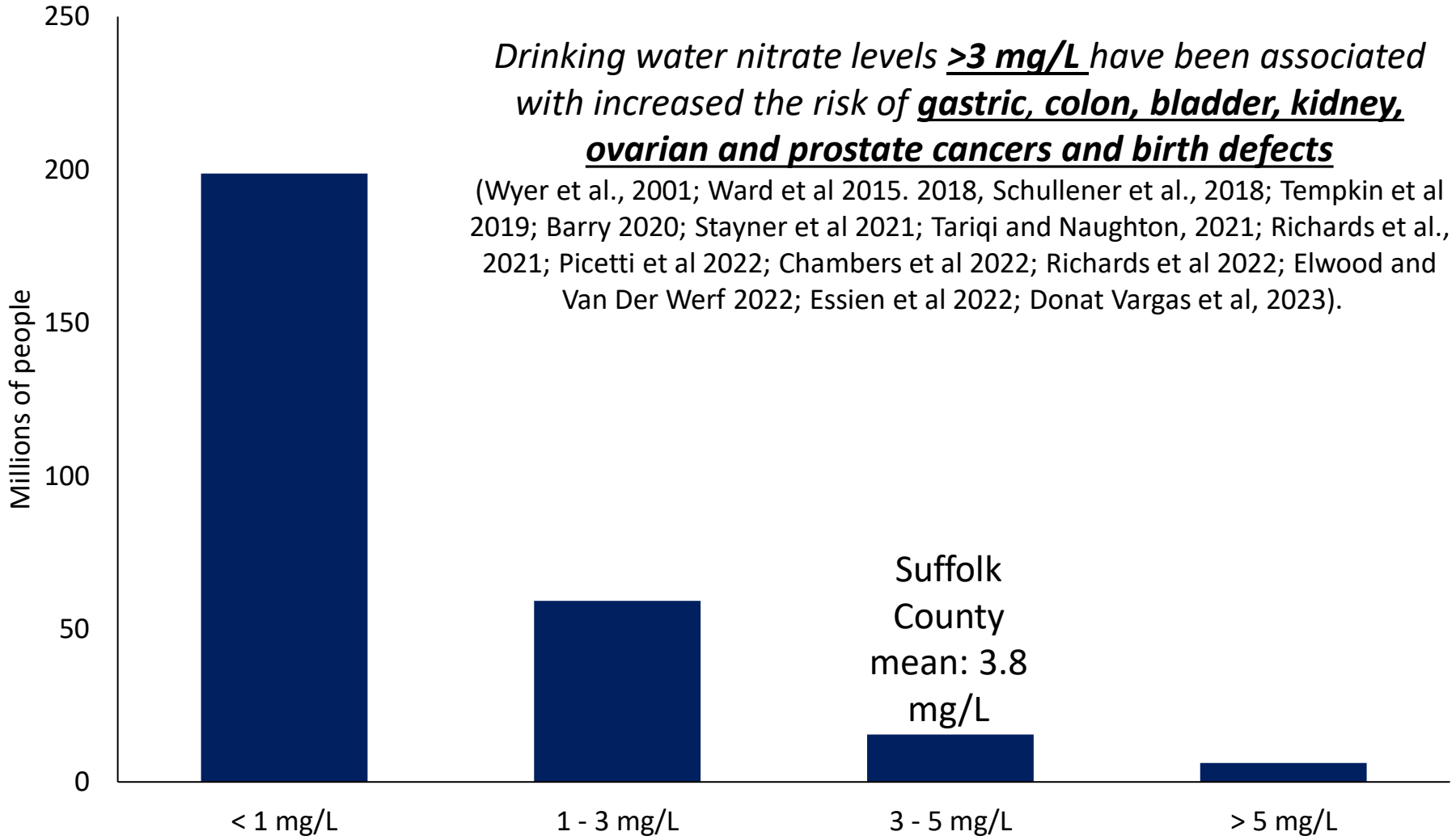




Suffolk County tap water by zip code



Suffolk County public water is in the top 5% of nitrate levels in the US



*Drinking water nitrate levels **>3 mg/L** have been associated with increased the risk of **gastric, colon, bladder, kidney, ovarian and prostate cancers and birth defects***

(Wyer et al., 2001; Ward et al 2015. 2018, Schullener et al., 2018; Tempkin et al 2019; Barry 2020; Stayner et al 2021; Tariqi and Naughton, 2021; Richards et al., 2021; Picetti et al 2022; Chambers et al 2022; Richards et al 2022; Elwood and Van Der Werf 2022; Essien et al 2022; Donat Vargas et al, 2023).

Tempkin et al 2019

Most nitrogen loading from wastewater

((Kinney and Valiela, 2011; Lloyd 2014, 2016; Gobler and Stinette, 2016; SCSWP, 2020; NCSWP, 2020, 2022)

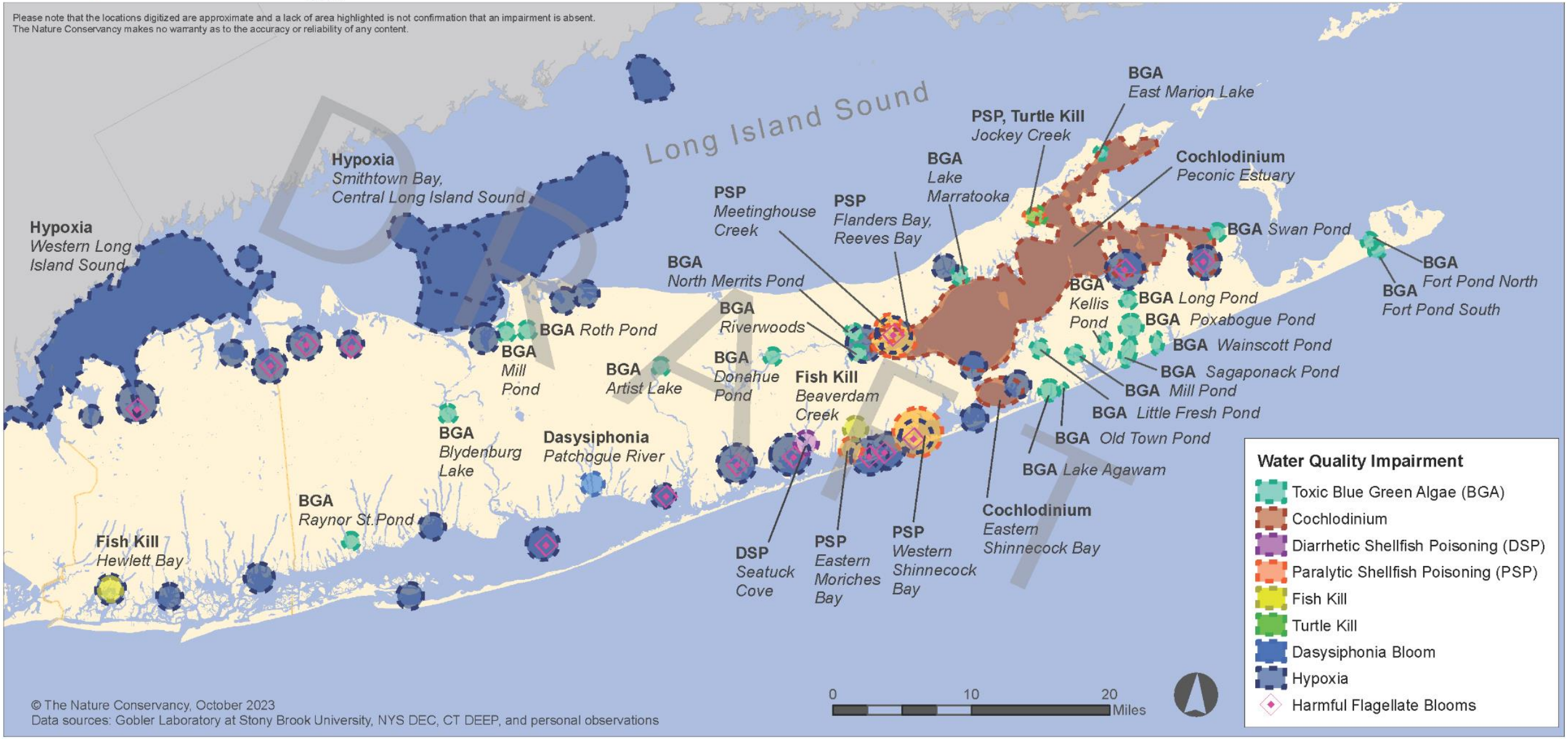
Stony Brook University
School of Marine and Atmospheric Sciences

GOBLER LABORATORY

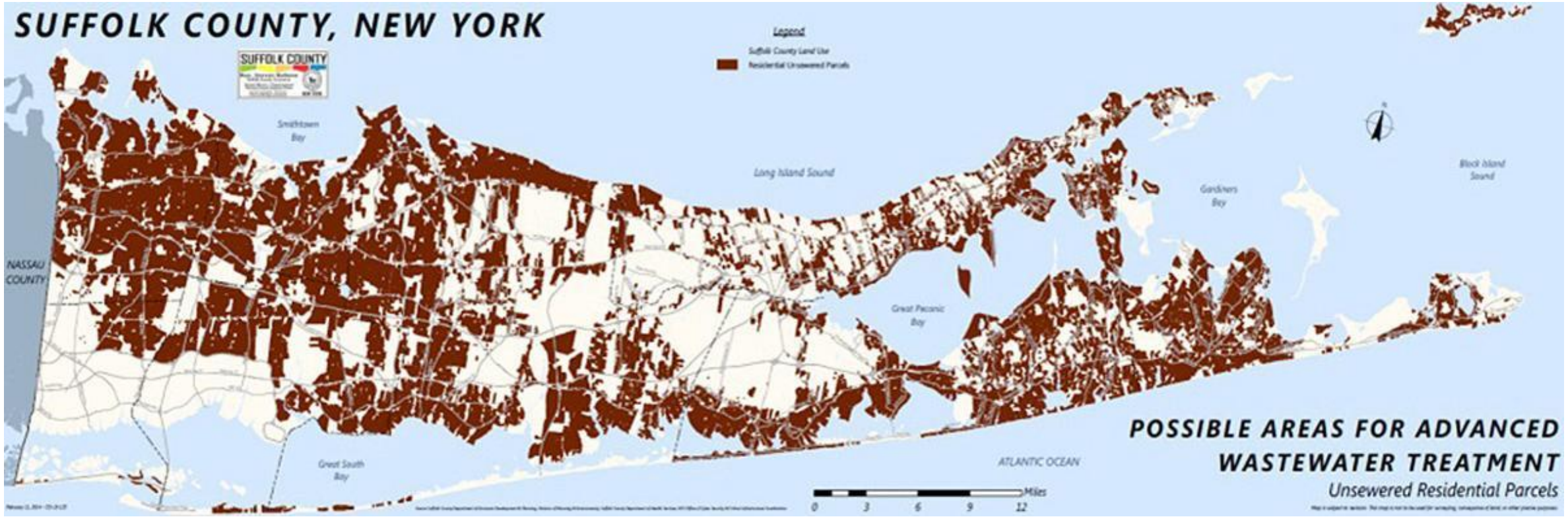
Long Island Water Quality Impairments
Summer 2023

The Nature Conservancy

Please note that the locations digitized are approximate and a lack of area highlighted is not confirmation that an impairment is absent.
The Nature Conservancy makes no warranty as to the accuracy or reliability of any content.

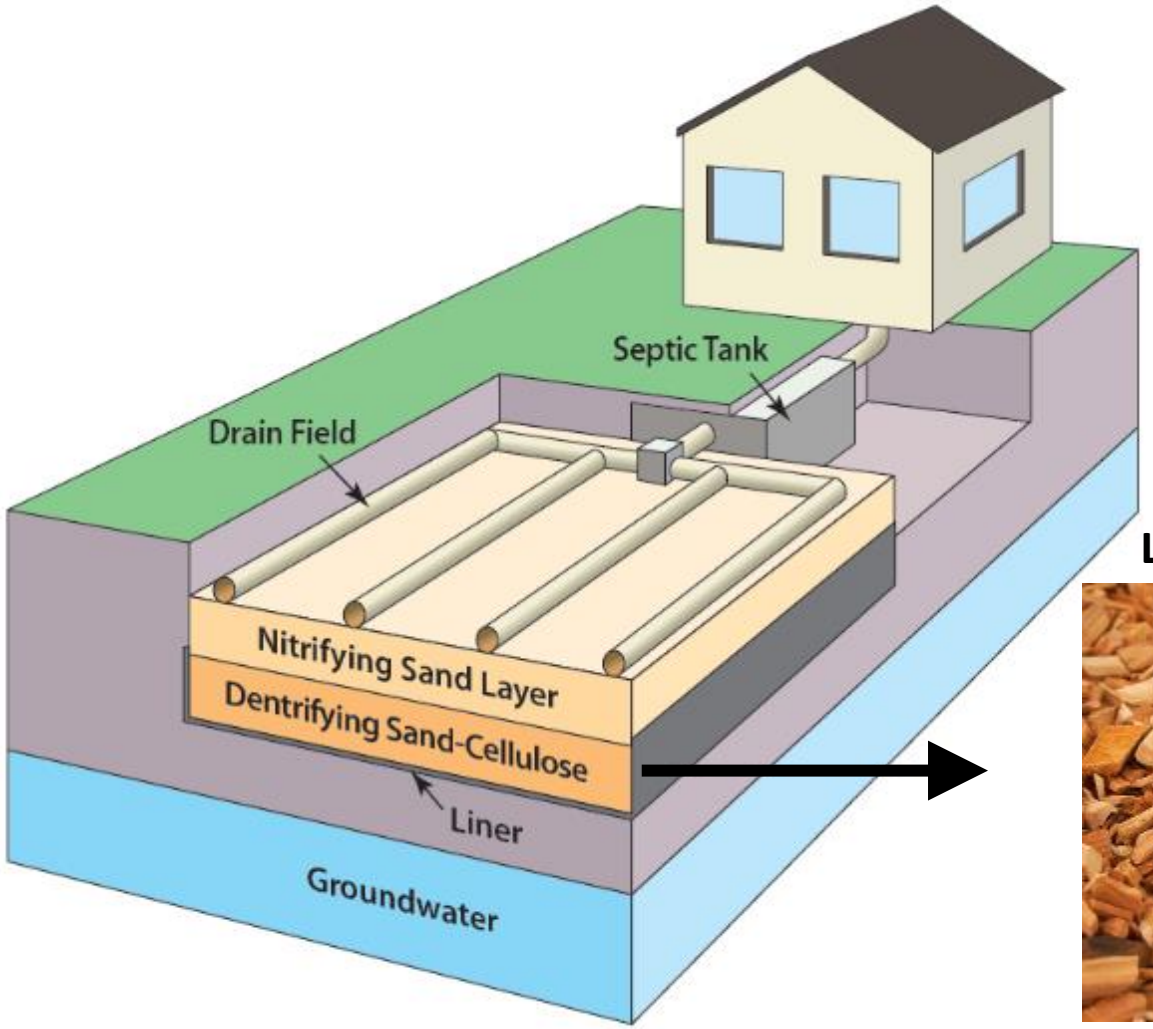


Data sources: Gobler Laboratory at Stony Brook University, NYS DEC, CT DEEP, and personal observations



- Approximately 360,000 onsite sewage disposal system: septic tanks and cesspool
- Additional 50,000 in Nassau County

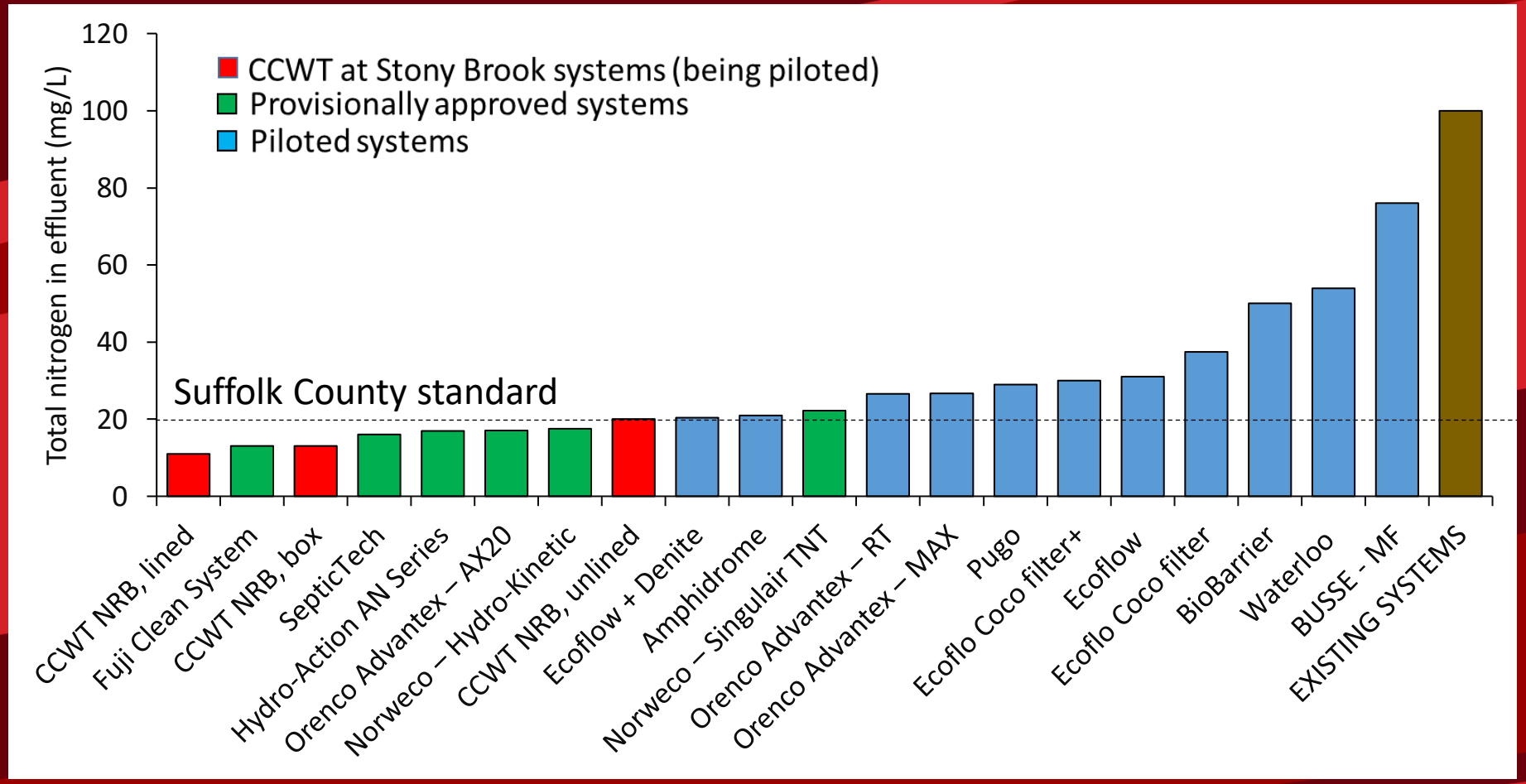
Nitrogen Removing Biofilters (NRB)



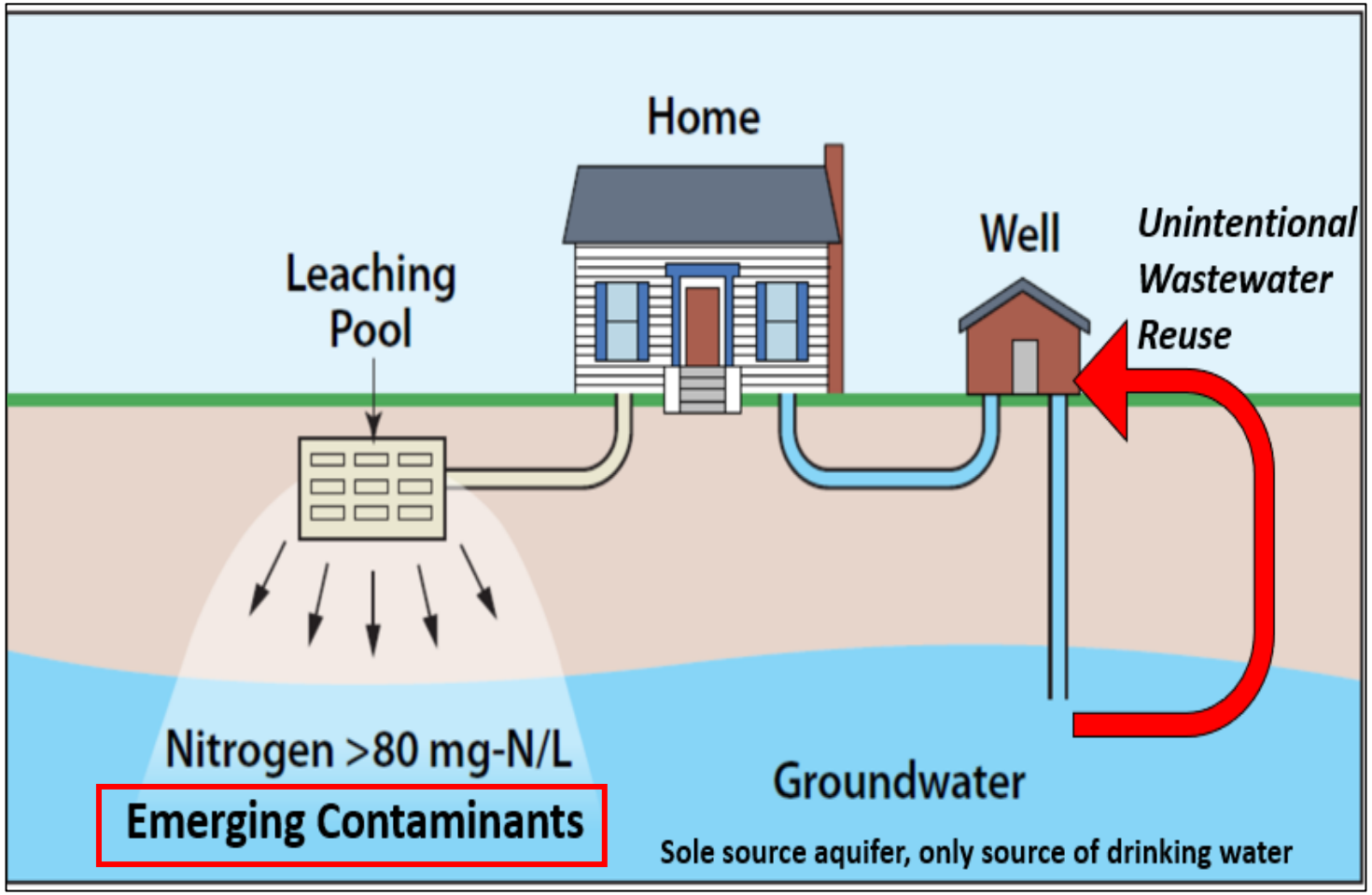
Lignocellulose = wood, chips

Carbon source to promote denitrification

Comparison of I/A performance in Suffolk County



Wastewater contains more than nitrogen



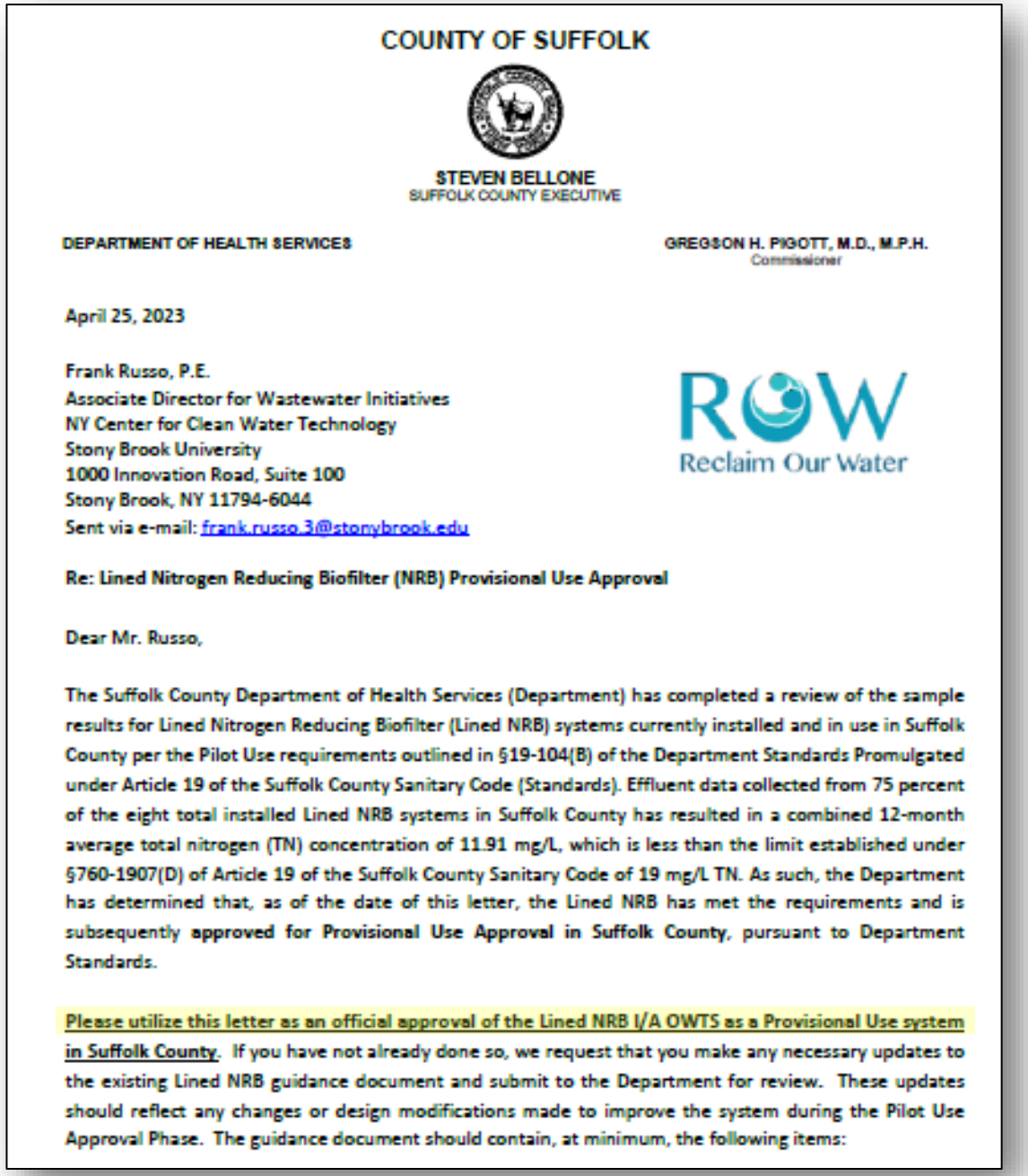
NRBs remove 50 – 100% of 25 drugs, pharmaceuticals, personal care products, and solvents

Compound	Use	Removal (%)
1,4-dioxane	solvent	60%
Acetaminophen	NSAID	94 – 100
Caffeine	stimulant	99 – 100
Paraxanthine	human metabolite of caffeine	98 – 99
DEET	mosquito repellant	82 – 96
Nicotine	stimulant	92 – 97
Cotinine	human metabolite of nicotine	86 – 98
Sulfamethoxazole	antibiotic	85 – 97
Diphenhydramine	antihistamine	97 – 95
Trimethoprim	antibiotic	87 – 90
Ciprofloxacin	antibiotic	64 – 78
Atenolol	beta blocker	88 – 97
Metoprolol	beta blocker	85 – 90
Diltiazem	calcium channel blocker	76 – 90
Carbamazepine	anticonvulsant	51 -60
Ketoprofen	NSAID	68 – 74
TCEP	flame retardant	60 – 70
Salbutamol	bronchiodialator	50 – 78
Ranitidine	anti-acid	82 – 100
Diclofenac	NSAID	76
Propranolol	beta blocker	98 – 100
Venlafaxine	antibiotic	98
Fluoxetine	antidepressant (SSRI)	64 – 66
Lamotrigine	anticonvulsant	82
Primidone	anticonvulsant	58

Venkatesan et al., 2021; Sci. Total Environ.
Clyde et al 2021, Water Research

- Nitrogen Removing Biofilters have been approved for provisional use in Suffolk County.

