



Sources, Transport, Exposure and Effects of Poly- and Perfluoroalkyl Substances (STEEP): A Program Update Focusing on Cape Cod Efforts

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What is STEEP?

- Research
- Community Engagement
- Research Translation
- Training the next generation of scientists
- Focus on poly- and perfluoroalkyl substances (PFASs)

Faroe Islands



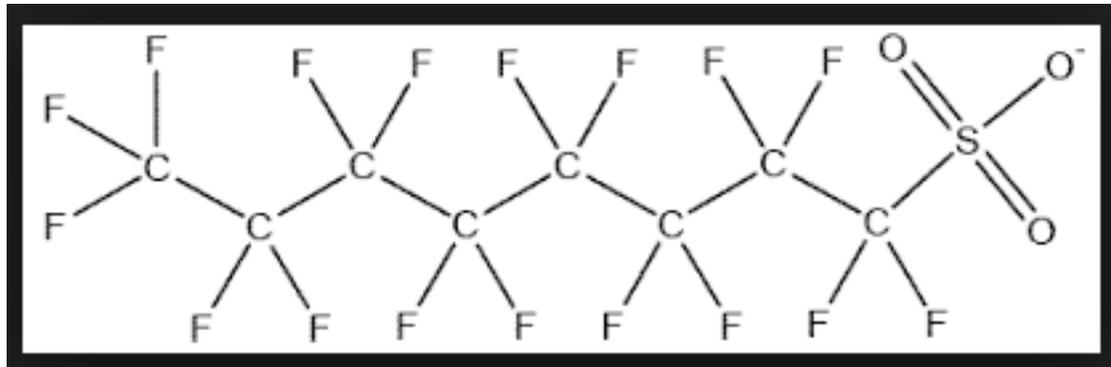
Cape Cod



The PFAS Challenge

- Over 600 PFAS-contaminated sites across U.S.
- PFASs have been detected in the drinking water of over 16 million Americans
- Produced and used in consumer products for over 60 years
- Effective protection from PFAS exposure through regulation and remediation remains a major challenge
- Sources of PFAS contamination of Cape Cod can include firefighting foams at municipal and military fire training areas, airports, municipal wastewater, septic systems, and landfills

PFASs - A Unique Family of Chemicals



PFOS chemical structure

- Extremely persistent (“forever chemicals”)
- Man-made
- Carbon-fluorine bonds
- Water soluble
- Oil and water repellence
- 1000s of related chemicals