- Installations offered by
  - A&A Sewer and Drain,
  - Excav Services,



COUNTY OF SUFFOLK

STEVEN BELLONE
SUFFOLK COUNTY EXECUTIVE

DEPARTMENT OF HEALTH SERVICES

GREGSON H. PIGOTT, M.D., M.P.H.
Commissioner

April 25, 2023

Frank Russo, P.E.
Associate Director for Wastewater Initiatives
NY Center for Clean Water Technology
Stony Brook University
1000 Innovation Road, Suite 100
Stony Brook, NY 11794-6044
Sent via e-mail: frank.russo.3@stonybrook.edu

ROW
Reclaim Our Water

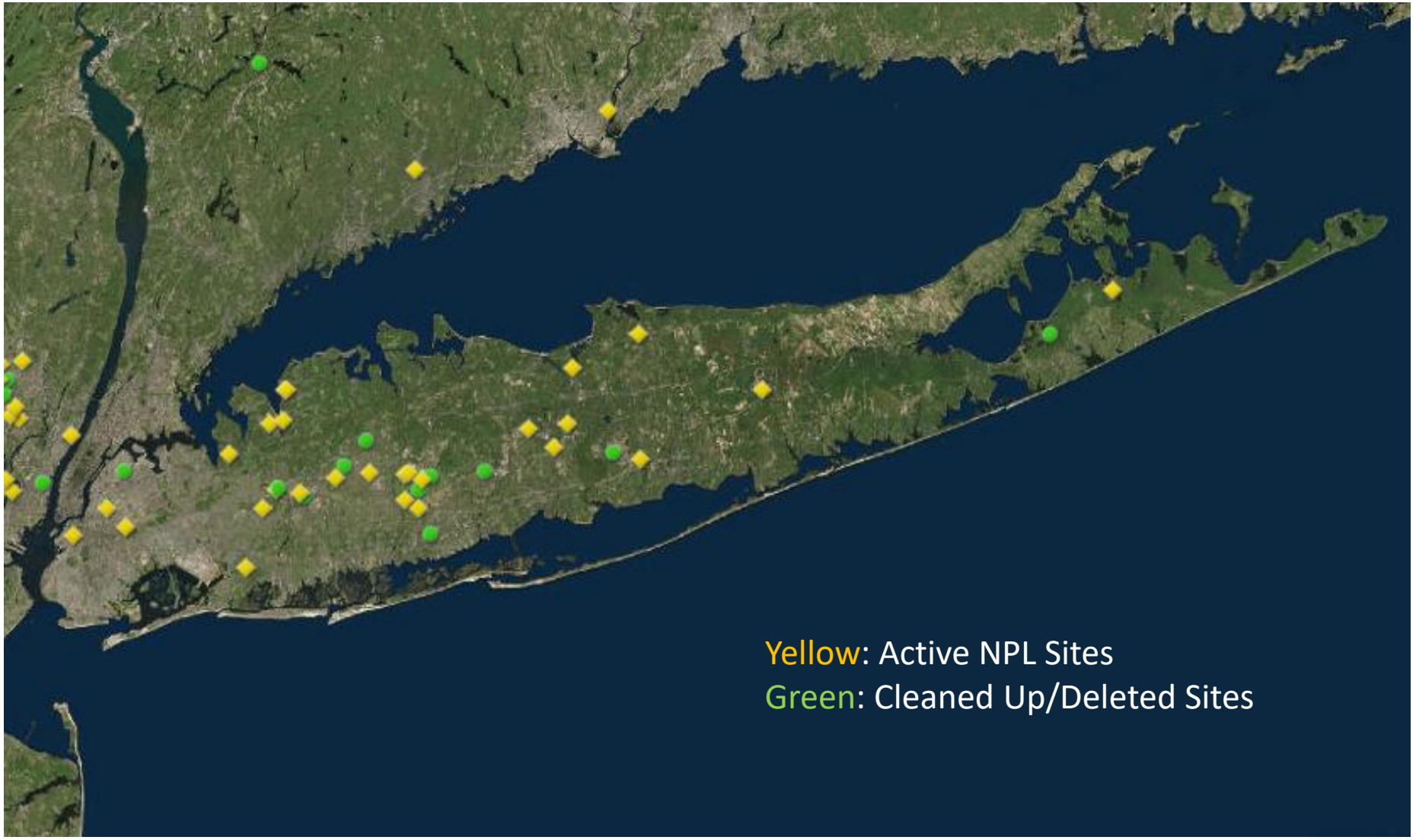
Re: Lined Nitrogen Reducing Biofilter (NRB) Provisional Use Approval

Dear Mr. Russo,

The Suffolk County Department of Health Services (Department) has completed a review of the sample results for Lined Nitrogen Reducing Biofilter (Lined NRB) systems currently installed and in use in Suffolk County per the Pilot Use requirements outlined in §19-104(B) of the Department Standards Promulgated under Article 19 of the Suffolk County Sanitary Code (Standards). Effluent data collected from 75 percent of the eight total installed Lined NRB systems in Suffolk County has resulted in a combined 12-month average total nitrogen (TN) concentration of 11.91 mg/L, which is less than the limit established under §760-1907(D) of Article 19 of the Suffolk County Sanitary Code of 19 mg/L TN. As such, the Department has determined that, as of the date of this letter, the Lined NRB has met the requirements and is subsequently **approved for Provisional Use Approval in Suffolk County**, pursuant to Department Standards.

Please utilize this letter as an official approval of the Lined NRB I/A OWTS as a Provisional Use system in Suffolk County. If you have not already done so, we request that you make any necessary updates to the existing Lined NRB guidance document and submit to the Department for review. These updates should reflect any changes or design modifications made to improve the system during the Pilot Use Approval Phase. The guidance document should contain, at minimum, the following items:

National Priorities List (**NPL**): list of hazardous waste sites in the US eligible for long-term remedial action (cleanup) financed under the federal Superfund program

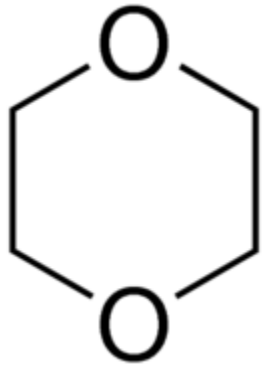


Source: https://epa.maps.arcgis.com/apps/webappviewer/index.html?id=33cebcdfdd1b4c3a8b51d416956c41f1

Immediate Concern Long Island: 1, 4-Dioxanein

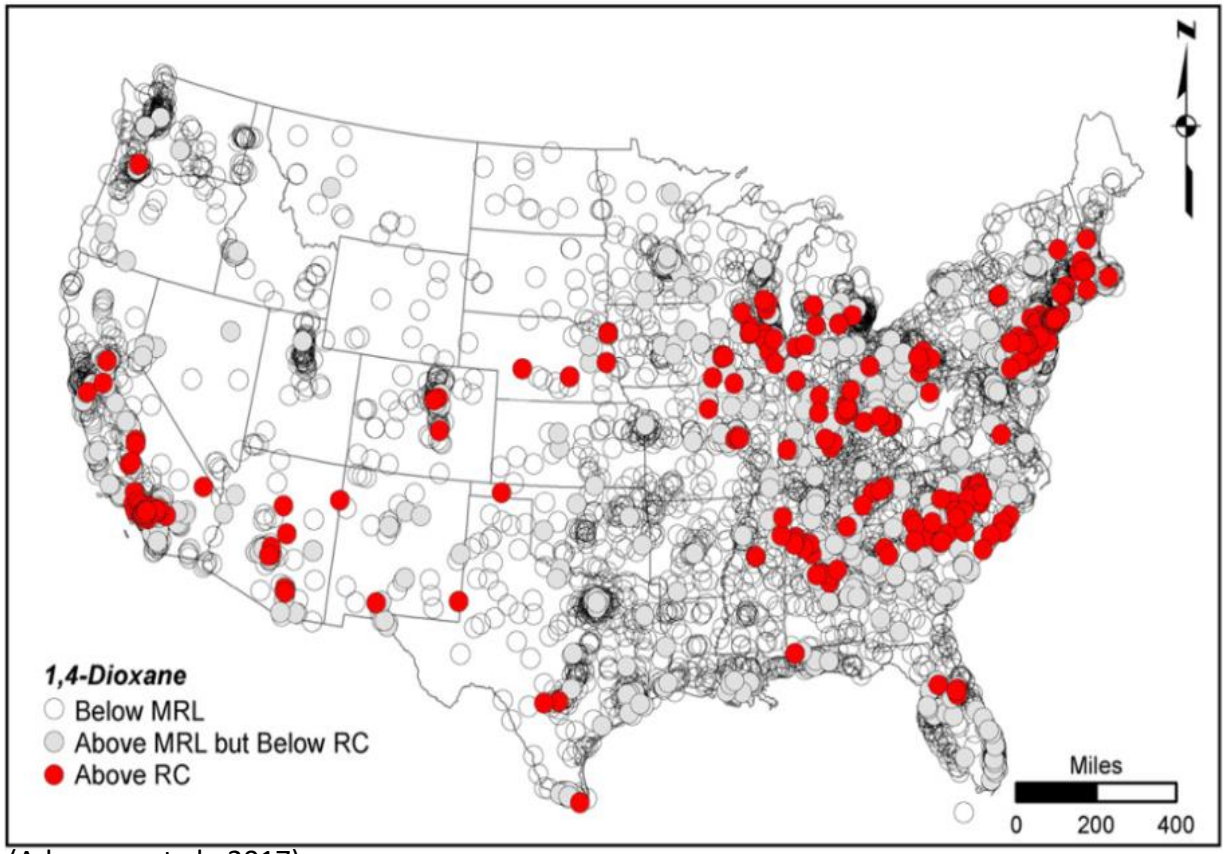
- Industrial solvent: stabilizer; purifying agent; byproduct in processes (PET) etc.

Reporting Year	2012	2013	2014	2015
Total Aggregate Production Volume (lbs)	894,505	1,043,627	474,331	1,059,980



- Possible **human carcinogen**
- Regulation:
  - EPA Health Advisory Level: 0.35 ppb (parts-per-billion) = 1 in a million cancer risk
  - Federal: No Maximum Contamination Level (MCL)
  - NY State standard: 1 ppb

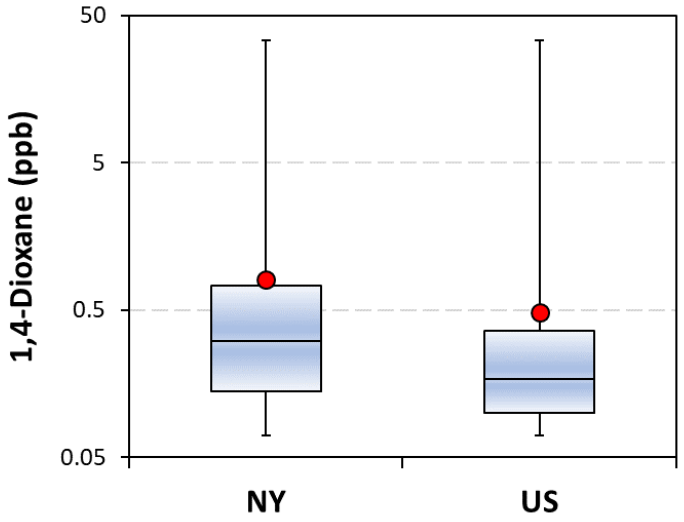
Nationwide Detection in Drinking Water



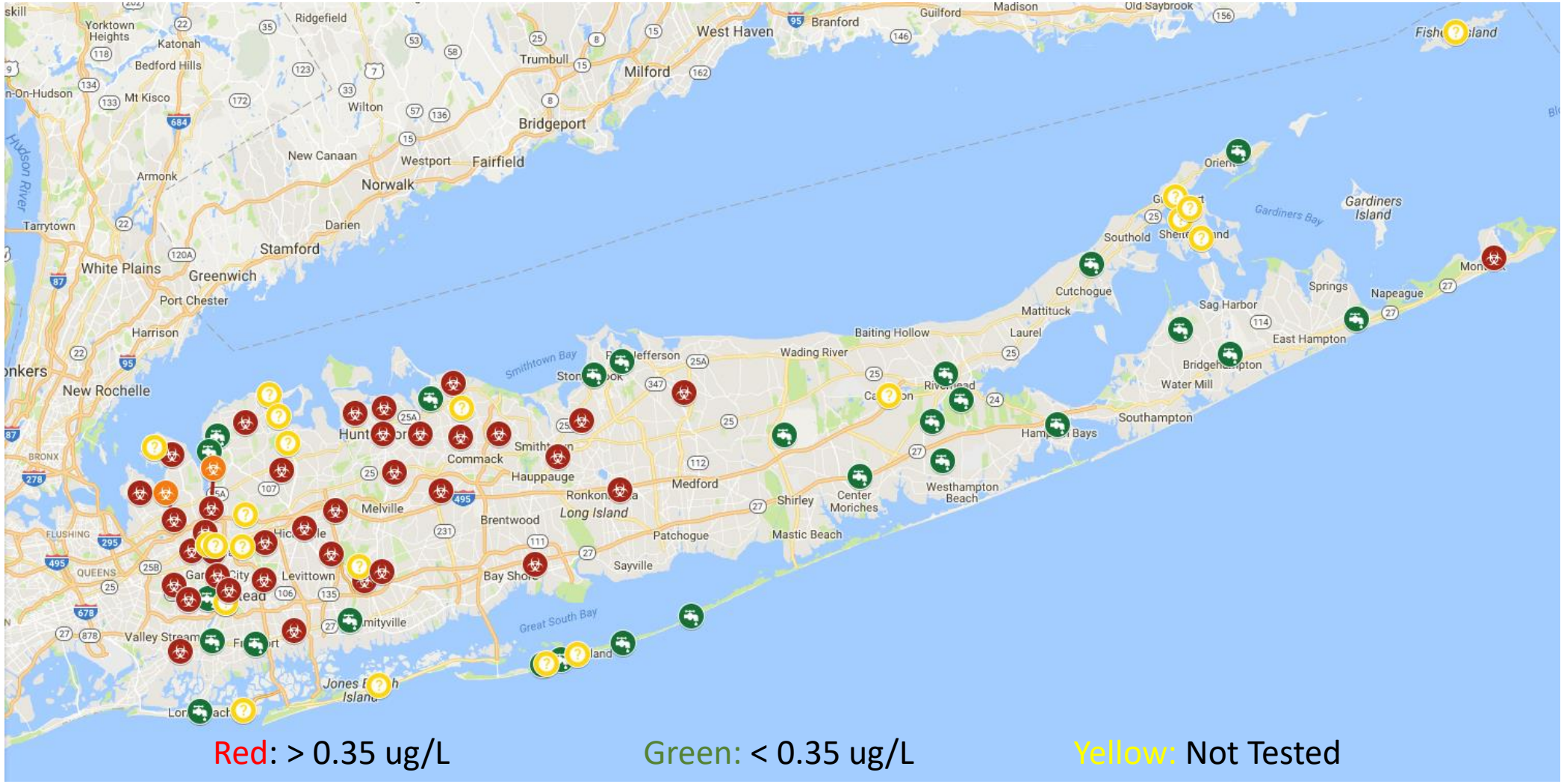
(Adamson et al., 2017)

1,4-Dioxane nationwide survey (2013-2015):
~4000 sites detectable (>0.07 ppb)
~600 sites above 0.35 ppb

174 from NYS
164 from Suffolk and Nassau Counties



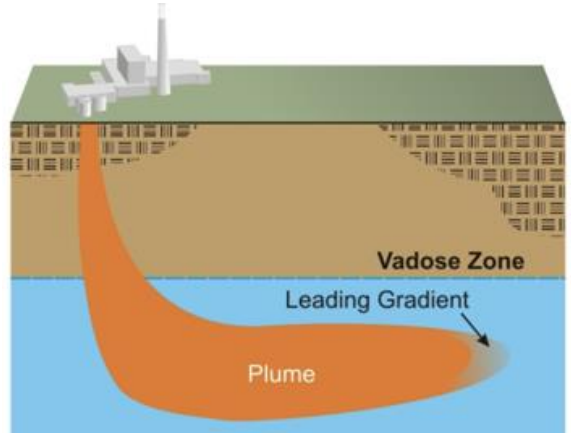
1,4-Dioxane Detection in Long Island, NY

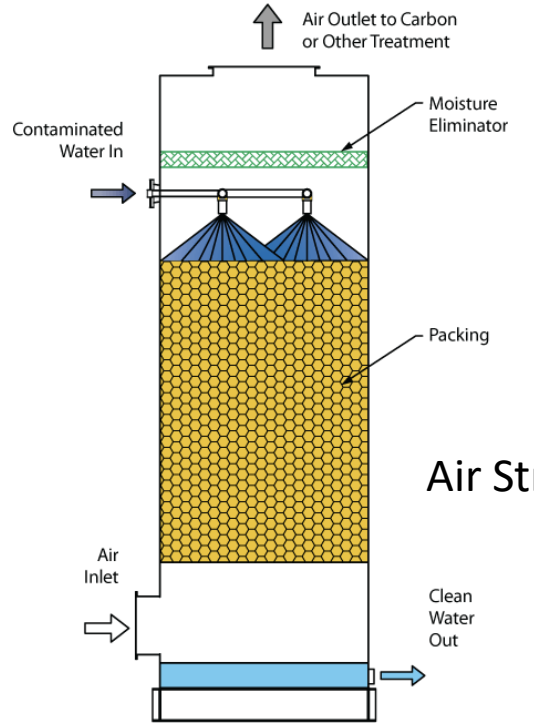


https://www.citizenscampaign.org/campaigns/dioxane.asp

Difficulties in the treatment of 1,4-dioxane

Property	Challenges in Treatment
High miscibility in water	High mobility (plume expands faster)
Low vapor pressure	No removal by air stripping
Low sorption coefficient	No removal by adsorption (ion-exchange, activated carbon etc.)
Resistant to biodegradation*	No removal by conventional biological treatment



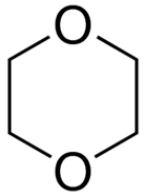


Air Stripping

Treatment of 1,4-Dioxane

- Advanced oxidation processes (AOP)
  - Hydrogen peroxide (H_2O_2)/UV; H_2O_2/ozone; Fenton; photocatalytic oxidation with TiO_2 etc.
  - Hydroxyl radical (.OH) production
  - Non-specific and strong oxidant: reaction rate 10^8–10^{10} M^{-1} s^{-1}

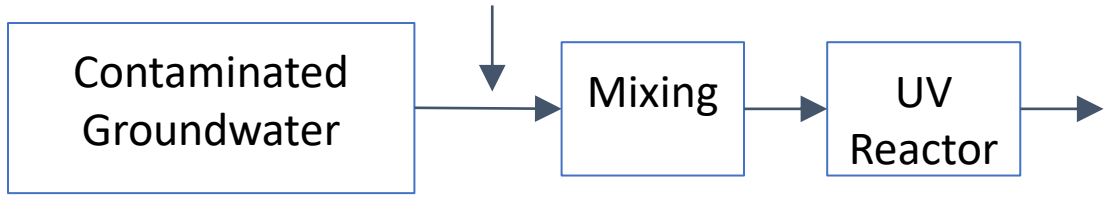
- Carbonates, bicarbonates, Natural Organic Matter (NOMs): free radical scavengers



+ •OH → Byproducts + CO_2 + H_2O (k = 2.5 x 10^9 M^{-1} s^{-1})

AOP Examples

Hydrogen Peroxide (or) Titanium Dioxide Addition



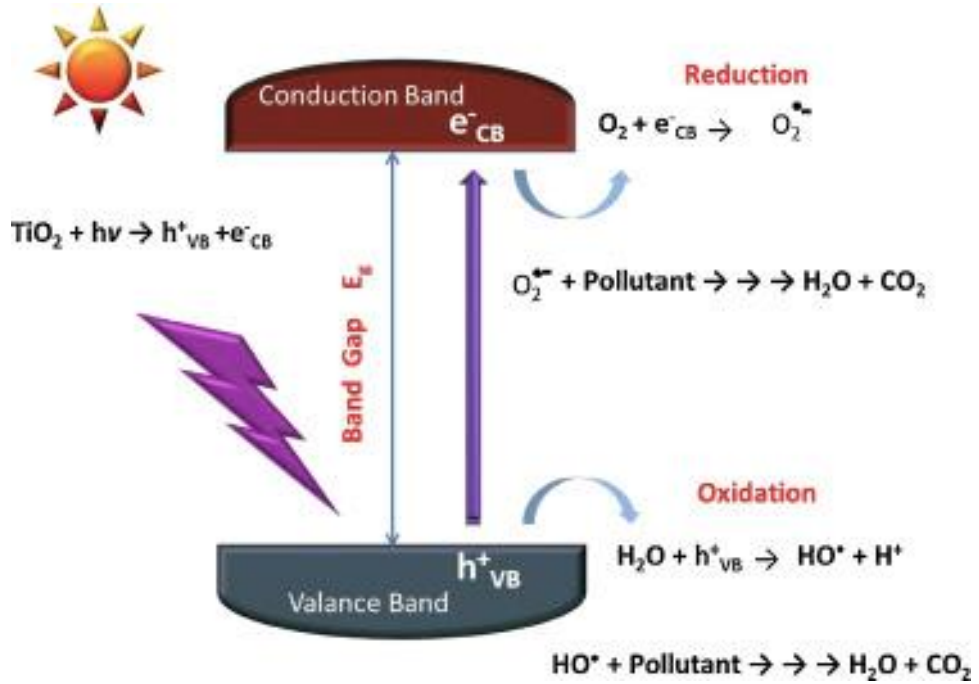
$$H_2O_2 + h\nu \rightarrow 2^{\cdot}OH$$

$$\cdot OH + H_2O_2 \rightarrow H_2O + HO_2\cdot$$

$$HO_2\cdot + H_2O_2 \rightarrow H_2O + O_2 + \cdot OH$$

$$2HO_2\cdot \rightarrow H_2O_2 + O_2$$

TiO_2



Pilot-scale AOPs

Trojan: UV/H_2O_2

$H_2O_2 + UV \rightarrow 2\ OH\cdot$

Purifics: UV/TiO_2

$TiO_2 + UV \rightarrow e^- + p^+$ (electron gap)

$p^+ + H_2O \rightarrow OH\cdot + H^+$

Calgon: UV/OCl

$HOCl + UV \rightarrow OH\cdot + Cl\cdot$

Xylem: O_3/H_2O_2

$H_2O_2 \rightarrow HO_2^- + H^+$

$HO_2^- + O_3 \rightarrow OH\cdot + O_2^- + O_2$

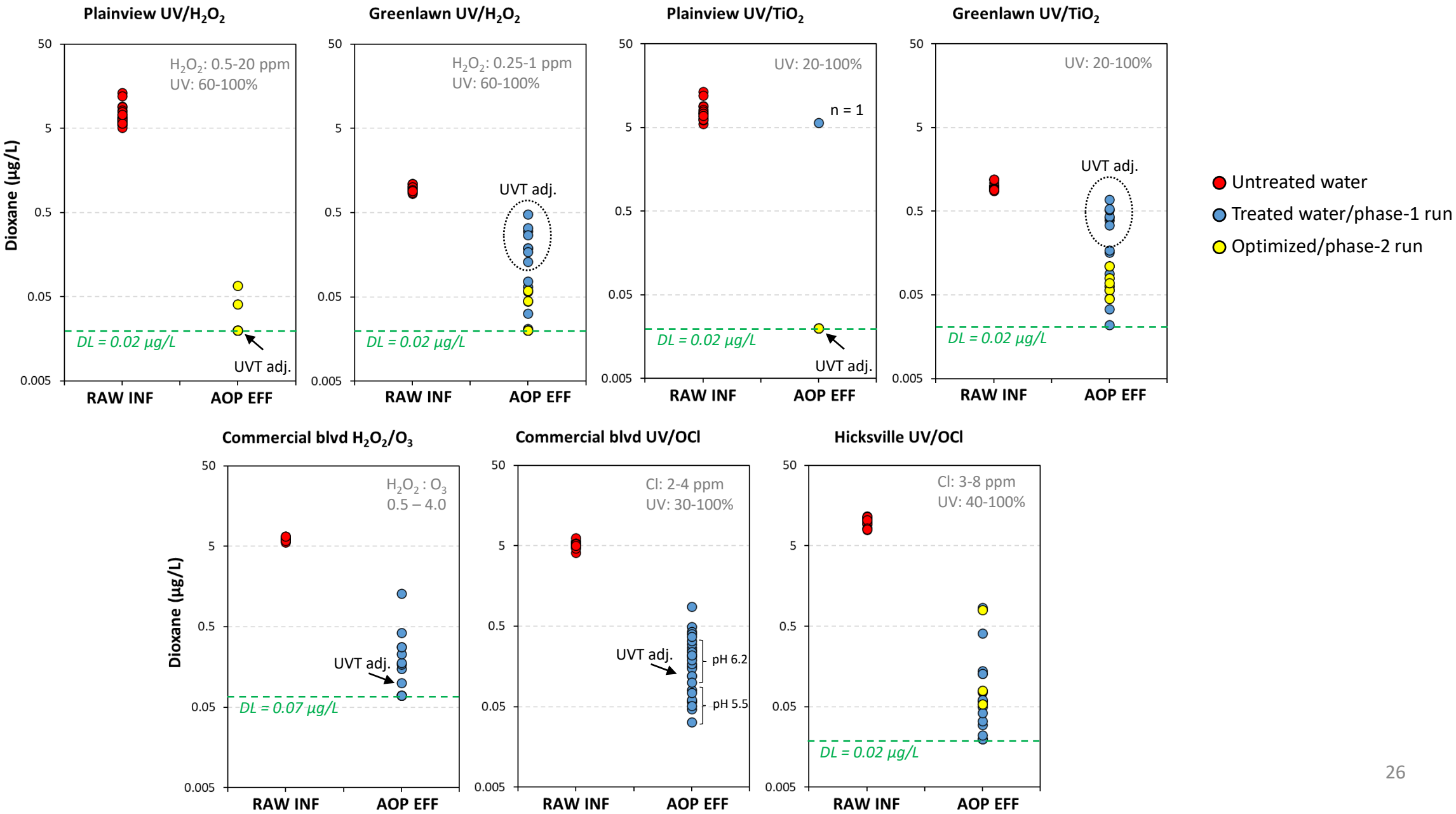
- Total: 7 pilots at 4 locations in LI
- Impacts of source water quality on treatment
- An economic analysis of each treatment approach
- Inform on future testing and monitoring requirements

Test sites

- Four contaminated wells
- Four AOP technologies

→ Seven pilot-scale testing

1,4-Dioxane degradation



Overview: AOP treatment of co-contaminants

VOCs		Plainview			Greenlawn			Central Islip			Hicksville		EPA
	unit	Untreated	UV/H2O2 treated	UV/TiO2 treated	Untreated	UV/H2O2 treated	UV/TiO2 treated	Untreated	**Peroxone treated**	UV/OCl treated	Untreated	**UV/OCl treated**	MCL
1,1,1-Trichloroethane	µg/L	7.3	6.5	3.5	0.59	0.53	<0.5	0.88/0.84	0.84	0.84	4.2	3.9	200
1,1,2-Trichlorotrifluoroethane	µg/L	5.8	5.8	2.3	0.56	<0.5	<0.5	<0.25/<0.25	<0.25	<0.25	0.82	0.76	
1,1-Dichloroethane	µg/L	2.4	1.3	0.6	1.1	0.70	0.72	4.2/3.7	3.3	3.3	8.5	5.6	5
1,1-Dichloroethene	µg/L	7.4	<0.5	<0.5	0.80	<0.5	<0.5	6.5/5.9	7.7	3.1	14	<0.5	7
cis-1,2-Dichloroethene	µg/L	7.9	<0.5	<0.5	<0.5	<0.5	<0.5	0.64/0.57	0.69	0.61	6.0	<0.5	70
Trichloroethene	µg/L	228	<0.5	<0.5	0.88	<0.5	<0.5	1.9/1.7	2.1	1.1	20	0.9	5
Tetrachloroethene	µg/L	183	0.82	<0.5	0.94	<0.5	<0.5	0.33/0.32	0.37	0.33	14	1.3	5
Chloroform	µg/L	0.95	0.82	0.61	0.55	<0.5	<0.5	0.35/0.36	0.35	0.36	<0.50	0.54	70[h]
Acetone	µg/L	11	22	14	3.9	5.3	3.2				6.9	<2.0	
Methyl-tert-butyl ether	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.25/<0.25	<0.25	<0.25	<0.25	<0.25	10[n]
1,2,3-Trichloropropane	µg/L							0.28/0.30	0.26	0.31			100[d]
Carbon tetrachloride	µg/L										0.92	0.94	5
Dichlorodifluoromethane	µg/L										1.1	1.1	1000[d]
Trichlorofluoromethane	µg/L										0.94	0.83	2000[d]

d: drinking water equivalent level
n: NYS MCL
h: health advisory (life-time)

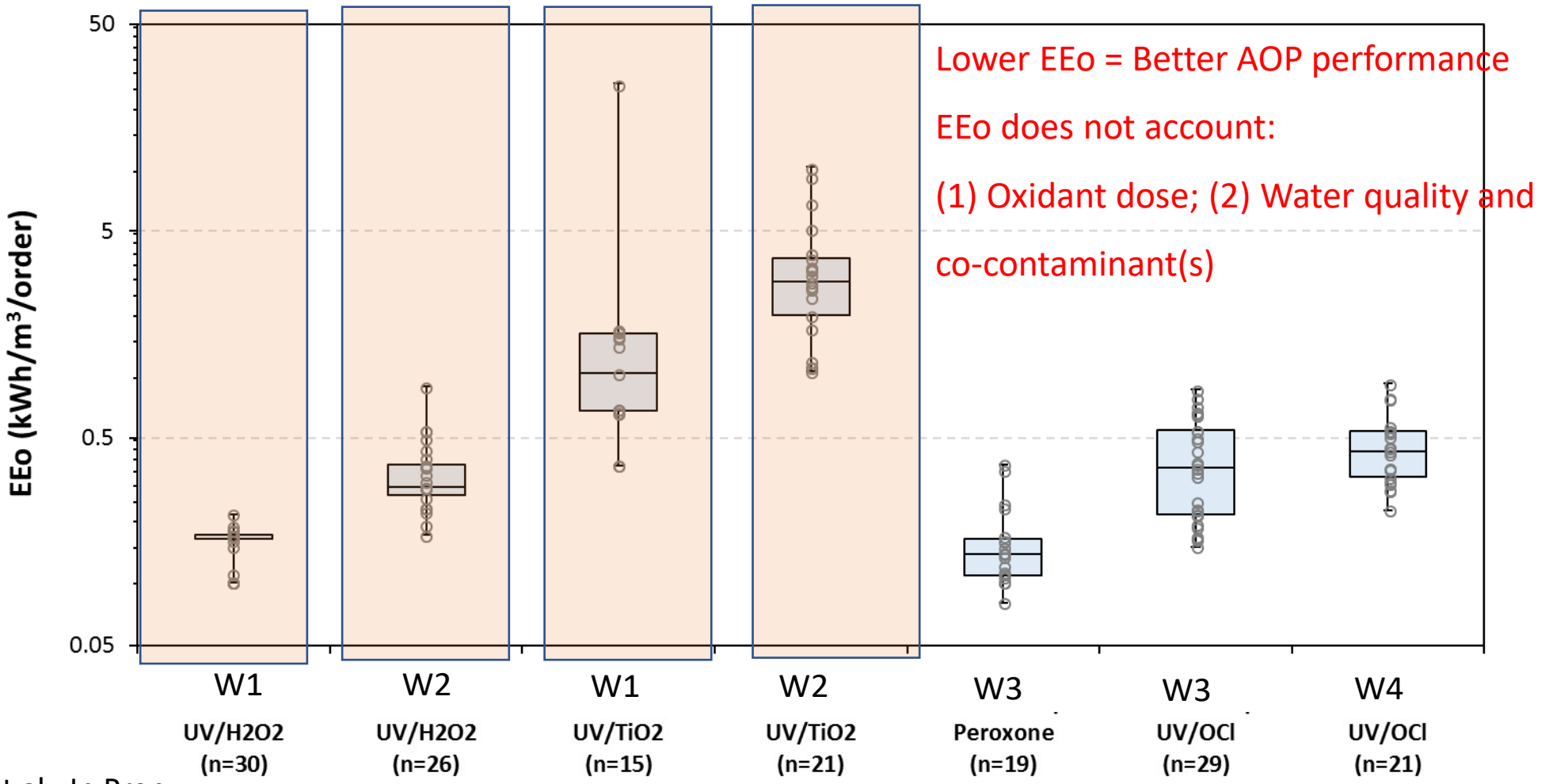
Overview: Byproduct formation

Compound		Plainview			Greenlawn			Central Islip			Hicksville		EPA
	unit	Untreated	UV/H_2O_2 treated	UV/TiO_2 treated	Untreated	UV/H_2O_2 treated	UV/TiO_2 treated	Untreated	Peroxone treated	UV/OCl treated	Untreated	UV/OCl treated	MCL
Formaldehyde	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0/3.6	4.2	3.3	<1.0	<1.0	1000[h]
Acetaldehyde	µg/L	<1.0	<1.0	<1.0	<1.0	1.0	1.0	<2.0/<2.0	2.7	2.3	<1.0	1.3	
Glyoxal	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0/<2.0	2.7	2.2	<1.0	<1.0	
Methyl Glyoxal	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0/<2.0	2.2	4.2	<1.0	<1.0	
Acetic acid	mg/L	<0.005	0.009	0.008	<0.005	0.013	0.008	0.01/0.01	0.02	0.01	<0.005	<0.005	
Formic acid	mg/L	<0.005	0.012	0.009	0.006	0.017	0.015	0.06/0.01	0.06	0.02	<0.005	0.010	
Oxalic acid	mg/L	<0.005	0.005	0.011	<0.005	<0.005	0.006	<0.01/0.03	0.02	0.05	0.006	0.009	
Bromochloroacetic Acid	µg/L	<0.30	<0.30	0.37	<0.30	<0.30	<0.30	<0.80	<0.80	na	na	na	
Monobromoacetic Acid	µg/L	<0.30	0.63	0.73	<0.30	<0.30	<0.30	<0.80/<0.80	<0.80	1.2	<0.30	0.32	
Trichloroacetic Acid	µg/L	<0.50	0.52	0.76	<0.50	<0.50	<0.50	<0.40	<0.40	na	<0.50	0.73	20[h]
Dichloroacetic Acid	µg/L	3.1	6.4	0.82	<0.30	<0.30	<0.30	<1.2/1.3	<1.2	2.0	0.37	1.5	30[h]
Chloropicrin	µg/L	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50/<0.50	<0.50	0.50	<0.50	<0.50	
Chromium (VI)	µg/L	0.13	0.11	0.07	0.26	0.27	0.03	0.12/0.15	1.5	0.18	0.26	0.38	100*
Perchlorate	µg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	na	na	na	3.1	na	15[h]
Chlorite	µg/L	<25	<25	<25	<25	<25	<25	<20/24	<20	<20	<25	<25	1000
Chlorate	µg/L	<25	<25	<25	42	42	42	36/184	34	258	<25	1794	
Bromide	µg/L	<20	27	33	43	52	48	43/39	36	35	64	45	
Bromate	µg/L	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<1.0/<1.0	14	5.4	<5.0	21	10

*: total Cr
h: health advisory (life-time)

Pilot system performance

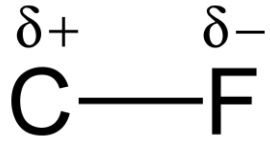
- Electrical Energy per Order: $EEO\left(kWh\ m^{-3}\ order^{-1}\right) = \frac{P \times t \times 1000}{V \times 60 \times \log([C]_0/[C]_t)}$

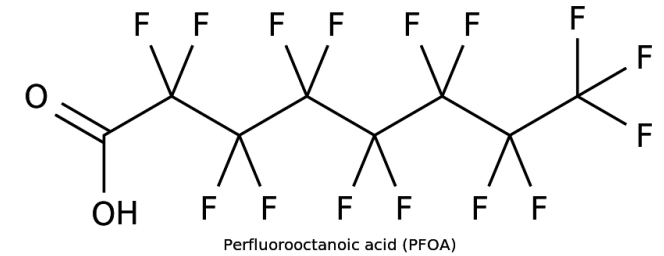


Venkatesan et al., In Prep

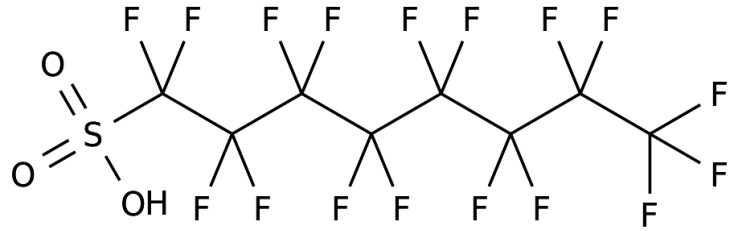
Per- and Polyfluoroalkyl Substances (PFAS)

- Carbon-fluorine bond is one of the strongest in the universe
- Resists heat, oil, stain, grease, and water
- Widely used since 1940s





Perfluorooctanoic acid (PFOA)



Perfluorooctanesulfonic acid (PFOS)

15,000 different compounds!

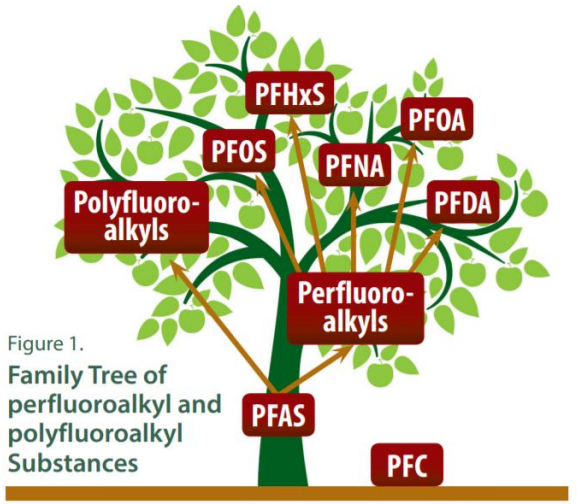
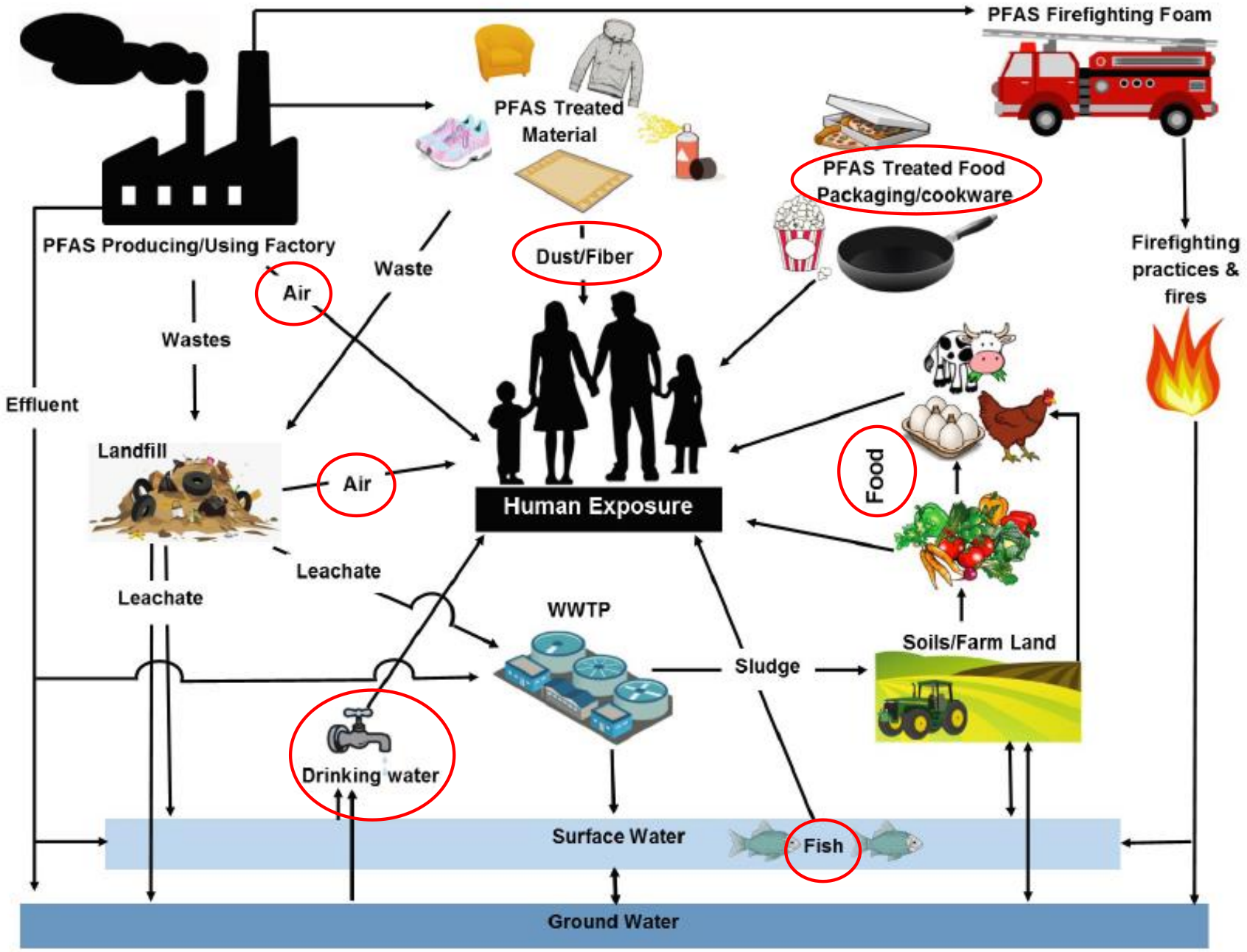


Figure 1.
Family Tree of perfluoroalkyl and polyfluoroalkyl Substances

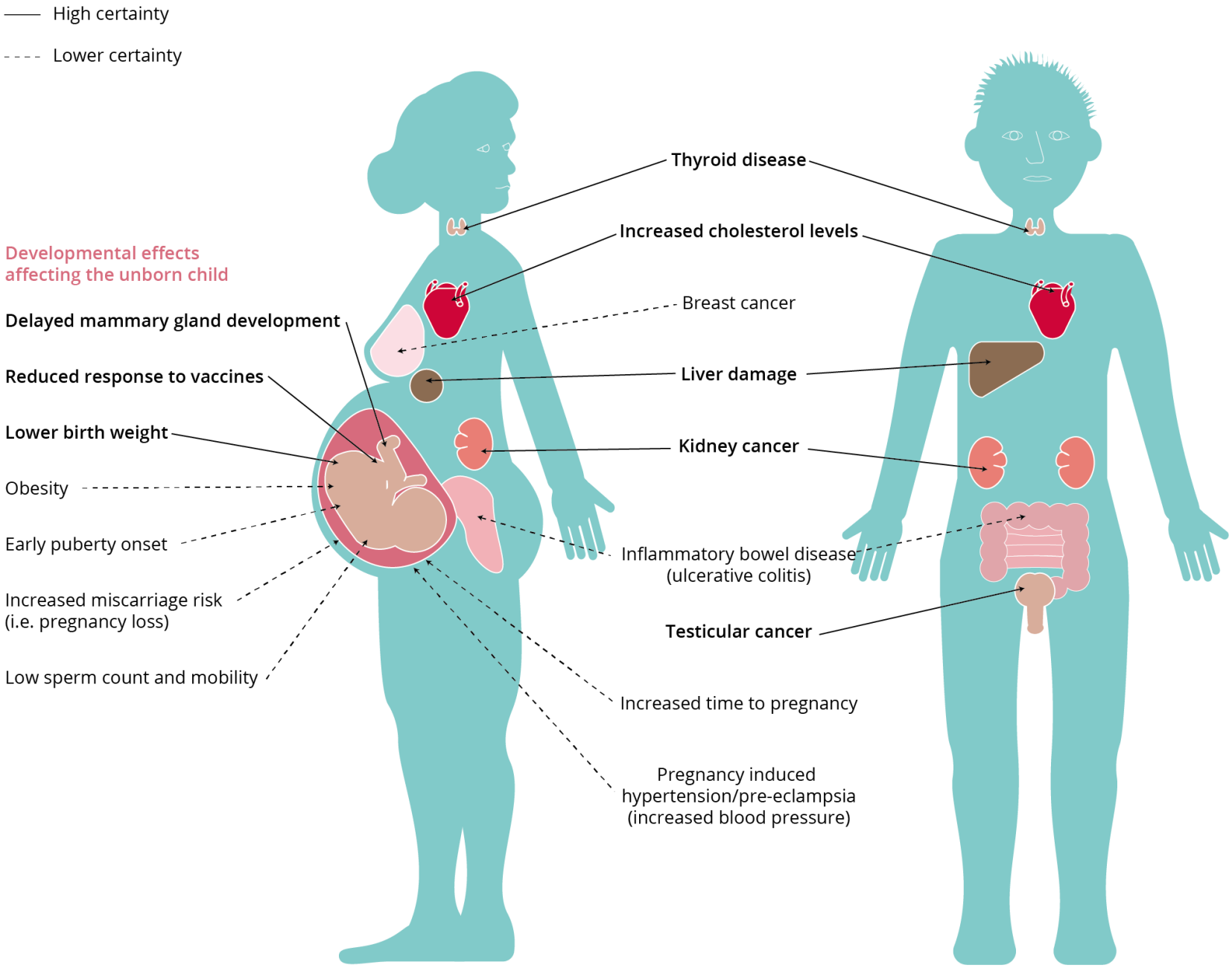
Exposure to PFAS



Source: maine.gov

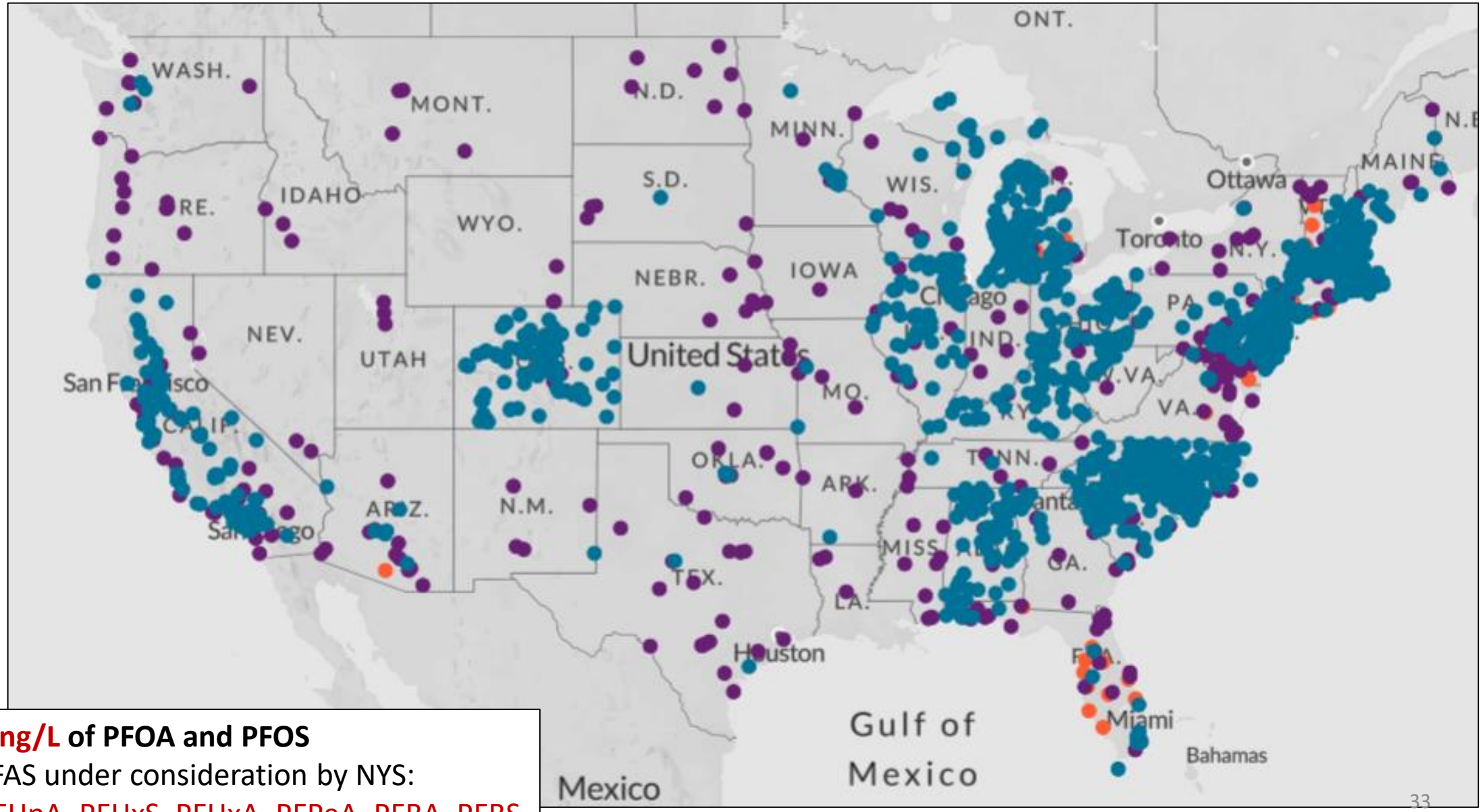
PFAS health risks

- Perfluorooctanoic acid (PFOA): classified as a **possible human carcinogen** by International Agency for Research on Cancer (IARC)



https://www.eea.europa.eu/

Widespread PFAS Occurrence in U.S.



NYS: 10 ng/L of PFOA and PFOS
Other PFAS under consideration by NYS:
PFNA, PFHpA, PFHxS, PFHxA, PFPeA, PFBA, PFBS

vg.org/interactive-maps/pfas_contamination/map/

EPA's Proposed Action for the PFAS NPDWR

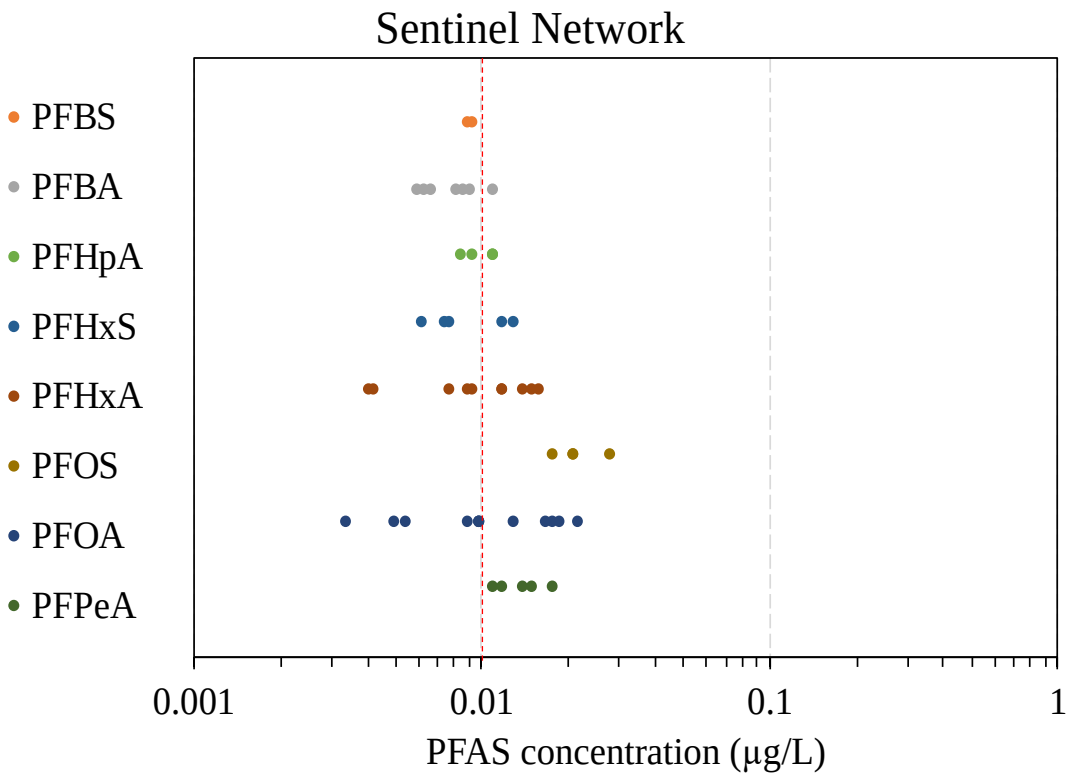
Compound	Proposed MCLG	Proposed MCL (enforceable levels)
PFOA	0 ppt*	4.0 ppt*
PFOS	0 ppt*	4.0 ppt*
PFNA		
PFHxS	1.0 (unitless) Hazard Index	1.0 (unitless) Hazard Index
PFBS		
HFPO-DA (commonly referred to as GenX Chemicals)		

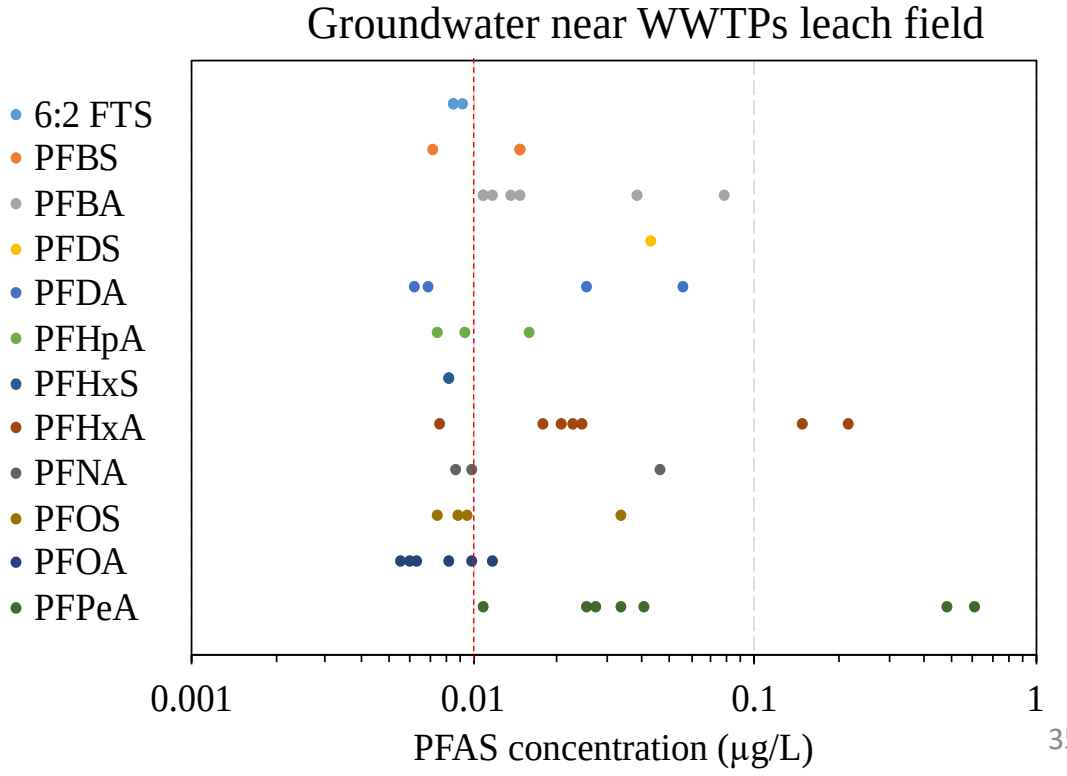
The Hazard Index is a tool used to evaluate potential health risks from exposure to chemical mixtures.

Compound	Proposed HBWC (ppt)
PFHxS	9.0
PFNA	10
PFBS	2000
HFPO-DA (commonly referred to as GenX Chemicals)	10

USGS Study in Long Island

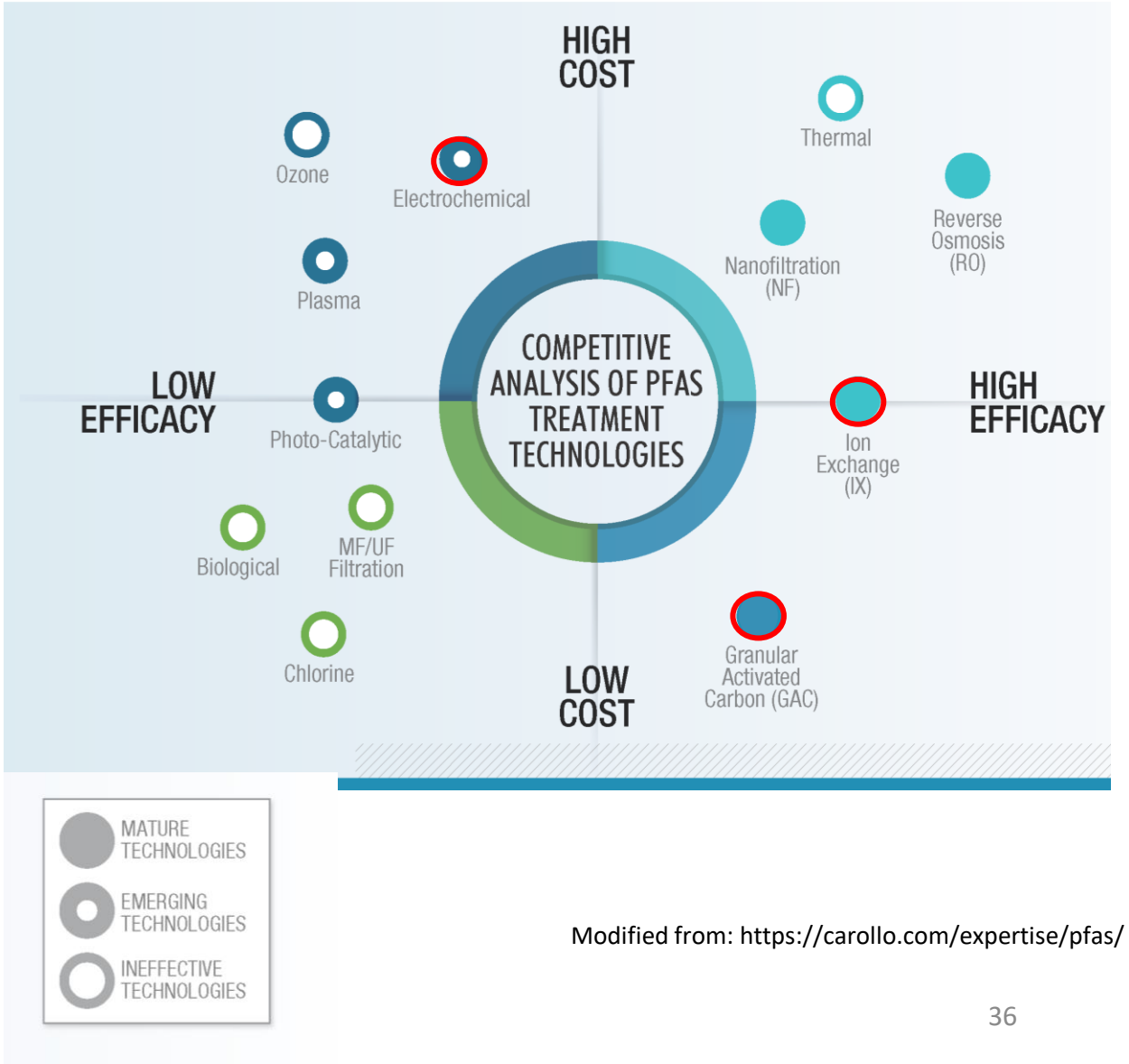
- Sentinel network: upper glacial aquifer with different land-use settings
  - Concentration of PFAS: 3.4 to 93 ng/L in 26 out of 37
- WWTP groundwater network: downgradient of decentralized WWTPs discharging to groundwater.
  - Concentration was much higher: 5 to 620 ng/L





PFAS treatment technologies: a summary

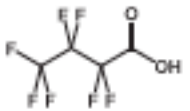
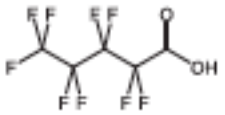
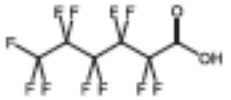
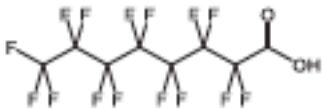
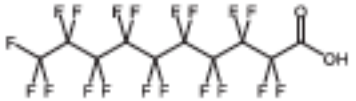
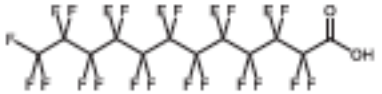
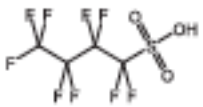
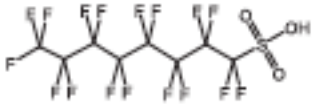
Treatment Type	Technology Category	Technology
Sequestration Technologies	Sorption	Activated Carbon Anion Exchange Resin Biochar Zeolites/clay minerals
	Membrane Filtration	Reverse Osmosis Nanofiltration
	Coagulation	Specialty Coagulants
Transformation or destruction technologies	Redox treatment	Electrochemical Electron beam Ozone Plasma
	Other	Sonochemical Thermal Biological



Modified from: https://carollo.com/expertise/pfas/

Variation in physicochemical properties of PFAS

- Definition
  - **Short-chain**: <C6 for perfluoroalkyl sulfonic acid (PFSA); <8 for perfluoro alkyl carboxylic acid (PFCA)
  - **Long chain**: >=C6 PFSA; >=C8 PFCA
- Hydrophobicity (K_{OW} = octanol-water partitioning coefficient)
- Surfactant-like properties
- Changes with chain length, degree of fluorination, functional group, and isomers

Compound, Number of carbons	Structure	Log K_{ow}[a]
Perfluorobutanoic acid (PFBA), C4		2.31
Perfluoropentanoic acid (PFpeA), C5		3.01
Perfluorohexanoic acid (PFHxA), C6		3.71
Perfluoroheptanoic acid (PFHpA), C7		4.41
Perfluorooctanoic acid (PFOA), C8		5.11
Perfluorodecanoic acid (PFDA), C10		6.51
Perfluorododecanoic acid (PFDoDA), C12		7.92
Perfluorobutanesulfonic acid (PFBS), C4		2.63
Perfluorooctanesulfonic acid (PFOS), C8		5.43

Park et al. Water Research, 2020.

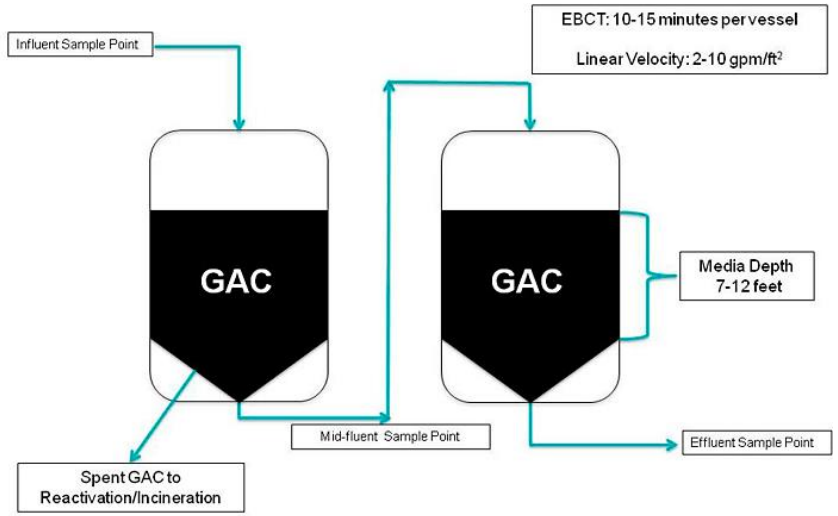
Removal by Granular Activated Carbon (GAC)

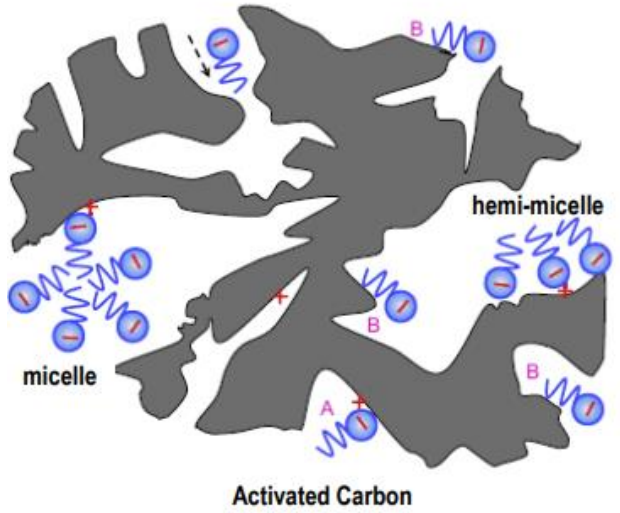
GAC Material:

- Made from bituminous coal or coconut
- Highly porous, large surface area

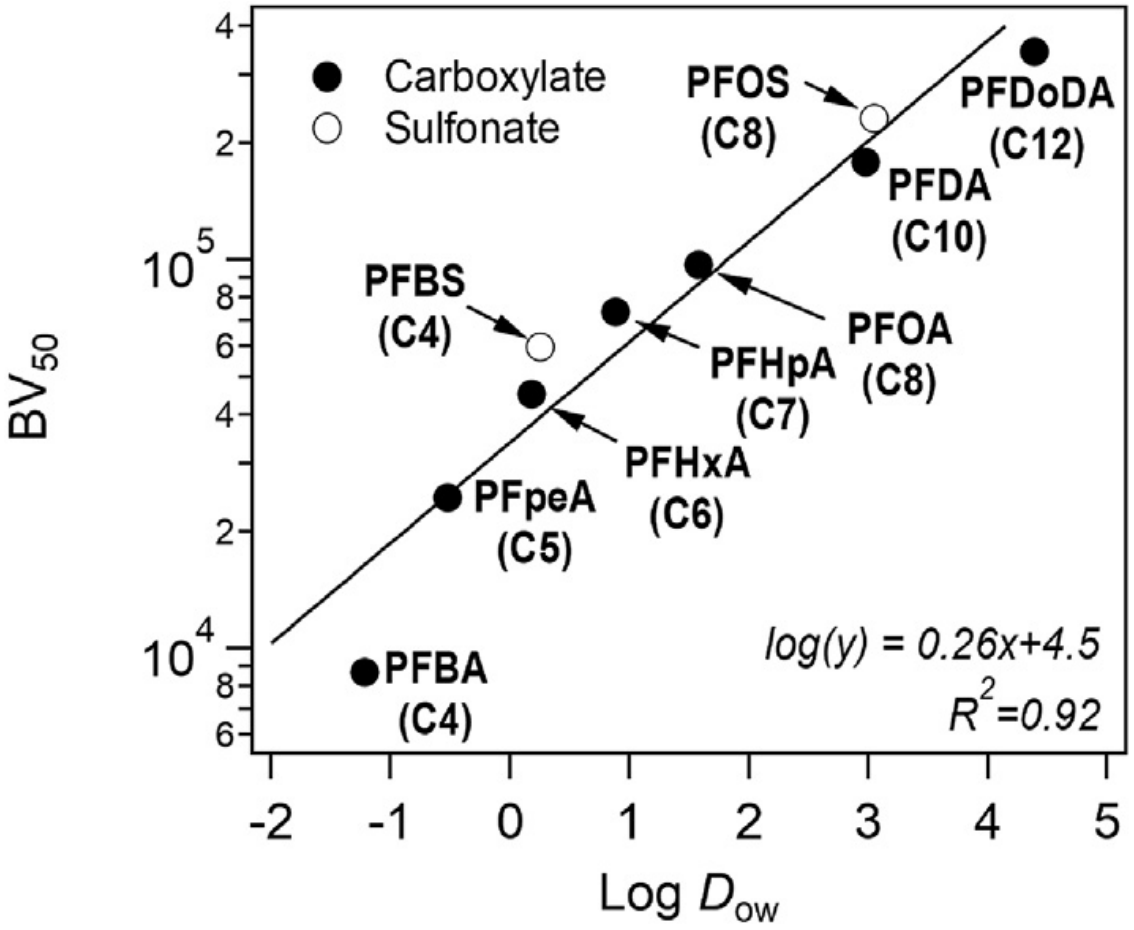
Sorption Mechanism:

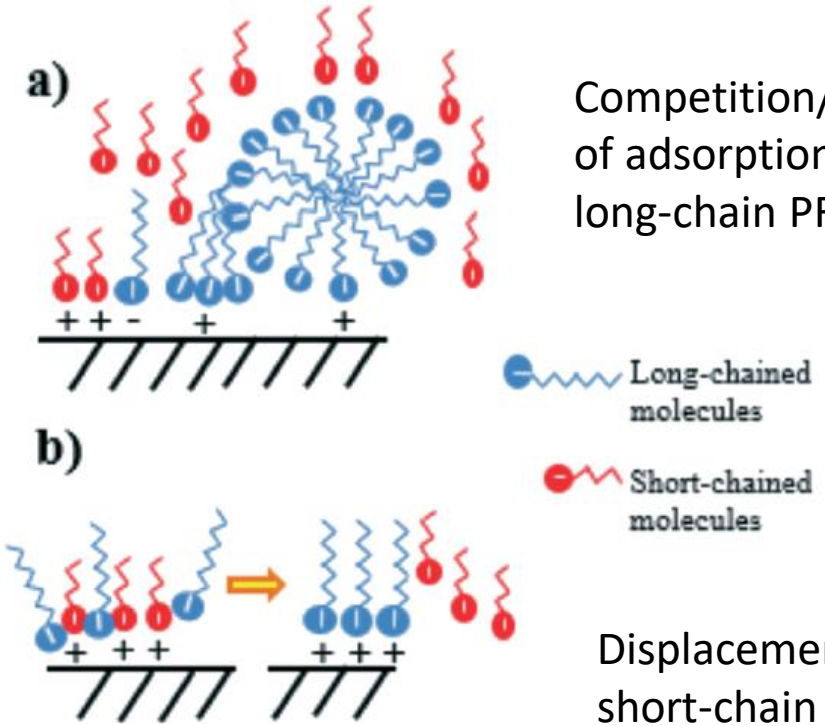
- Hydrophobic interactions - dominant mechanism
- Long-chain PFAS with higher hydrophobicity show better removal compared to short-chain PFAS





Current understanding of early breakthrough of short-chain PFAS





Competition/blockage of adsorption site by long-chain PFAS

Displacement of short-chain by long-chain PFAS

Park et al. Water Research, 2020.

Improving the removal of short-chain PFAS by GAC using the surfactant cetyltrimethylammonium chloride (**CTAC**)

- Engineered approach: improve short-chain PFAS hydrophobicity
  - hydrophobic ion-pairing reagent CTAC to enhanced short-chain PFAS sorption

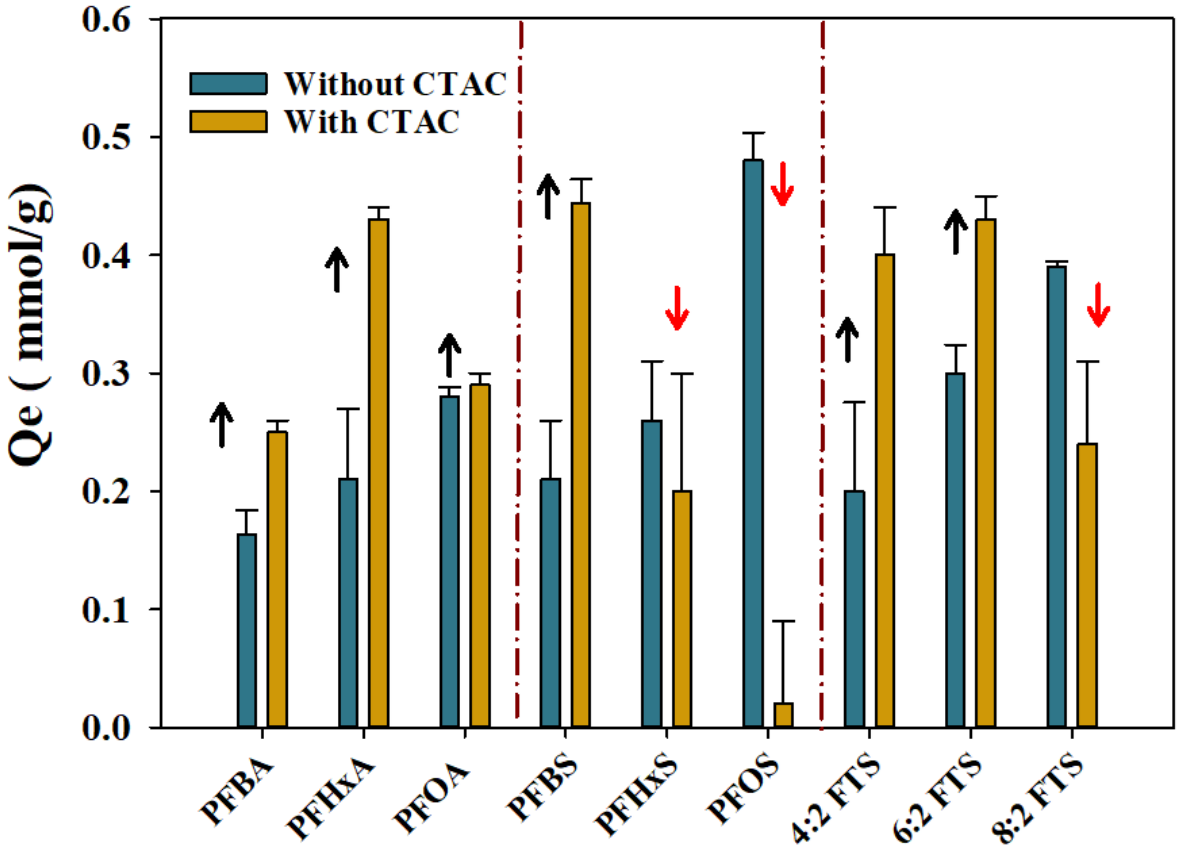
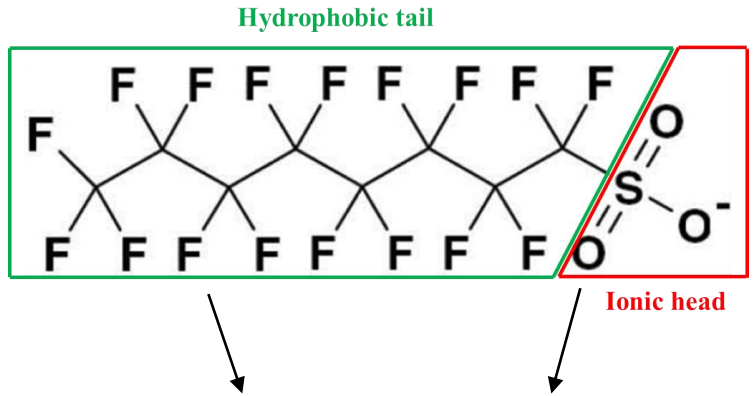
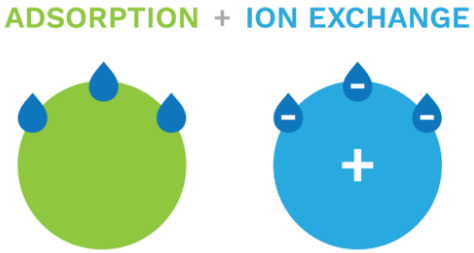


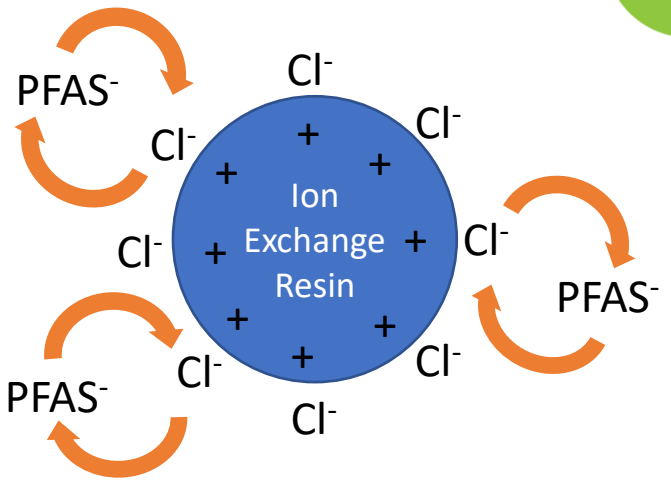
Figure 7. Impact of the ion pair reagent CTAC on the equilibrium sorption (Q_e) of individual carboxylate compounds (PFBA, PFHxA, PFOA), sulfonate compounds (PFBS, PFHxS, PFOS), and fluorotelomer compounds (4:2 FTS, 6:2 FTS, 8:2 FTS) onto GAC F400.

Removal by Anion Exchange Resin (IX)

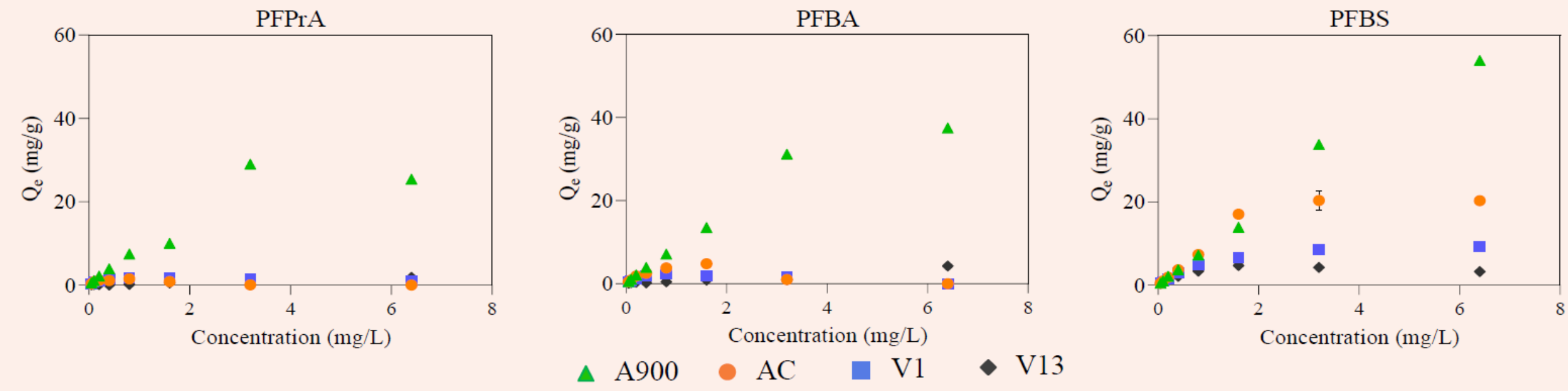
- Dual Action
  - Adsorption→ Interacts with hydrophobic tail
  - Electrostatic interaction → Interacts with ionic head
- Single-use vs. regenerable resins
  - Single-use resin performs better
- Advantages over GAC
  - Faster reaction kinetics
  - Higher operating capacity
  - Good for high PFAS concentration





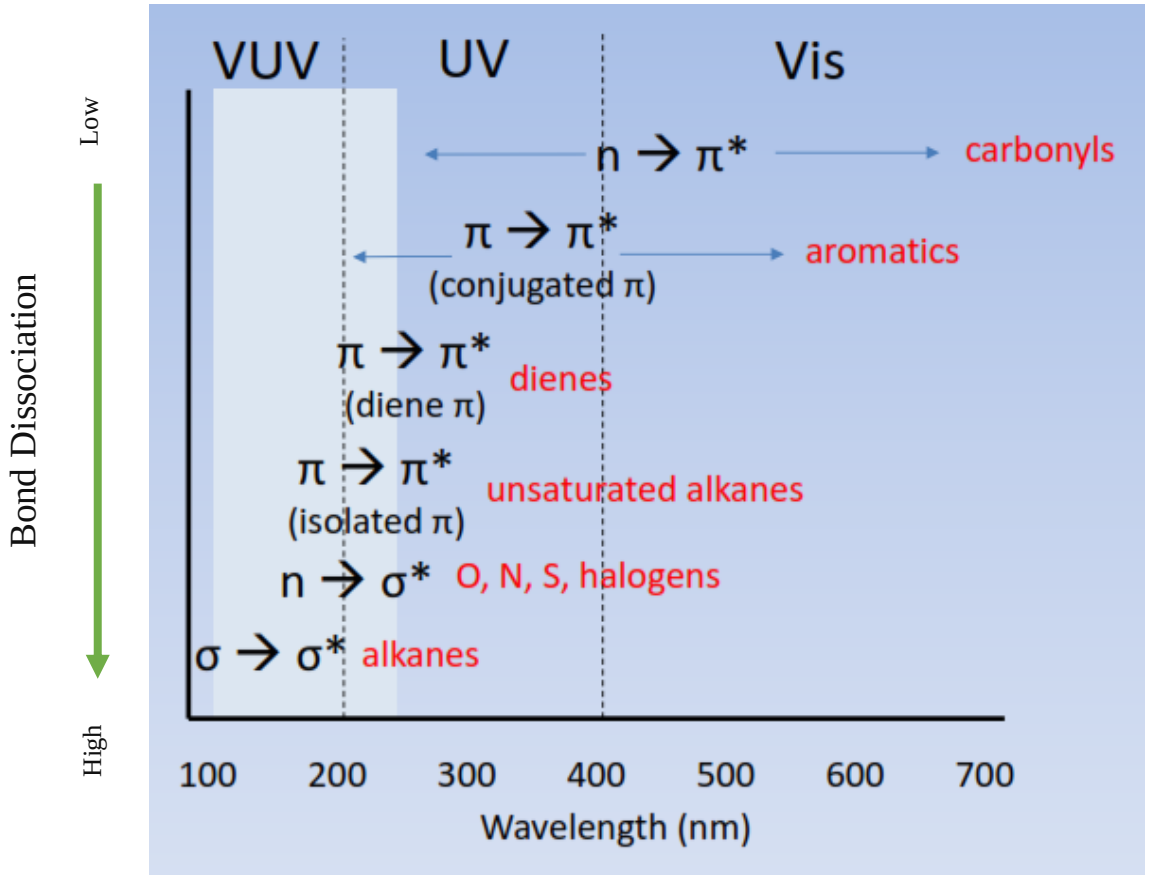


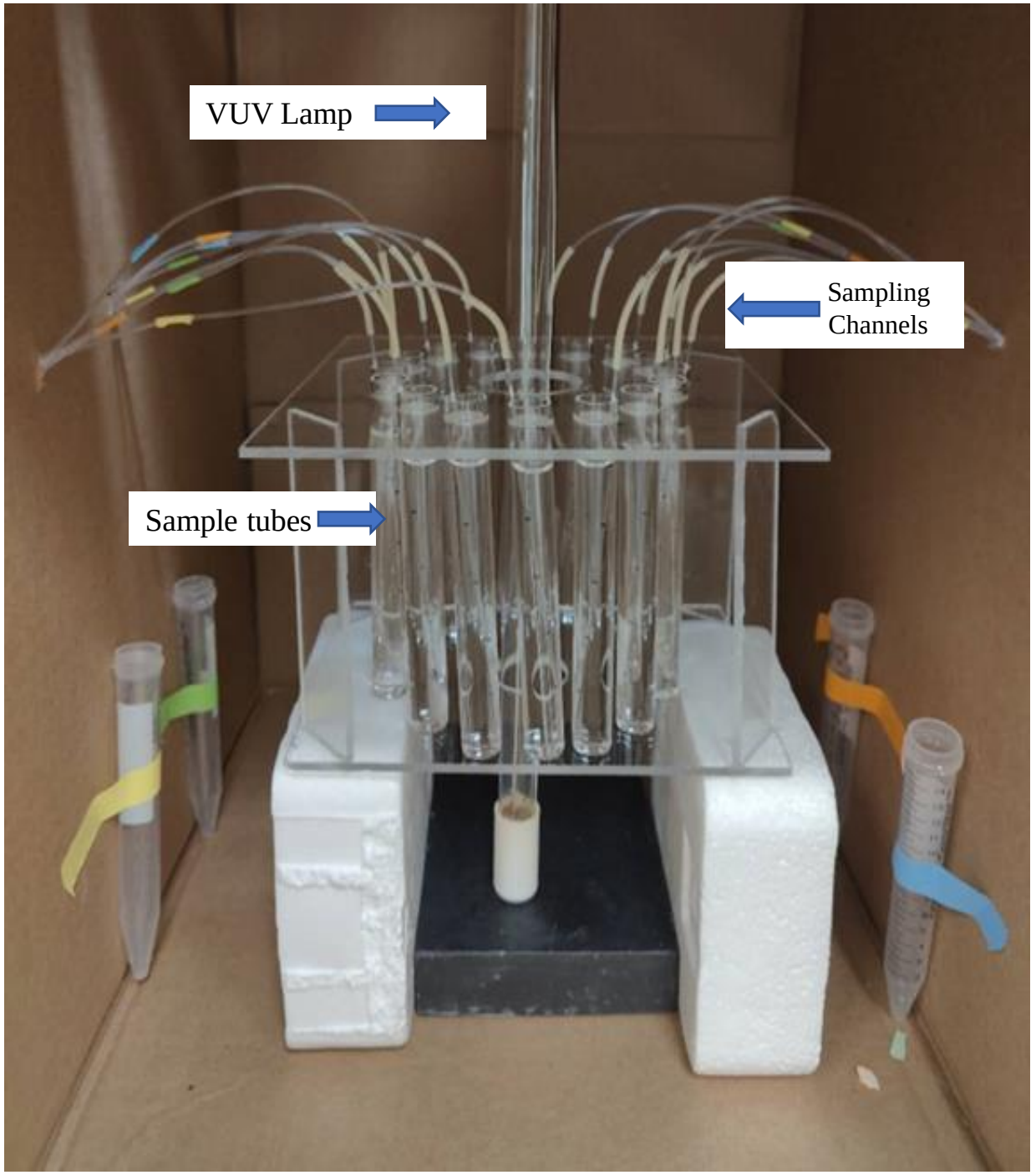
Adsorption of short chain-PFAS by anion exchange resin



Lenka et al., in prep

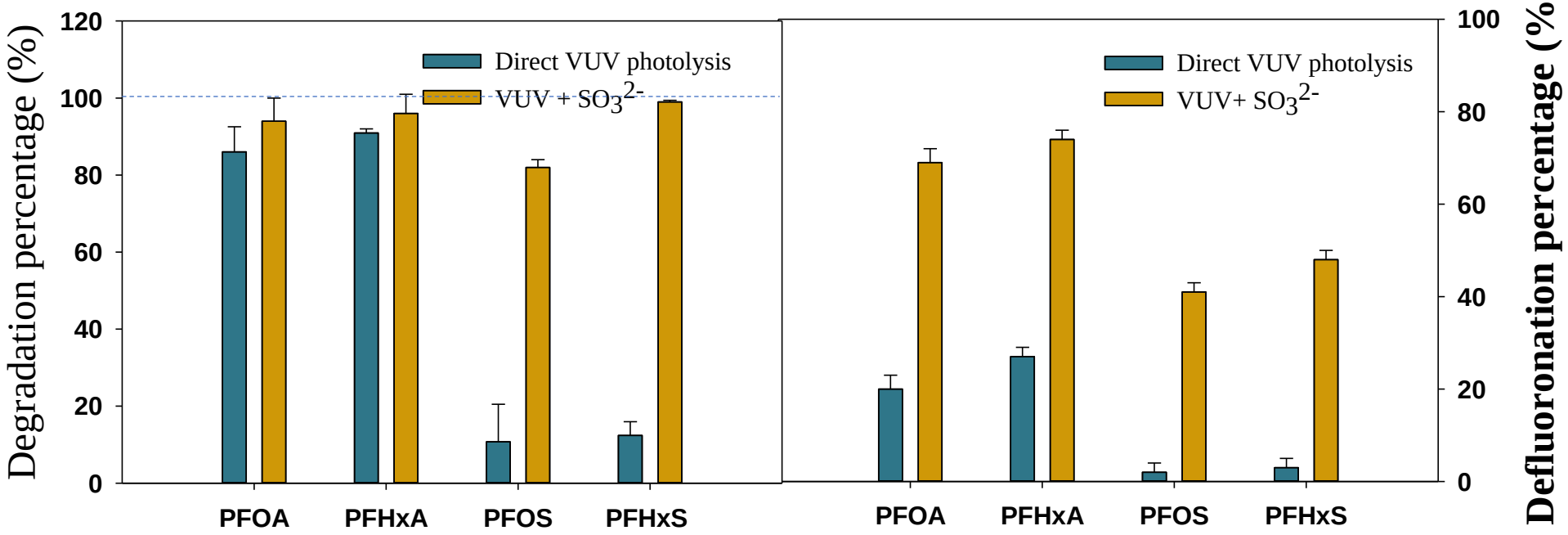
Vacuum UV destruction of PFAS





VUV irradiation + reducing agent

Experiement Conditions
PFOA, PFHxA, PFOS, PFHxS
PFAS conc. 1 ppm
SO_3^{2-} 5 mM
ambient air
PFOA pH changes (5.1-3.39)
DI water
Irradiation time 4 hours



- **Destruction further improved by pH adjustment and via the next generation device with different configuration**

Conclusions

- Nitrate contamination of groundwater is a threat to surface waters and human health.
- NRBs remove nitrate and emerging contaminants more efficiently than any advanced septic system on Long Island
- Long Island has the highest 1,4-dioxane levels in the nation.
- AOP with UV and H_2O_2 or TiO_2 efficiently removes 1,4-dioxane and other contaminants without creating by products.
- PFAS levels above 4 – 10 ppt are common on Long Island.
- Creative treatment trains using combinations of GAC, resins, and VUV must be piloted to meet drinking water standards.

Introduction of Panel

Jason Belle

First Vice Chairman, Long Island Water Conference &
Superintendent, West Hempstead Water District

Kristine Wheeler, P.E.

Director, New York State Department of Health

NEW YORK STATE | Department of Health

Regulatory Update

Bureau of Water Supply Protection
October 2023

Kristine Wheeler, P.E., Director
Bureau of Water Supply Protection

Agenda

- EPA PFAS Proposal
- NYS PFAS
- Consumer Confidence Rule
- Long Term Revisions to Lead and Copper Rule (LCRR)
- Cybersecurity
- Disinfection Byproducts

EPA PFAS Proposal

Proposed Action

Compound	Proposed MCLG	Proposed MCL
PFOA	0 ppt*	4.0 ppt*
PFOS	0 ppt*	4.0 ppt*
PFNA	1.0 unitless hazard index	1.0 unitless hazard index
PFHxS		
PFBS		
HFPO-DA (GenX)		

Compound	Health Based Water Concentration (ppt)
PFNA	10
PFHxS	9.0
PFBS	2000
HFPO-DA (GenX)	10

NEW YORK STATE | Department of Health

NYS PFAS Legislation

Emerging Contaminants in NYS - Summary

- Amendments to Public Health Law (PHL) §1112 Passed by Senate and Assembly in 2021. Signed by Governor in December of 2021 and amended in 2022.
- PHL requires all community water systems (CWS) and nontransient noncommunity water systems (NTNC) to monitor for emerging contaminants.
- PHL requires that the Department of Health (DOH) establish notification levels for emerging contaminants on the list.

Emerging Contaminants in NYS - Summary

- DWQC meeting held on March 10, 2022.
  - MCLs for PFNA, PFHxS, PFHpA, PFDA set at 10 ppt each.
  - MCL for PFAS6: 30 ppt for the sum of PFOA, PFOS, PFNA, PFHxS, PFHpA and PFDA.
  - Two notification level tiers.
  - Proposed regulation published in State Register on October 5, 2022.
- DWQC meeting held on June 25, 2023.
  - EPA proposal discussed.
  - Notification Level resolution.

Next Steps

- DOH evaluating how PHL §1112 and the proposed NPDWR intersect.
- Will present to DWQC in the fall.

EPA Consumer Confidence Rule Proposal

Consumer Confidence Rule Proposal

- Effective 1-year after promulgation of the final rule, or around April 1, 2025.
- Codify electronic delivery options.
- Modify lead notification and add corrosion control public notification requirements.
- Improve readability, clarity and understandability.
- Improve accuracy and risk communication.
- Requires CWS>10,000 to distribute CCR twice per year.
- Require states to report compliance monitoring data.

Lead and Copper Rule Long Term Revisions (LCRR/I)

Lead and Copper Next Steps

- LCRR implementation deadline is October 16, 2024.
- Service line inventories due on October 16, 2024.
- States that will not pursue primacy for the LCRR must file for an extension with EPA.
- PWS should be working on their service line inventories.
- LCRI has been sent to the Office of Management and Budget (OMB) for review.
- Proposed rule published after review by OMB.

Cybersecurity

Cybersecurity

- EPA released cybersecurity memo and guidance on March 3, 2023.
- This memo clarifies that primacy agencies have responsibility and authority to evaluate cyber practices during sanitary surveys and enforce deficiencies identified.
- April 17, 2023 – petition filed against EPA by the States of Iowa, Missouri and Arkansas.
- Two industry groups receive approval by the Court to intervene.
- Stay granted by the 8th Circuit Federal Court of Appeals in July.
- Result: EPA withdrew cybersecurity interpretive memo October 11.

Disinfection Byproducts

National Drinking Water Advisory Council

- On October 11 the National Drinking Water Advisory Council (NDWAC) reviewed the recommendations put forth by the NDWAC's Microbial Disinfection Byproducts Working Group, which included:
  - Addressing the potential for low or no disinfectant residual in surface water PWS distribution systems.
  - Premise plumbing and a national building water quality improvement initiative.
  - Addressing data and analysis gaps with DBPs of emerging concern.
  - Multi-benefit precursor control.
  - Finished water storage tank vulnerabilities.
  - Improving chloramination practices.
  - Improving water quality and regulatory compliance for consecutive systems.
  - Source control and leveraging non-SDWA authorities.
  - EJ improvement opportunities.
  - Overall MDBP analysis gaps.
  - Aligning TMF capacity for small, rural, and underserved communities
  - Primacy agency capacities.

NEW YORK STATE | Department of Health

Slide credit: Association of State Drinking Water Administrators

Paul Granger, P.E.

Superintendent, Hicksville Water District

Evaluating Budgetary Impacts of New Treatment Systems

PAUL J. GRANGER, P.E.

OCTOBER 20, 2023

Responsible, effective water resource management, Since 1921

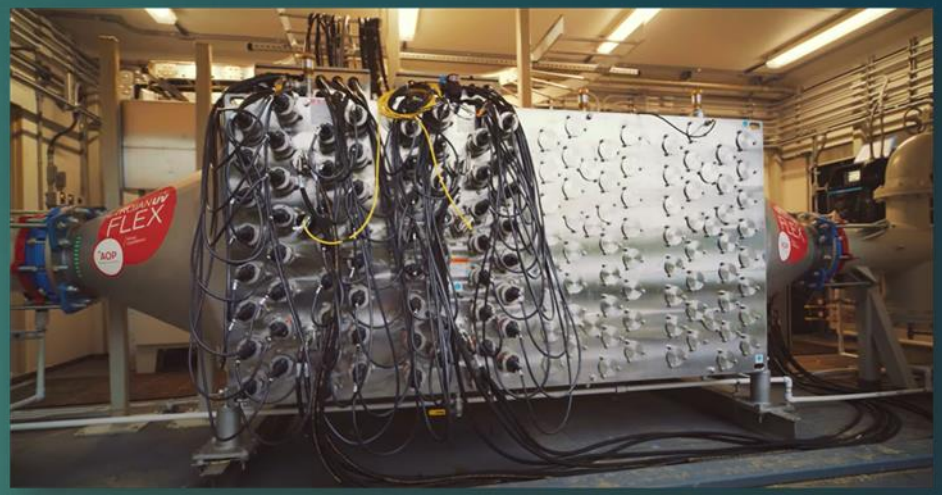
HICKSVILLE WATER DISTRICT

Proudly Serving the Community Since 1921

www.hicksvillewater.org

District Summary

- The Hicksville Water District (HWD) was founded in 1921.
- Population: 48,000 residents in 15,400 homes
- Service Area: Hicksville, Bethpage, East Meadow, Jericho, Levittown, Syosset and Westbury in a 7.9 square-mile service territory
- HWD provides customers with approximately 2.5 billion gallons of water each year from 14 active supply wells.
- There are more than 166 miles of water main.



Responsible, effective water resource management, Since 1921

HICKSVILLE WATER DISTRICT

www.hicksvillewater.org

Emerging Contaminant (EC) Treatment System Infrastructure

- The HWD currently has ten wells online that have dedicated treatment for 1,4-dioxane PFOA and PFOS
- Total of nine Advanced Oxidation Process systems and eleven pairs of Granular Activated Carbon filters.
- Two more projects will commence in 2024. When build out is completed, 13 out of the 14 active supply wells will have EC treatment in place.
- **Aggressive timeline required a phased approach which increased costs**.
  - Short term – Interim treatment phase
  - Long term – Permanent Treatment Buildings

Responsible, effective water resource management, Since 1921

HICKSVILLE WATER DISTRICT

Capital Budget for EC Treatment

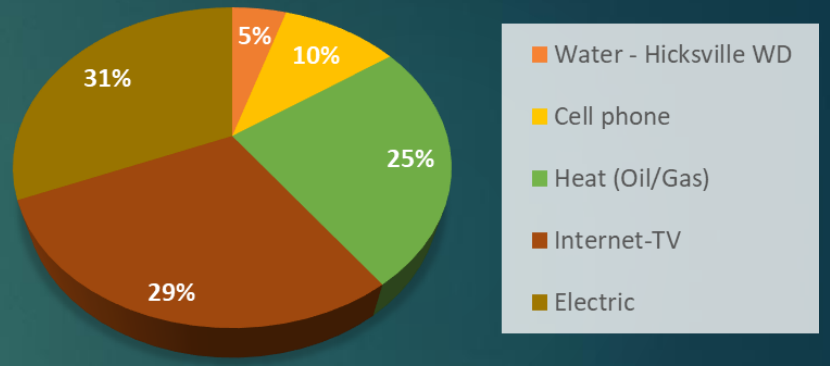
- **Build out Cost is projected to be $77 million. Through September 2023, the District has expended $43 million.**
  - **Grant Funding -** $34.7 million in grants awarded from the state. Does not cover O&M and replacement costs.
  - **Bonding –** District is a municipal corporation and obtains financing directly.
  - **Litigation Against Polluters**
    - Aggressively pursuing damages against polluters
    - Litigation is expected to take years, but if successful, the compensation will fund capital improvements and pay down bonded debt

- **Water rates were increased in 2021 through a 5-year financial plan to pay for the treatment while mitigating customer rate shock**
    - Designed to target the high user
    - Impact less on senior citizens or low users

Pre and Post EC Treatment Budget Comparison

- 2017 Actual Total Expenses: $8,362,323
  - Source of Supply, Power and Pumping: $2,295,171
    - Cost of chemical treatment, GAC and analysis: $410,000

- 2024 Budgeted Total Expenses: $14,051,053
  - Source of Supply, Power and Pumping: $5,441,000
    - Cost of chemical treatment, GAC and analysis: $ 1,760,000

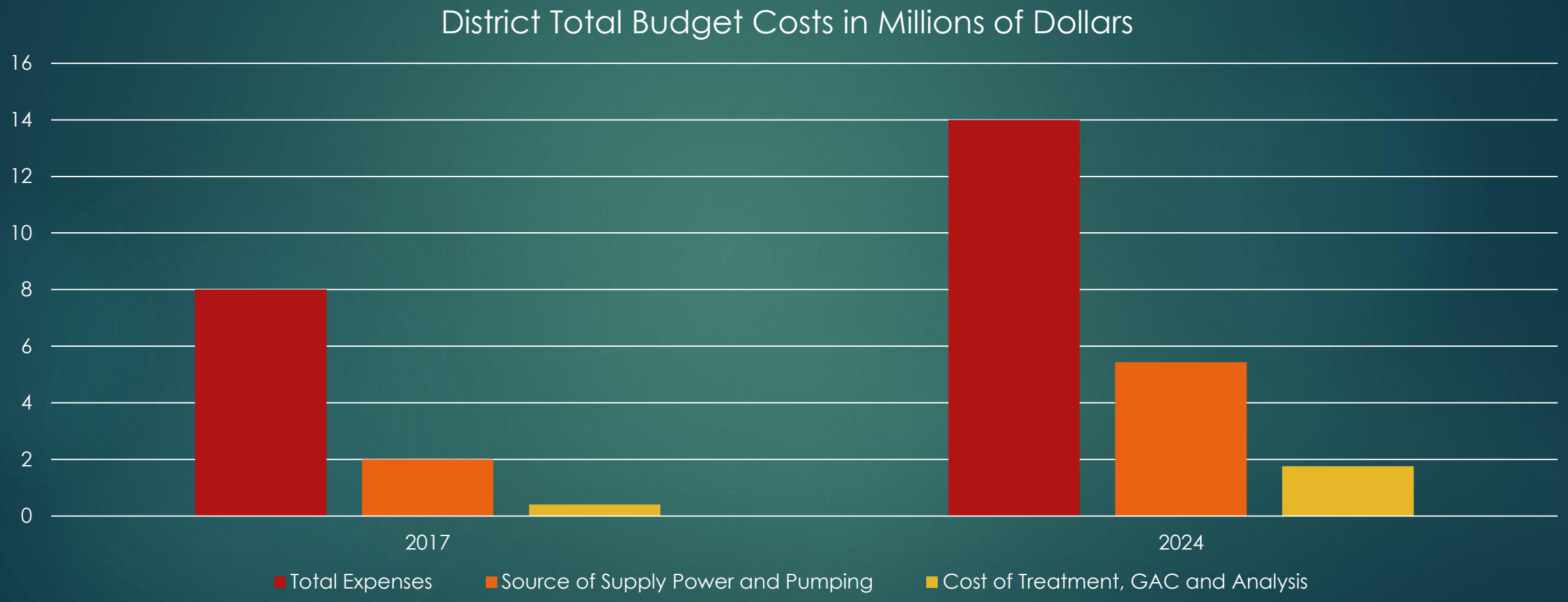


Average Monthly Cost

Responsible, effective water resource management, Since 1921

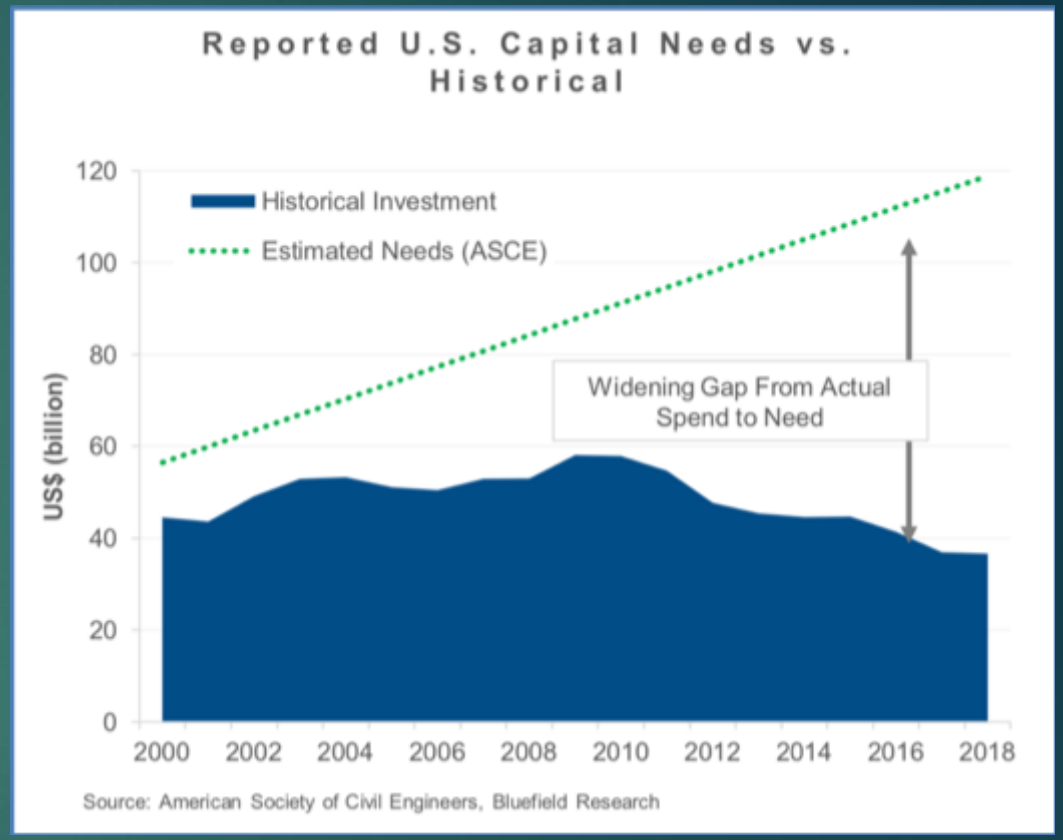
HICKSVILLE WATER DISTRICT

District Budget Costs

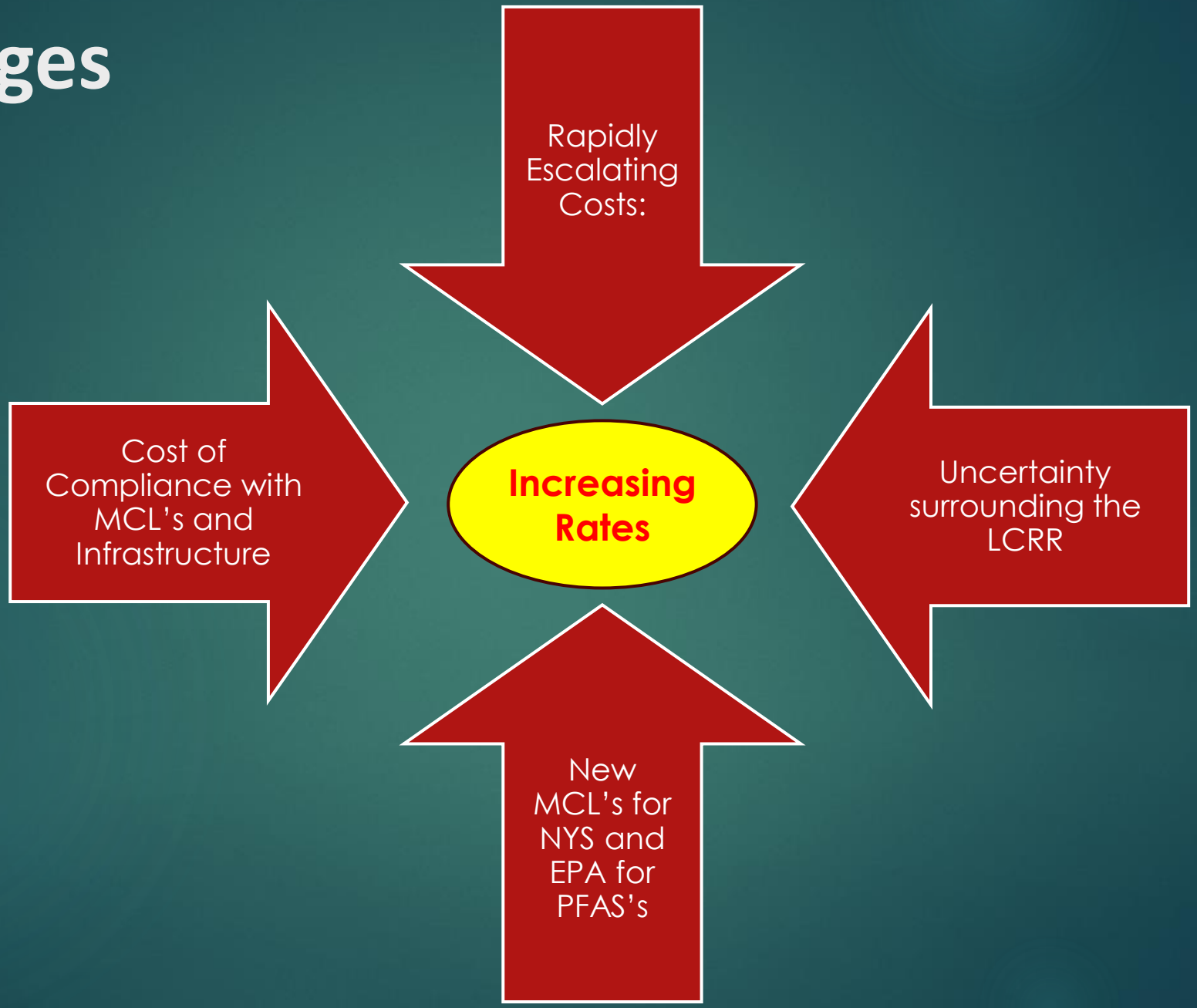


We Cannot Ignore Our Base Infrastructure

- The American Society of Civil Engineers estimates that NYS Water Utilities are facing $40 billion in infrastructure costs in the next 20 years.
  - Does not include costs for compliance with 1,4 Dioxane, PFOS, PFOA MCL's
  - Does not include costs for future EC regulations and LCRR



Challenges


Rapidly Escalating Costs:
Cost of Compliance with MCL's and Infrastructure
Increasing Rates
Uncertainty surrounding the LCRR
New MCL's for NYS and EPA for PFAS's

Proposed New PFAS MCLs:

- Based on DWQC recommendations, DOH poised:
  - Regulate 4 additional PFAS compounds
  - Establish cumulative MCL for all 6 PFAS
  - Establish emerging contaminant list
- Concerns:
  - How will PWS's reconcile EPA and NYS MCLs on PFAS?
  - Supply chain issues and laboratory capacity
  - Adequacy of current treatment

Impact and Concerns with Additional Regulatory Action

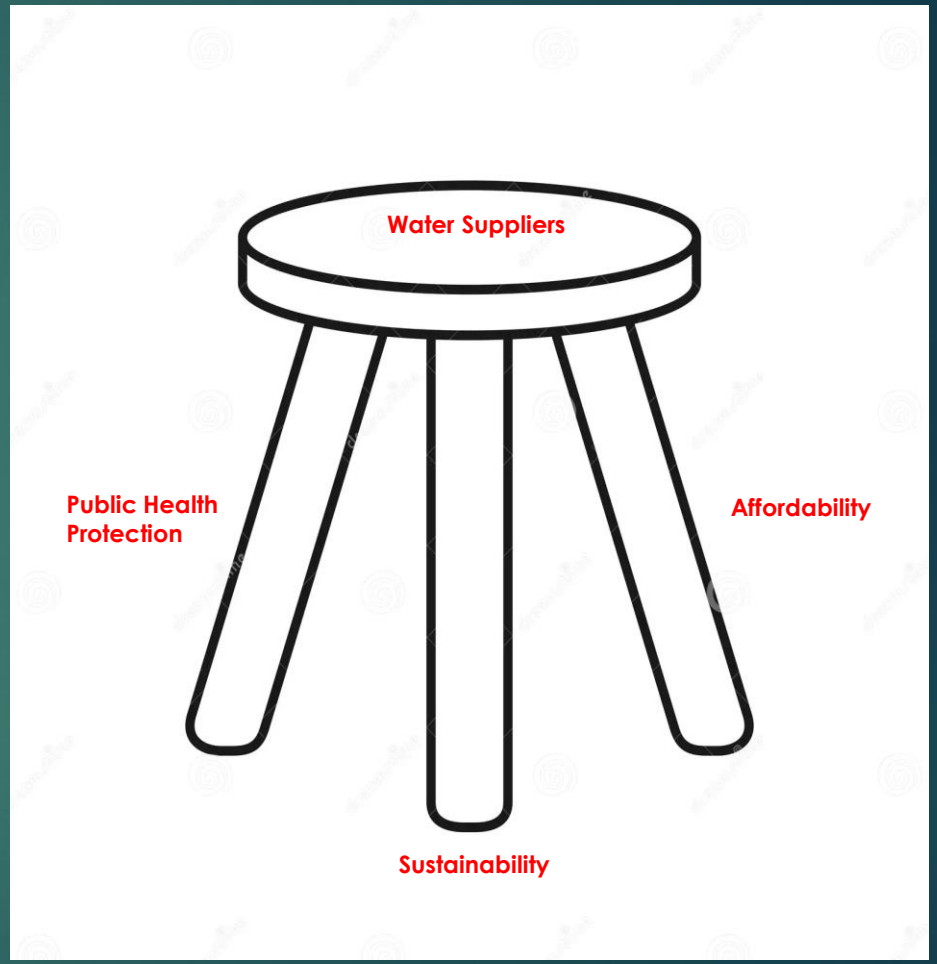
- Although our treatment of 1,4-dioxane and the other currently regulated perfluorinated compounds have been successful, proposed regulations for shorter-chained compounds will present new challenges.
- Are the existing carbon systems completely effective for the newly proposed contaminants?
- If the carbon mediums we are currently using are not as effective for necessary treatment in the future, how can we work together to find the most cost-effective solutions?
- Future cost impacts ….supply versus demand
- Environmental / climate change concerns – increase energy demand. One 80,000 lb GAC change requires five large diesel powered tractor trailers.

Responsible, effective water resource management, Since 1921

HICKSVILLE WATER DISTRICT

Current Regulatory Approach Must Change

- Current approach is not sustainable
  - Regulate not legislate
  - Is the sky always falling?
  - Is there enough science and data ?
  - Phased approach
  - Look at the big picture and all impacts
  - Balance the risk and rewards
  - Are the resources in place ?



What We Can Do and Some Closing Thoughts…

- Proactively communicate with and educated our elected officials and public we serve. We all must step up our efforts.
- Good, bad or indifferent engage the environmental community.
- Advocate for a balance approach to adopting new regulations.
- Partnering with academia (Center for Clean Water Technology) to pilot effective solutions to help standardize systems and produce industry buying power.

Responsible, effective water resource management, Since 1921

HICKSVILLE WATER DISTRICT


THANK YOU!

Joseph Pokorny, P.E.

Deputy CEO of Operations, Suffolk County Water Authority

Emerging Contaminants and Conservation

The Suffolk County Water Authority

Joseph Pokorny P.E.

- *Deputy CEO for Operations*

The Cost of Treating for Emerging Contaminants

- Treatment for PFOA and PFOS currently cost SCWA approx. $1.5M per well.
- O&M costs continue into future for carbon changeouts.
- Treatment for 1,4 Dioxane also costs SCWA approx. $1.5M per well although this assumes wells where a carbon system is currently in place.
- O&M costs continue into future for additional chemicals, carbon changeouts and system maintenance.
- Systems require additional operator costs along with testing

SCWA Action on Emerging Contaminants

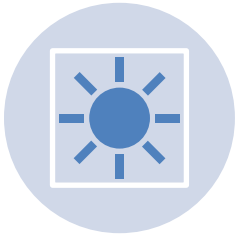
- SCWA has committed approx. $20M to installing PFOA/PFOS treatment systems to date.
- SCWA has committed over $22M to installing Advanced Oxidation Systems for treatment of 1,4 Dioxane.
- More treatment is slated for installation.
- Proposed EPA MCLs for PFOA/PFOS will require the installation of approximately 45 additional GAC systems.
- An additional 73 AOP systems will be needed to address all wells with detections of 1,4 Dioxane.

SUFFOLK COUNTY WATER AUTHORITY

SCWA

Water Overuse
"The Problem"

What issues are we facing?



SCWA experiences **peak water** usage between May and August which impacts pressure, emergency services.

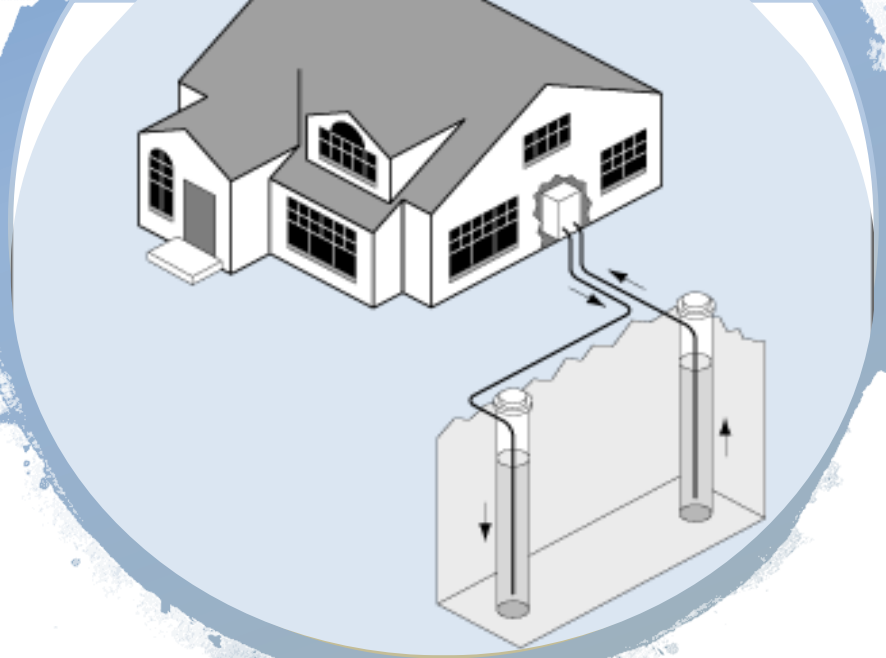
Long Island has a sufficient, but not limitless supply of groundwater.

Preserving Long Island's **sole source aquifer** for future generations.

Higher water usage means more SCWA infrastructure is needed to meet the peak, which means more costs that are passed along to customers. The cost of treating for Emerging Contaminants increases these costs.

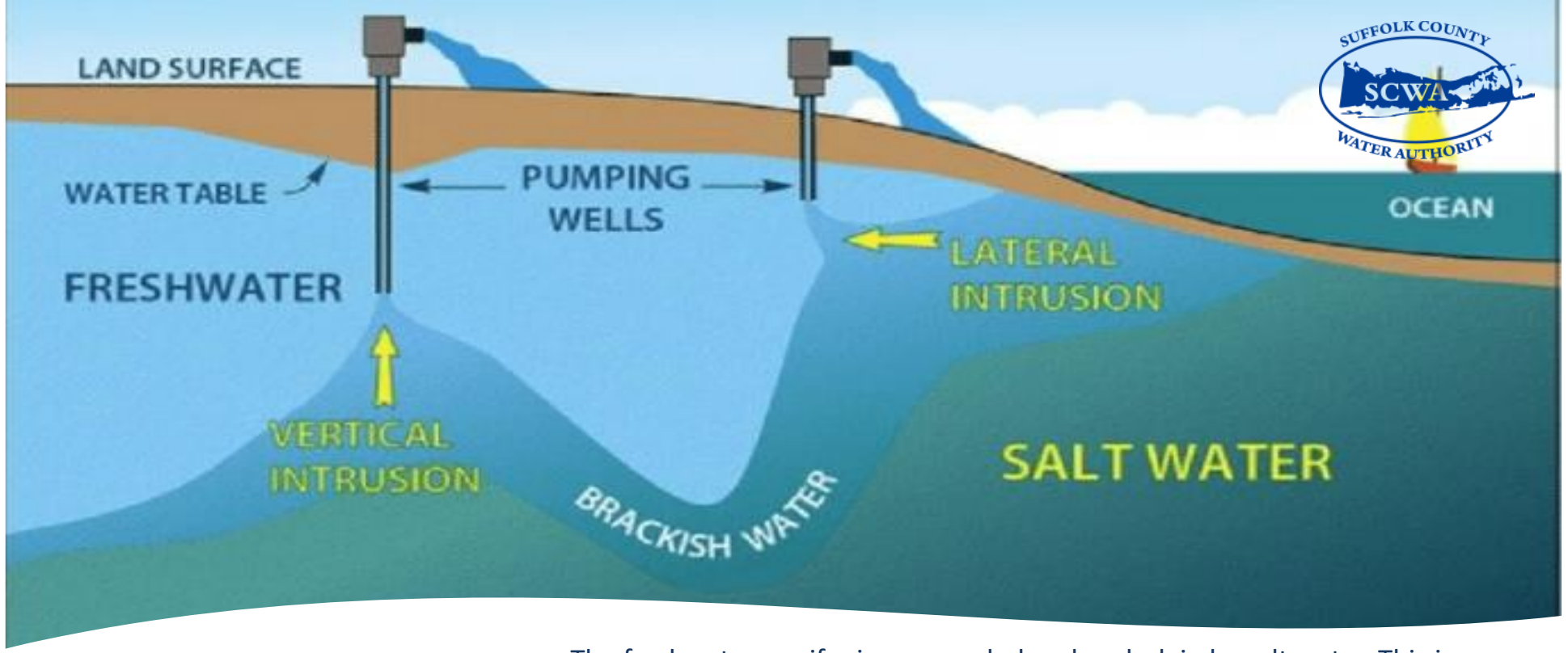
SUFFOLK COUNTY
SCWA
WATER AUTHORITY

What are the causes of high-water use?



Open-Loop Geothermal Systems

Irrigation for lawn watering



What risks do we face from over pumping?

- The freshwater aquifer is surrounded and underlain by salt water. This is the limiting factor when it comes to development of the local water supply.
- Some East Hampton wells have a potential to be affected by saltwater intrusion or “up coning” from underneath them as they are pumped.
- The presence of the saltwater limits a wells depth and available gallons per minute.
- This is a seasonal occurrence for some wells indicated by seasonally fluctuating chloride levels.
- If not controlled by limiting pump rate and/or the hours of operation, the fresh water beneath a well can be permanently affected by the underlying salt water, gradually becoming more saline and less and less usable.

Water Infrastructure
"The Cost"

Water Infrastructure Costs

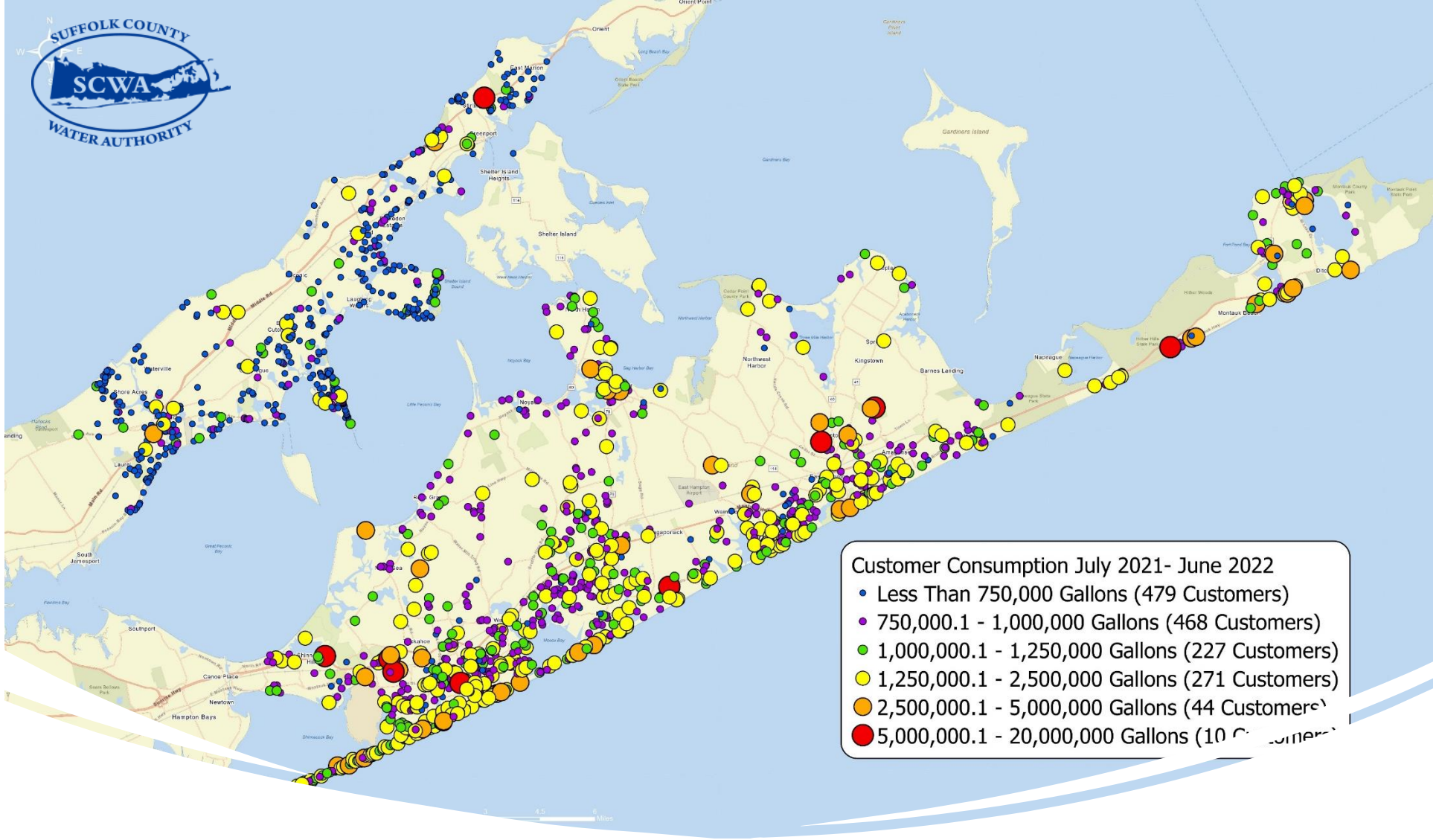
- Increases in demand must be countered by increases in supply. Supply is increased by:
  - Drilling new wells
    - New Wells cost approx. $1.0M each
  - Adding more Storage
    - New 2MG GST reservoir costs approx. $4.0M
  - Interconnecting areas that have a surplus with areas that have a deficit of water.
    - New pipelines costs approx. $1.5M per mile.
- Given the widespread existence of emerging contaminants. New wells will typically require approx. $1.5M in treatment systems.

SUFFOLK COUNTY WATER AUTHORITY

SCWA

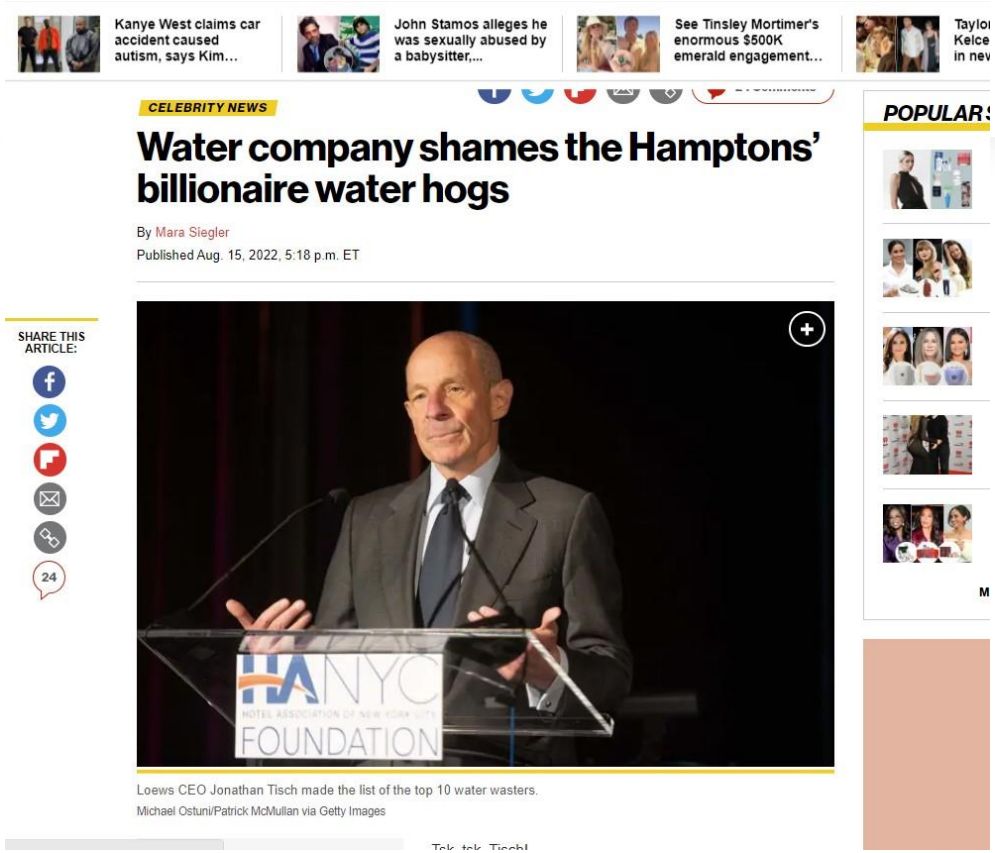
Water Conservation

"The Solution"



Top Water Consumers on the East End

Public Shaming is Not a Strategy



Kanye West claims car accident caused autism, says Kim...

John Stamos alleges he was sexually abused by a babysitter,...

See Tinsley Mortimer's enormous $500K emerald engagement...

CELEBRITY NEWS

Water company shames the Hamptons' billionaire water hogs

By Mara Siegler

Published Aug. 15, 2022, 5:18 p.m. ET

SHARE THIS ARTICLE:

24

Loews CEO Jonathan Tisch made the list of the top 10 water wasters.

Michael Ostuni/Patrick McMullan via Getty Images

POPULAR

NEWS

Kim, Kourtney Kardashian among worst water hogs during Calif. drought: report

By Lee Brown

Published Aug. 23, 2022 | Updated Aug. 23, 2022, 6:22 p.m. ET

Kim Kardashian is one of several stars who've been accused of violating water restrictions in California, according to The Los Angeles Times

00:09 / 01:17

Luckily not everyone is keeping up with the Kardashians.

Celebrity sisters Kim and Kourtney Kardashian are among a number of stars listed among the worst water wasters in their swanky California neighborhoods amid unprecedented drought restrictions.

Three of the duo's multi-million-dollar properties were among those issued "notices of exceedance" by the

SCWA Conservation Initiatives

- In 2020, SCWA adopted **a tiered rate structure**. Customers who use water above a certain threshold will be charged a higher rate.
  - SCWA is considering add a **third tier** for super users.
- In 2020, SCWA banned the use Open-Loop Geothermal Systems on our system.
- In January 2023, SCWA instituted a new **Comprehensive Water Conservation Plan**. Some of the key elements are:
  - The adoption of an **Odd/Even lawn watering** policy for all customers
  - Enhanced **rebates** for installing water saving devices
  - A proactive **ad campaign** to inform our customers about the importance of water conservation

SUFFOLK COUNTY WATER AUTHORITY

Administrative Offices: 4060 Sunrise Highway, P.O. Box 38, Oakdale, New York 11769-0901
(631) 589-5200

PRESS RELEASE

FOR IMMEDIATE RELEASE
October 18, 2023

Contact: Dan Dubois
(631) 563-0362
daniel.dubois@scwa.com

Suffolk County Water Authority Sees Success with Water Conservation Program

Data Indicates that Customers are Adopting Water Saving Measures and Reducing Peak Demand

The Suffolk County Water Authority says that it is seeing success with its water conservation plan and that customers are adopting water savings measures. SCWA adopted a new comprehensive water conservation plan at the beginning of this year that set new rules for lawn watering, enhanced credits for installing water saving devices and started an extensive outreach and messaging campaign to stress the importance of water conservation. With the summer and the lawn watering season ending, SCWA says that peak pumping rates were lower than in 2022, despite droughts in both years.

"We understand that it's going to be multi-effort to change behavior in Suffolk County," said SCWA Chairman Charles Lefkowitz. "Many of our customers have habits built over a lifetime and we are asking them to change that for the good of the water system. Even though this was just the first year of this new effort, we are already seeing that our customers are changing to the odd/even lawn watering schedule and taking other steps to reduce their water use. We will keep at it over time, but we are pleased to see some early success."

Central to SCWA's conservation plan was the adoption of an odd/even watering policy that instructs customers to only water their lawns on the calendar dates that correspond to their street address. Homes or businesses with odd numbered street address should only water on odd numbered calendar dates and homes or businesses with even numbered street address should only water on even numbered calendar dates.

The odd/even policy is intended to reduce peak demand on the system to ensure that there is adequate supply of water to serve all customers. SCWA says that data from this year shows that the policy is working. Despite this summer's drought, the highest level of pumping reached by SCWA this year was 515,720 gallons per minute, a 3.4% reduction from the peak last year of 533,338 gallons per minute. That difference represents the capacity of about 15 large supply wells.

SUFFOLK COUNTY
SCWA
WATER AUTHORITY

Thank You

Q&A

Special Presentation

Joseph Todaro, P.E.

Vice President, H2M Architects + Engineers

H 2 M architects + engineers

Long Island Water Conference
Drinking Water Symposium

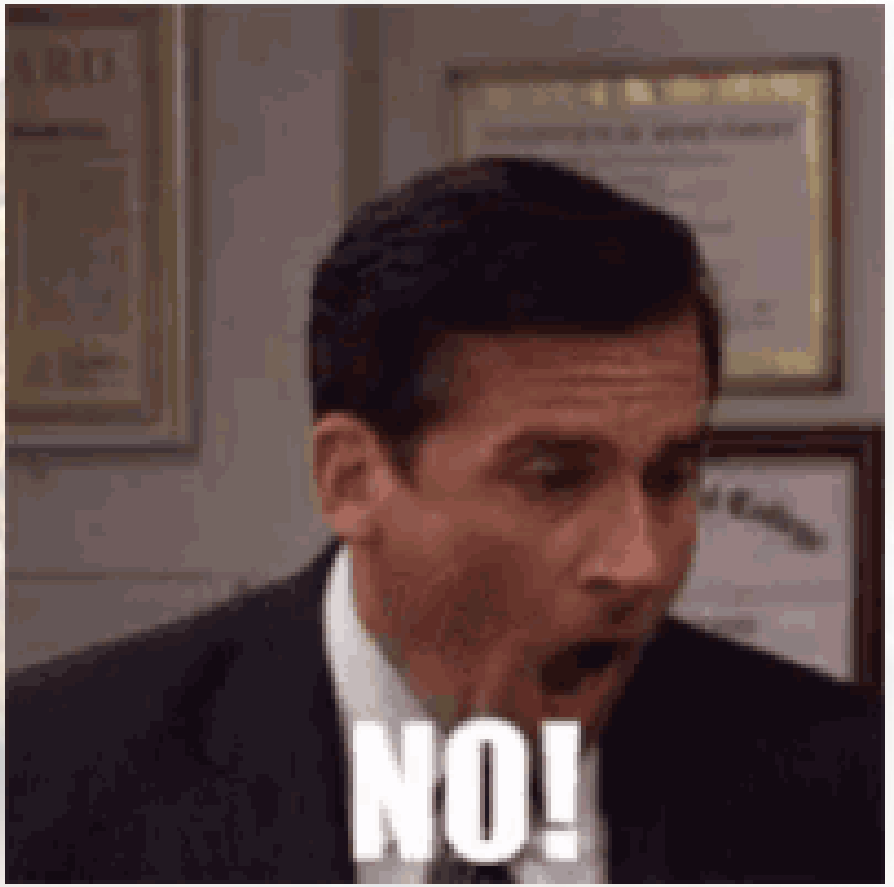
Lead Service Line Inventory Progress Updates

October 20, 2023

Content

- Lead Service Line Inventory Update

- Village of Garden City

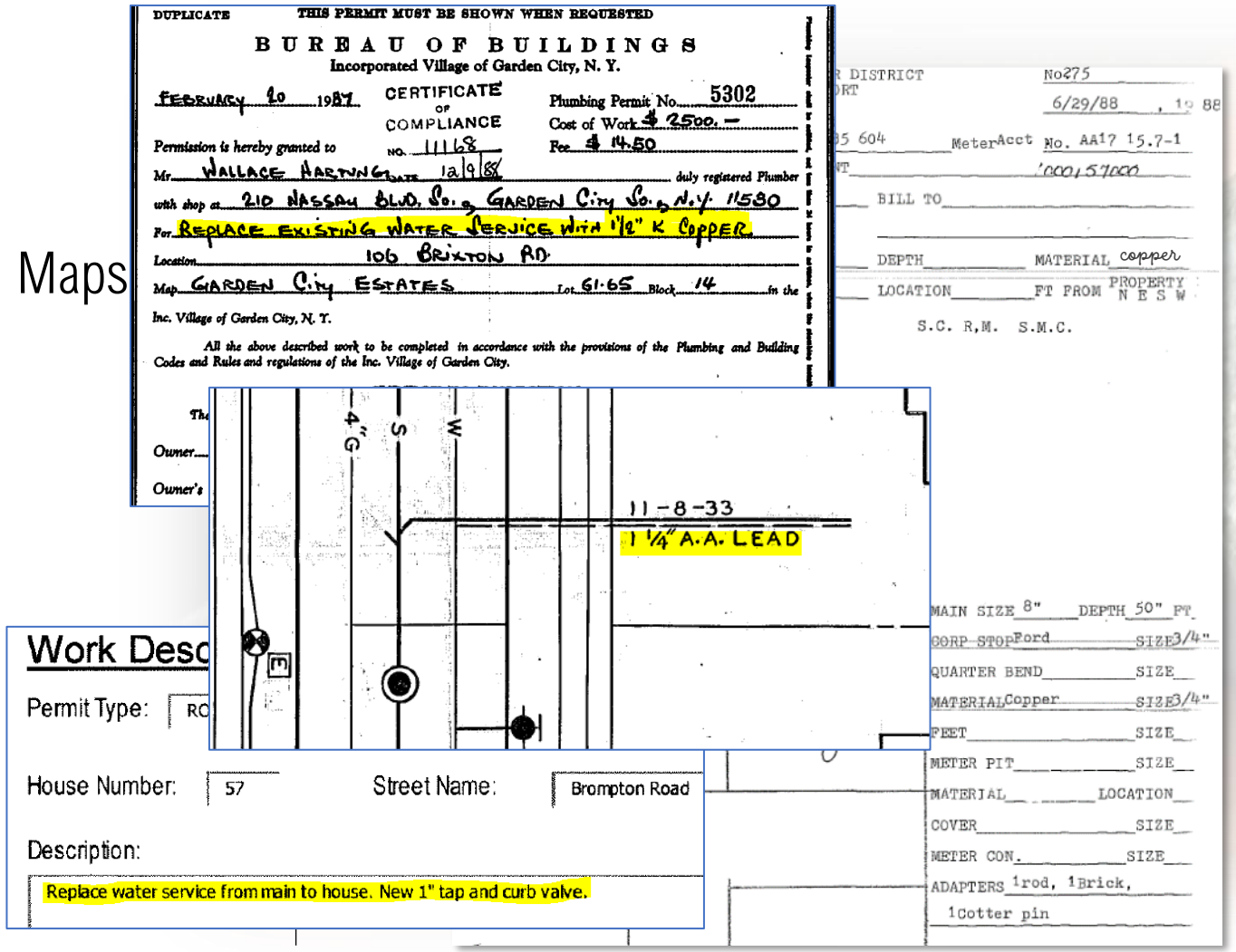


Lead Service Line Inventory

- Updates to the inventory are required until the following are met:
  - All unknowns are identified
  - All lead service lines and galvanized requiring replacement lines are replaced
- A plan must be developed to address unknown service lines
  - Identify unknowns are required through normal operations
    - Maintenance and repair
    - Reading water meters
  - Communicate with owners
    - Surveys to residents
    - Requests for material inspection

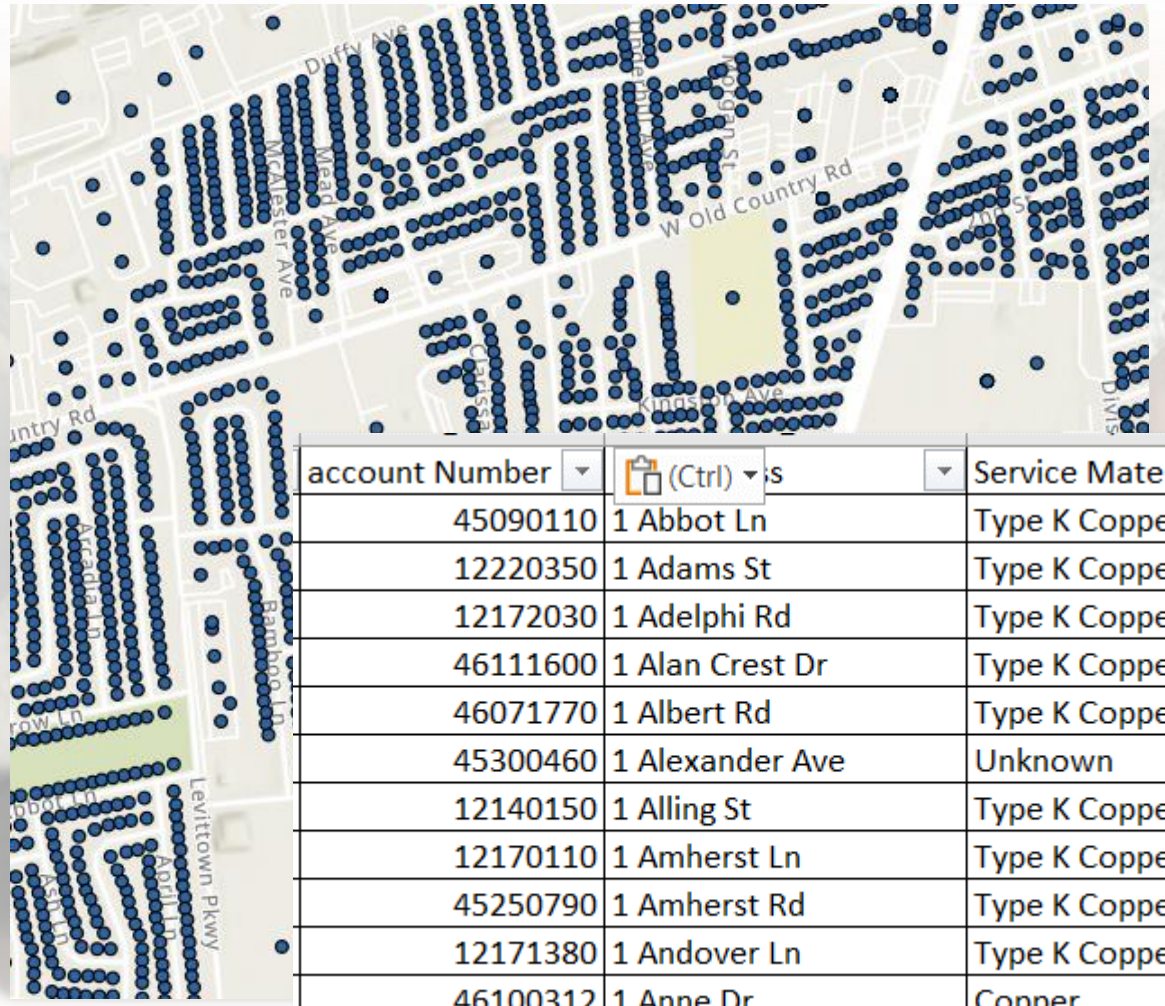
Sources of Service Line Material Information

- Tap Cards // Plumbing Permits
- Design Plans
- Water Main Replacement Record Maps
- Meter Change out records
- Work Orders
- Service Replacement Records
- Date of Construction
- Ordinance banning lead



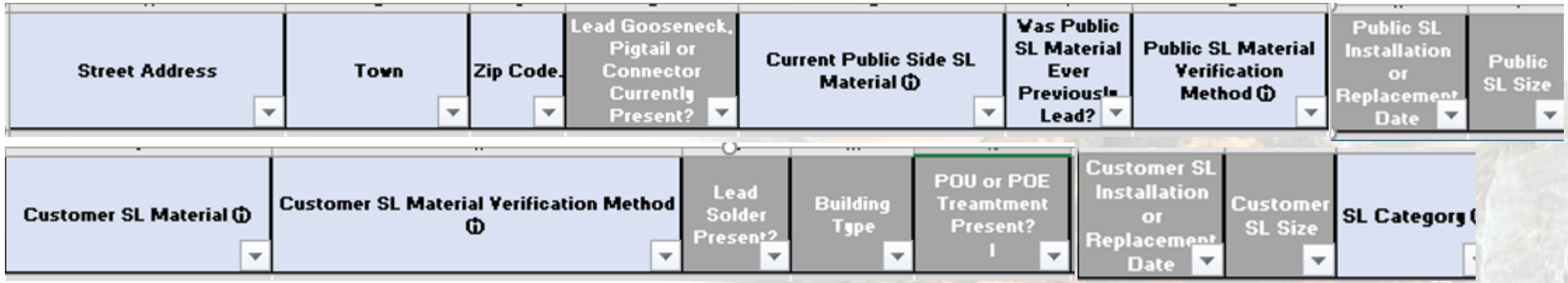
Lead Service Line Inventory
Map Water Services in GIS

- Spreadsheet with address or tax map ID number converts to points in a GIS map
- Incorporate existing information in a database or spreadsheet into GIS
- Additional fields can be incorporated in GIS that are not LSL required
  - Meter Size
  - Service Size
  - Tap Number
  - Meter Number



account Number	(Ctrl) s	Service Material
45090110	1 Abbot Ln	Type K Copper
12220350	1 Adams St	Type K Copper
12172030	1 Adelphi Rd	Type K Copper
46111600	1 Alan Crest Dr	Type K Copper
46071770	1 Albert Rd	Type K Copper
45300460	1 Alexander Ave	Unknown
12140150	1 Alling St	Type K Copper
12170110	1 Amherst Ln	Type K Copper
45250790	1 Amherst Rd	Type K Copper
12171380	1 Andover Ln	Type K Copper
46100312	1 Anne Dr	Copper

New York State Department of Health Service Material Template

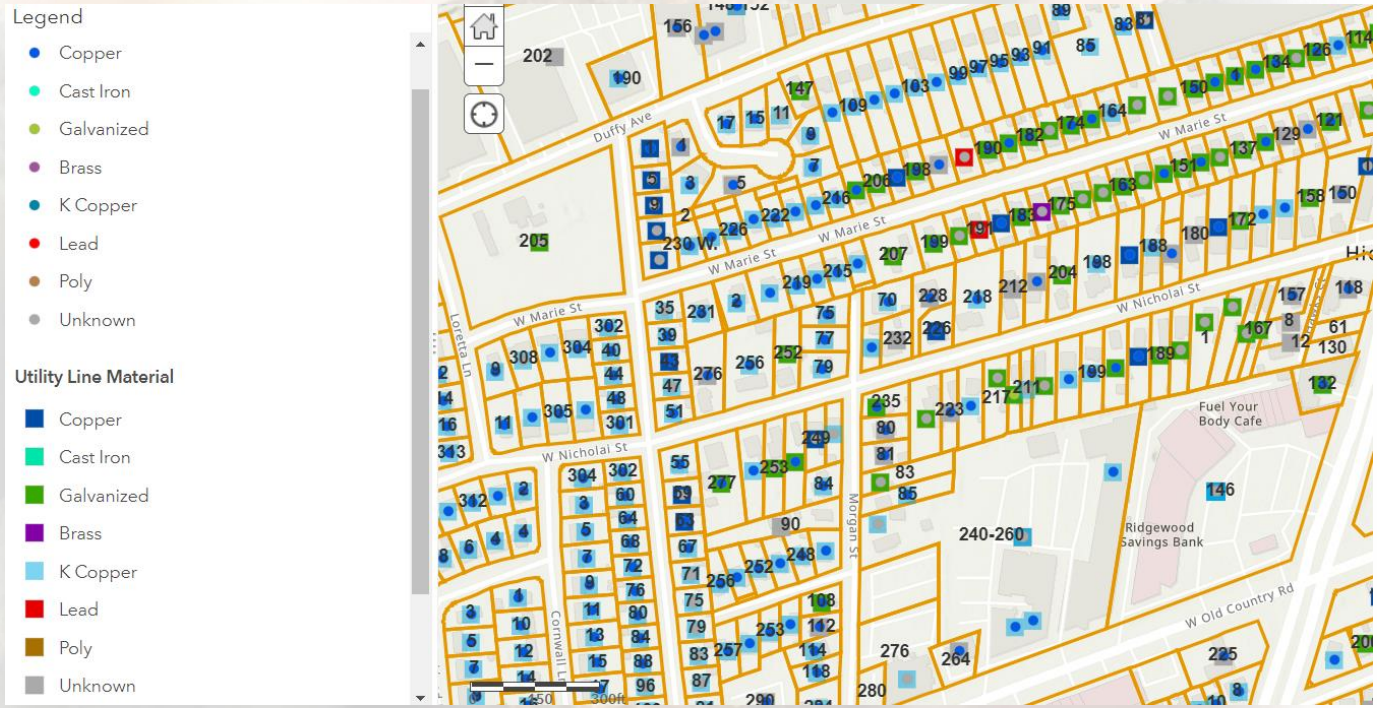


Required Recommended

- Federal guidelines are still working on revisions that may strengthen the regulation
- Lead Connectors: Currently, regulation states that if they are encountered, they must be removed
- Point of Use/Point of Entry : Important to note in regard to sampling
- SL Category: The whole service lines is designated as a Material Category, so partial lead replacements are not considered a full replacement in the designation

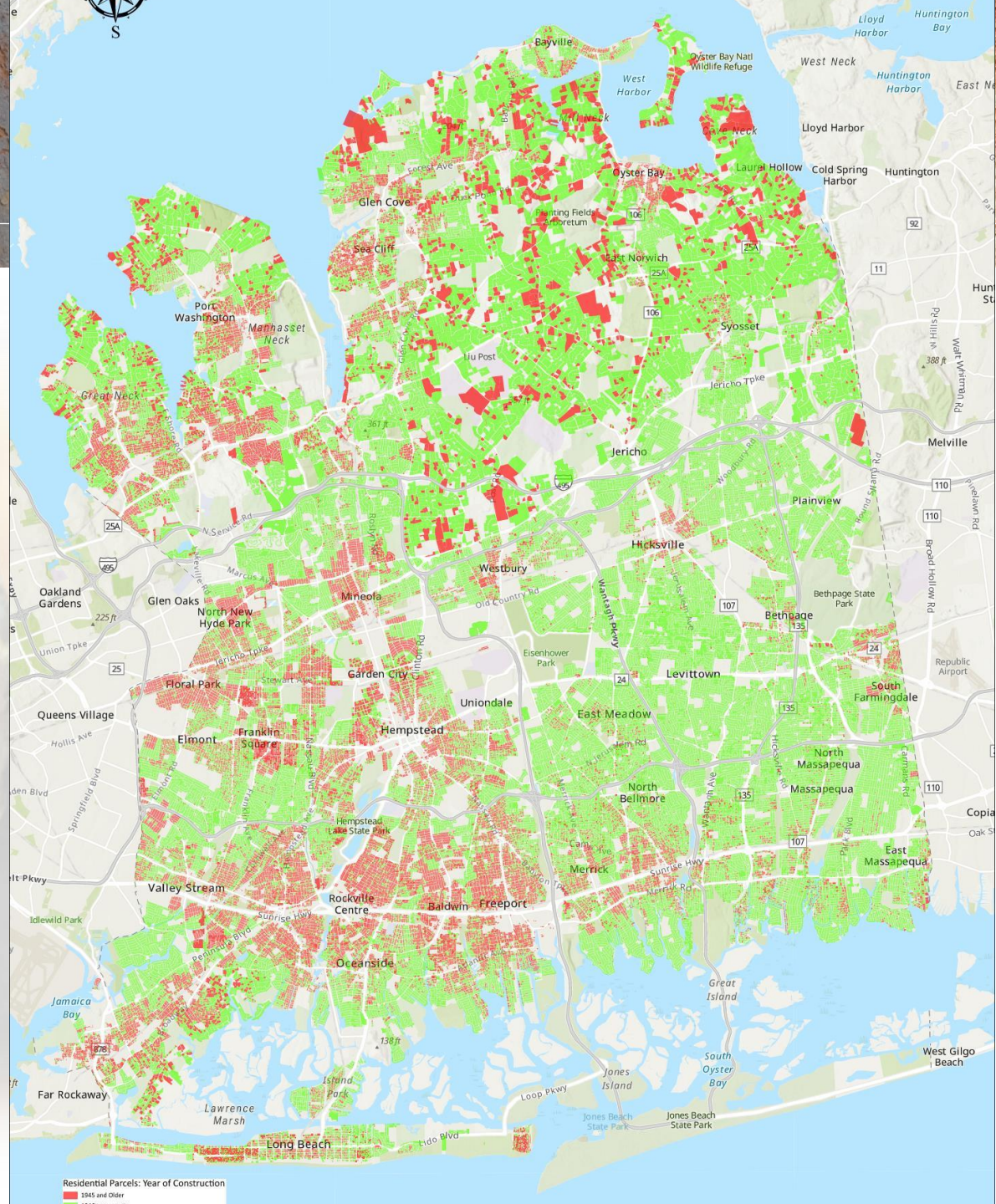
Service Material Map

- Provides transparency to customers
- Maps are searchable by address or account
- Maps are embedded in your existing website
- Provide quick and easy access to information
- Limit what public can see
  - Just show material information and hide other fields
- When updates are made, they are automatically updated to public map



Nasau County Home Construction Prior to 1945

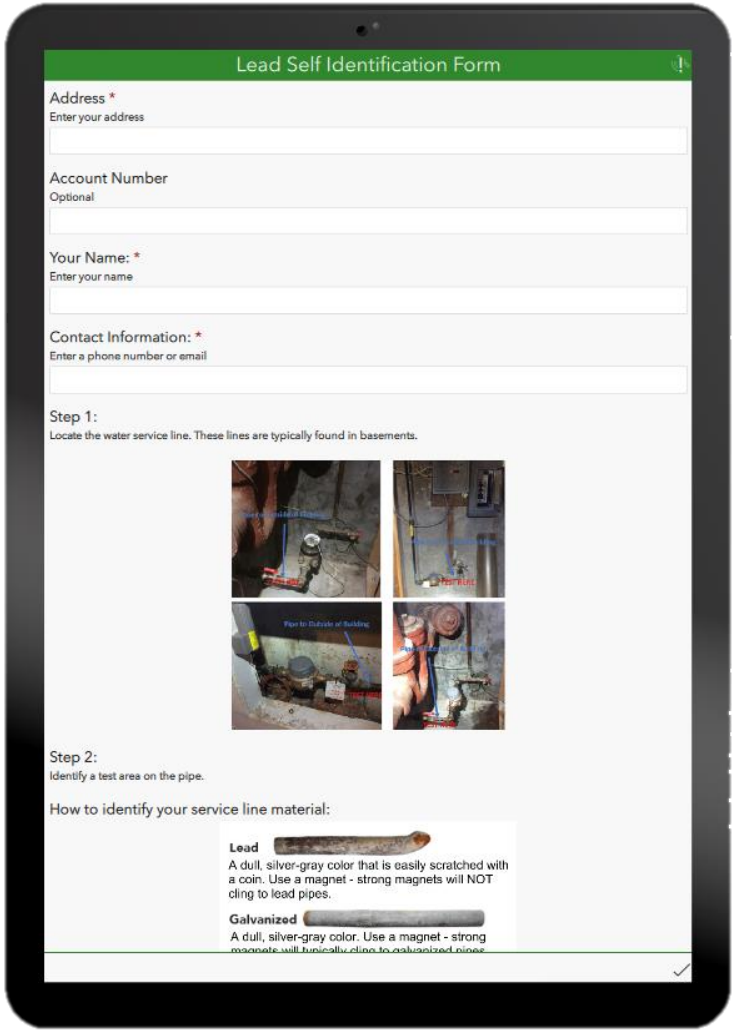
- Red shows residences constructed before 1945
- Residential only, not commercial
- Good start for lead service locations

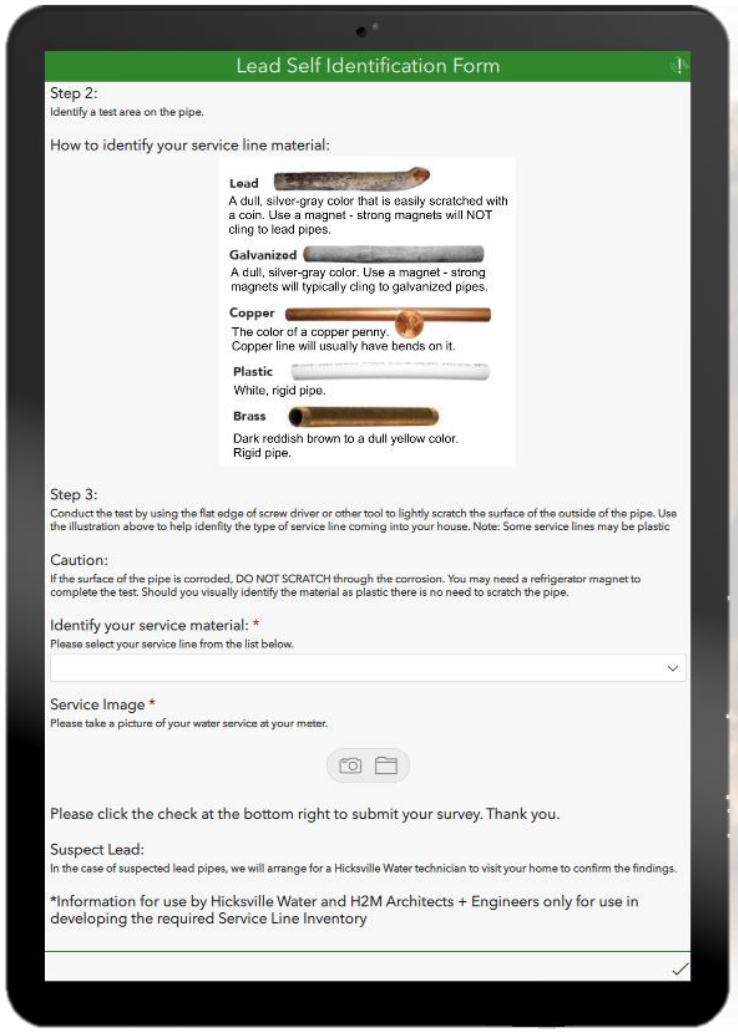


Identification Methods

- Technically complete with inventory after record research
- But may still have many unknowns
- The more unknowns, the more you need to accomplish
- Dig and determine
- Self Evaluation
- Inspection
- Machine Learning
- Eventually need to eliminate all unknowns and all lead services.

Survey 123 Inspection forms
Self Identification survey





QR Code, can be put on website or flyer

Surveys can be setup for District to be email notified when residents submit a survey indicating lead!

NYSDOH “How to Find Out if You Have a Lead Service Line” Video
https://www.health.ny.gov/environmental/water/drinking/lead/

Fateful Day

- October 20, 2021
- Village notified of Elevated Blood Level in a pregnant resident
- Local Health Dept. investigated house
- Village sampled wells and distribution system
- Village sampled various residences in area

Immediate Sampling

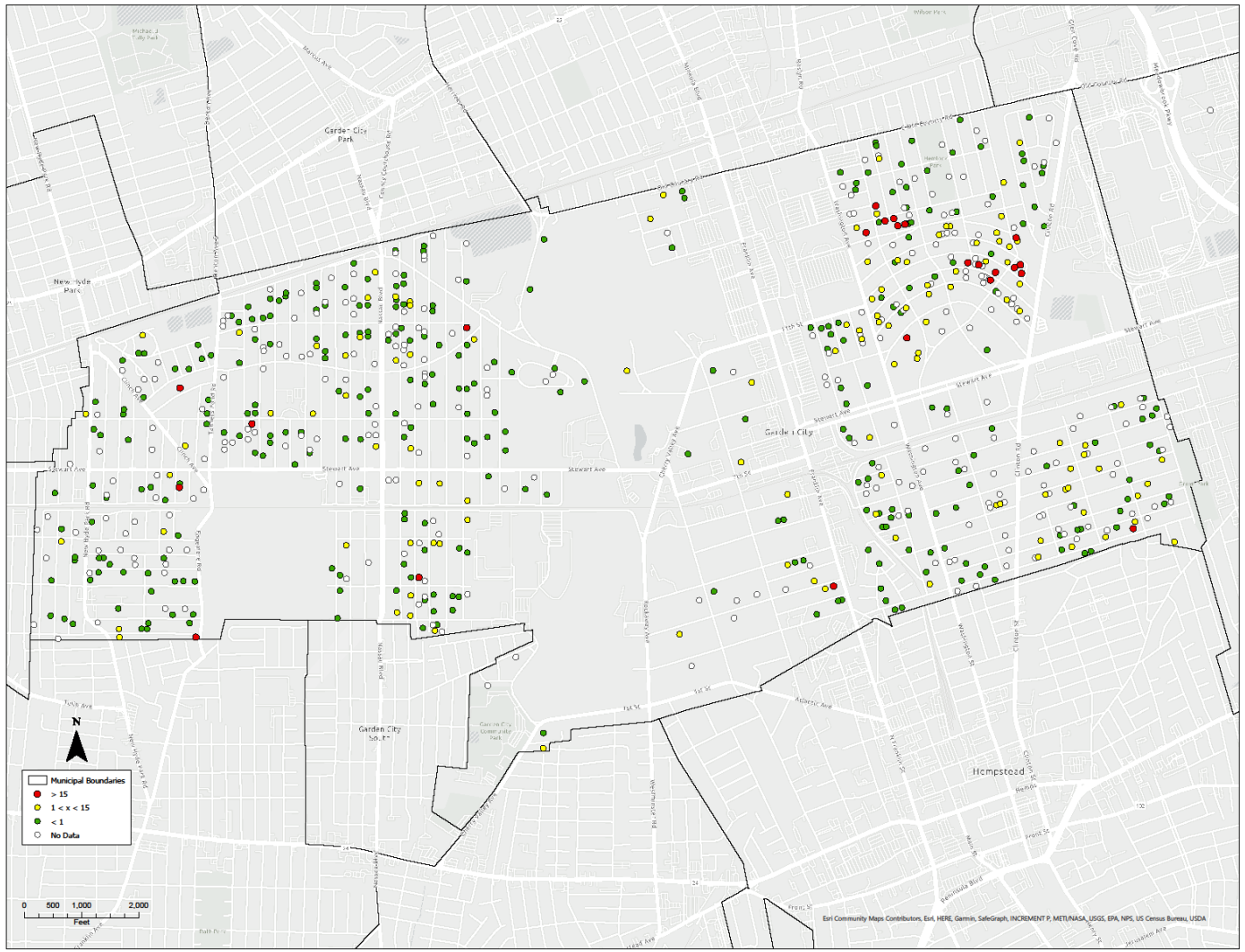
Homeowner Lead Sampling Results 12/2/2021

No.	Address	Lead - First Draw	Lead - Flush Draw	Notes
1	[redacted]	ND	ND	
2		9.1	24.7	
3		ND	ND	
4		ND	ND	
5		~100	~100	Assumed result
6		ND	ND	
7		ND	ND	
8		2.67	6.50	Results are averaged of two sample points
9		ND	ND	
10		15.9	3.42	
11		ND	ND	
12		ND	ND	
13		ND	ND	Rerigertor line showed detect for lead
14		ND	ND	

December 2021

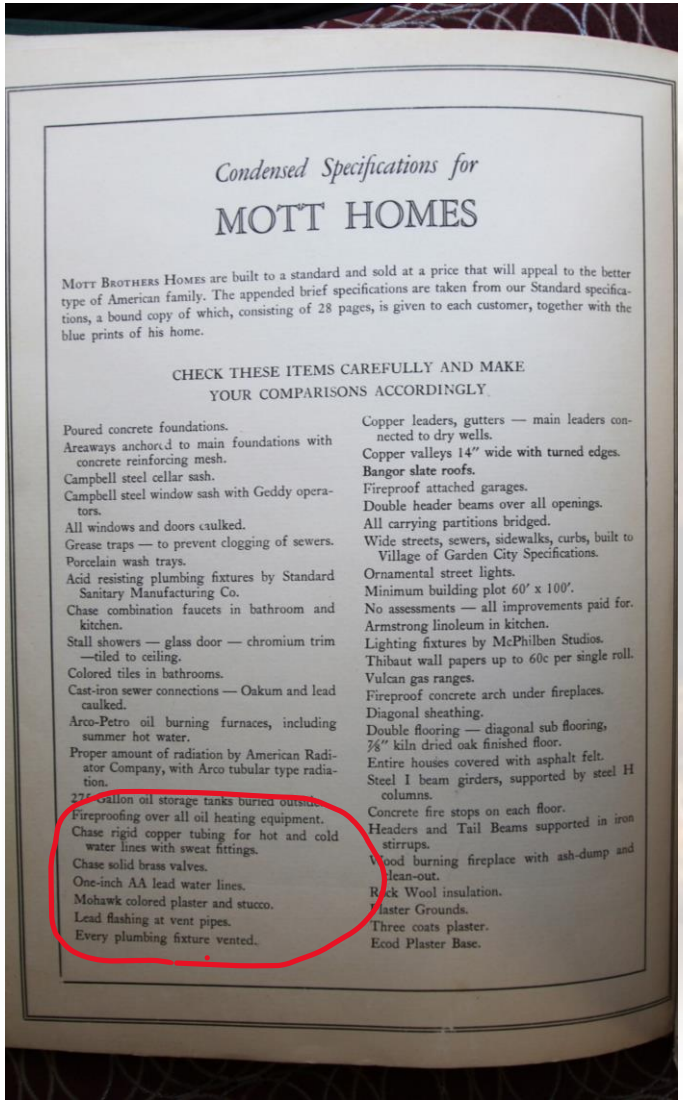
- Village notified of samples above action level
- NYSDOH Free Lead Testing Pilot Program
  - 2 – 250 mL sample bottles
- NCDH requests Village sample 6 houses
- Social Media Push
- Friday, January 21, 2022
  - Phone Conferences with Local Health Dept.

NYS Free Lead Testing Pilot Results Map



January 2022

- Weekend testing of neighbors of high Level Samples in Mott Section
- Hydrant Sampling in Mott area
- Following week – Phone conference with NYSDOH and local HD
- Canvas entire Mott Section



Condensed Specifications for

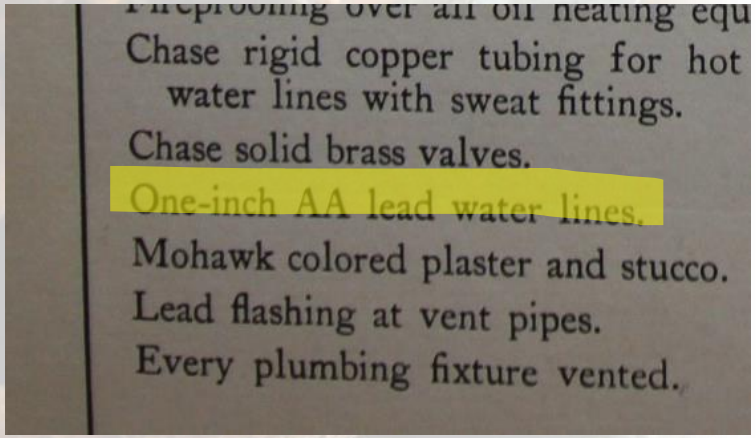
MOTT HOMES

Mott Brothers Homes are built to a standard and sold at a price that will appeal to the better type of American family. The appended brief specifications are taken from our Standard specifications, a bound copy of which, consisting of 28 pages, is given to each customer, together with the blue prints of his home.

CHECK THESE ITEMS CAREFULLY AND MAKE YOUR COMPARISONS ACCORDINGLY

Poured concrete foundations.
Areaways anchored to main foundations with concrete reinforcing mesh.
Campbell steel cellar sash.
Campbell steel window sash with Geddy operators.
All windows and doors caulked.
Grease traps — to prevent clogging of sewers.
Porcelain wash trays.
Acid resisting plumbing fixtures by Standard Sanitary Manufacturing Co.
Chase combination faucets in bathroom and kitchen.
Stall showers — glass door — chromium trim —tiled to ceiling.
Colored tiles in bathrooms.
Cast-iron sewer connections — Oakum and lead caulked.
Arco-Petro oil burning furnaces, including summer hot water.
Proper amount of radiation by American Radiator Company, with Arco tubular type radiation.
275 Gallon oil storage tanks buried outside.
Fireproofing over all oil heating equipment.
Chase rigid copper tubing for hot and cold water lines with sweat fittings.
Chase solid brass valves.
One-inch AA lead water lines.
Mohawk colored plaster and stucco.
Lead flashing at vent pipes.
Every plumbing fixture vented.

Copper leaders, gutters — main leaders connected to dry wells.
Copper valleys 14" wide with turned edges.
Bangor slate roofs.
Fireproof attached garages.
Double header beams over all openings.
All carrying partitions bridged.
Wide streets, sewers, sidewalks, curbs, built to Village of Garden City Specifications.
Ornamental street lights.
Minimum building plot 60' x 100'.
No assessments — all improvements paid for.
Armstrong linoleum in kitchen.
Lighting fixtures by McPhilben Studios.
Thibaut wall papers up to 60c per single roll.
Vulcan gas ranges.
Fireproof concrete arch under fireplaces.
Diagonal sheathing.
Double flooring — diagonal sub flooring, 7/8" kiln dried oak finished floor.
Entire houses covered with asphalt felt.
Steel I beam girders, supported by steel H columns.
Concrete fire stops on each floor.
Headers and Tail Beams supported in iron stirrups.
Wood burning fireplace with ash-dump and clean-out.
Rock Wool insulation.
Plaster Grounds.
Three coats plaster.
Ecod Plaster Base.



Fireproofing over all oil heating equ
Chase rigid copper tubing for hot water lines with sweat fittings.
Chase solid brass valves.
One-inch AA lead water lines.
Mohawk colored plaster and stucco.
Lead flashing at vent pipes.
Every plumbing fixture vented.

Mott Section

- Mott Section Sampling Query
- Flyers delivered house to house on February 10-11, 2022
- First delivery of sample bottles on February 11, 2022
- Bottle Collection started at Library on Saturday, February 12, 2022
- 3 1L bottles:
  - 1L, 5L, 10 minute

Mott Section Sampling Results

- 833 Flyers sent out
- 182 bottles delivered to residents
- 160 bottles returned and sample results received
- Sample Results over Action Level of 15 μg/L

First Draw – 1st Liter	Flush Draw - 5th Liter	Flush Draw – 10-minutes
23 (14.4%)	42 (26.3%)	29 (18.1%)

- Overall – 32.5% of samples had 1 or more draws over the action level

No. of Samples	Non-Detects (<1.0 ppb)	Detects > 1.0 ppb and < 15.0 ppb	Detects > AL (15.0 ppb)
160	64 (40%)	44 (27.5%)	52 (32.5%)

Health Dept Directive

- February 4, 2022
- Revert back to Standard Monitoring for LCR (June, Dec)
- Bi-weekly entry point sampling (pH, conductivity, Ca, Alk., LSI)
- Distribution System Sampling

LCR Compliance Sampling

- Challenge:
  - Finding Original Sites chosen in 1991
    - Specifically lead solder homes
    - Very difficult to find 40 years later
  - Over the years, sample locations switched
  - Suppliers will need to re-evaluate if LCR is due in 2024

LCR Compliance Sampling

- Results:
  - Sent out 85 sets of bottles, 65 returned
  - Only 3 lead solder homes, 62 LSL's
  - Current regulation: 1L sample, first draw analyzed for lead
  - Village exceeded 90th percentile for lead action level

No. of Samples	Non-Detects and Detects < 5.0 ppb	Detects > 5.0 ppb And < 15.0 ppb	Detects > AL (15.0 ppb)
65	31 (47.7%)	20 (30.8%)	14 (21.5%)

Continued Actions

- Continuing with LSL inventory
- Communicating with Village Residents and Health Dept.
  - Attend Board Meetings and Environmental Review Board
    - Presented 4-5 times since Nov. 2021
  - Answer resident questions after Sampling notifications
  - Many questions on replacement costs / filters / water quality
  - Finalized Corrosion Control Report
  - Implemented Orthophosphate Treatment

NYSDOH Sampling

- Results:
  - Samples: 903 (13% of homes)
  - Sample Pool: Anyone requesting sample within Village
  - Based on Max level of either sample bottle (First, Flush)

No. of Samples	Non-Detects and Detects < 5.0 ppb	Detects > 5.0 ppb And < 15.0 ppb	Detects > AL (15.0 ppb)
903	798 (88.4%)	56 (6.2%)	49 (5.4%)

Village-Wide Sampling

- Results:
  - Samples: 670 Total, 192 in Mott Section (28.7%)
  - Roughly 74% of Detects above AL are in Mott Section
  - Based on Max level of any sample bottle

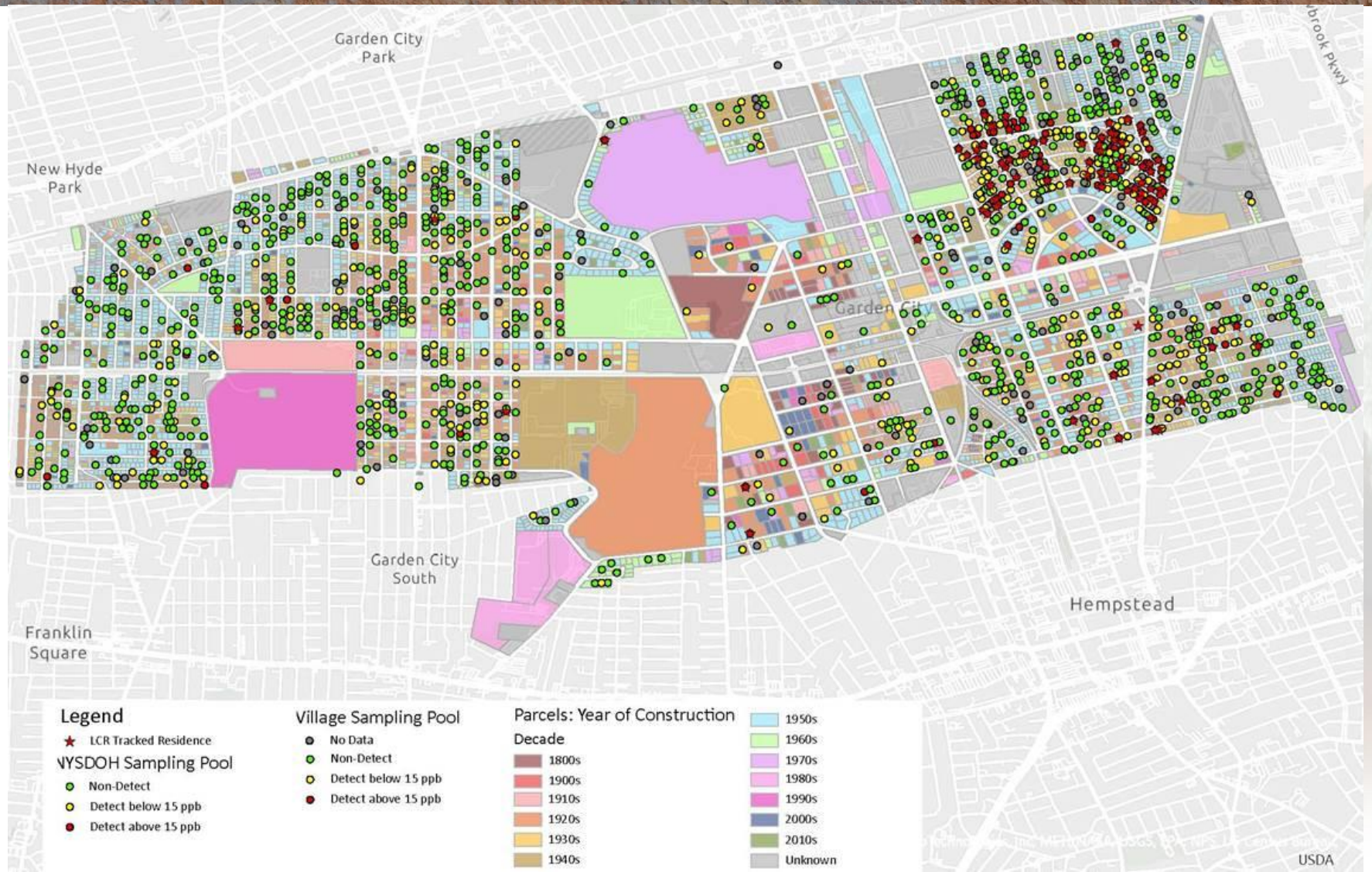
Location	No. of Samples	Non-Detects and Detects < 5.0 ppb	Detects > 5.0 ppb And < 15.0 ppb	Detects > AL (15.0 ppb)
Total	670	531 (79.3%)	53 (7.9%)	86 (12.8%)
Mott	192	99 (51.6%)	30 (15.6%)	63 (32.8%)
Rest	478	432 (90.4%)	23 (4.8%)	23 (4.8%)

Overall Sampling Results

- Total Overall Results:
  - Samples: 1573 (~23.5% of homes)
  - All sampling (NYSDOH, Village, LCR)
  - Based on Max level of any sample bottle

No. of Samples	Non-Detects and Detects < 5.0 ppb	Detects > 5.0 ppb And < 15.0 ppb	Detects > AL (15.0 ppb)
1573	1329 (84.5%)	109 (6.9%)	135 (8.6%)

Final Results Map



Takeaways

- Village:
- Reviewing Orthophosphate Efficiency (40%)
- Sampled in September (30 samples – repeats of LCR sampling)
- LCR Sampling in December (60 samples)
- Continuing sampling as requests are generated
- Maintaining communication with Residents and Health Dept.

Takeaways

- Overall:
- Don’t assume you have no lead services
- Even if you don’t, you still need to prove it
- Evaluate your LCR Sampling Pool
- Good Communication

Comments / Questions

Thank you for your attention.

Q&A

Closing Remarks

Andrew Bader

Commissioner, Plainview Water District