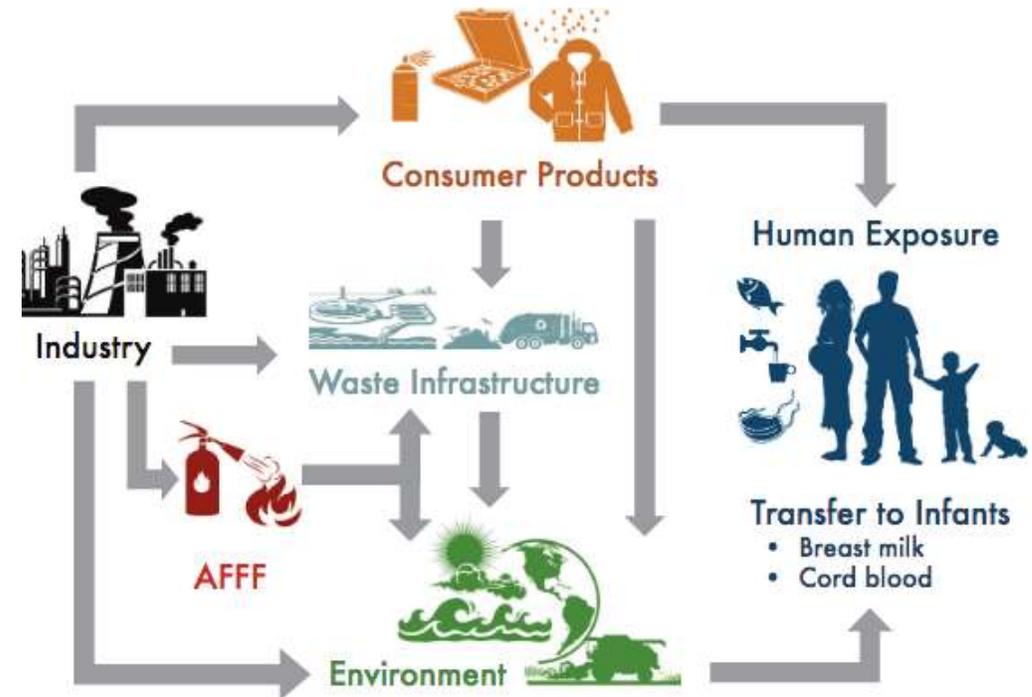
PFAS Sources In The Environment

- AFFF firefighting foams for fuel fires
- Production facilities
- Other industries
- Landfills
- Wastewater treatment plants and biosolids
- Septic systems



PFASs Common In Everyday Items

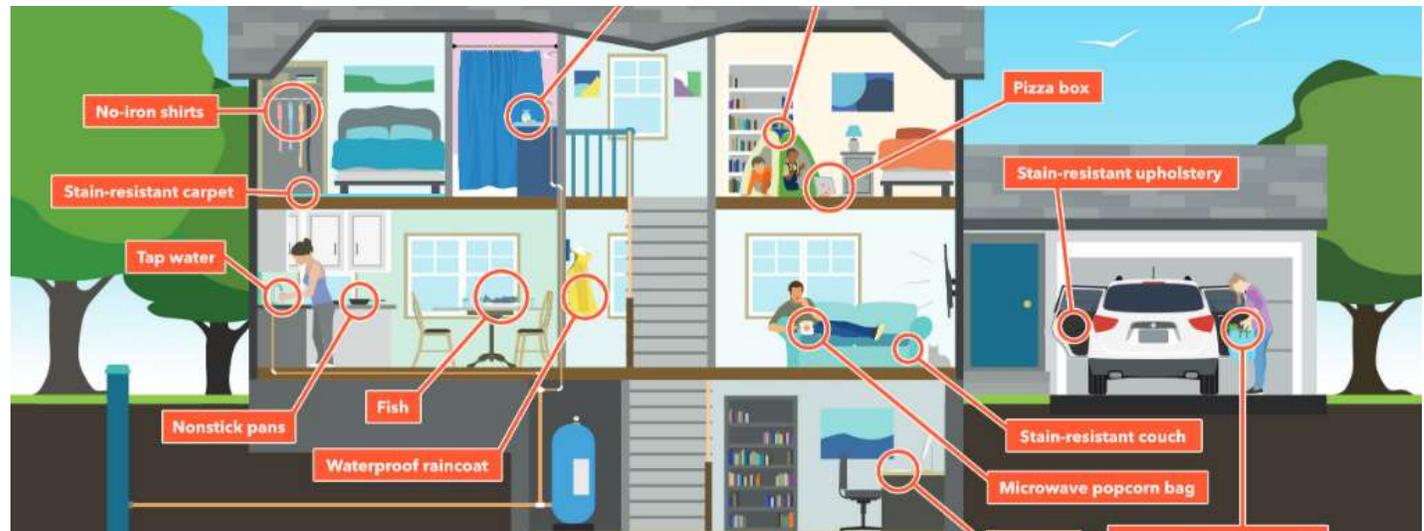
- Carpets & upholstery
- Waterproof clothing
- Waxes (floor, skis)
- Non-stick cookware
- Grease-proof food packaging
- Dental floss
- Paints



Adapted with permission from the Sunderland Lab.

Human PFAS Exposures

- Estimated that more than 98% of Americans have PFASs in their blood
- Some PFASs bioaccumulate
- Exposure from:
 - Drinking water
 - Diet (e.g., seafood)
 - Consumer products



STEEP Center fact sheet, 2018

Drinking Water Guidelines for some PFASs

	PFOS	PFOA	PFNA	PFHxS	PFHpA
US EPA Health Advisory	70 parts per trillion (Sum of both)				
MA DEP Office of Research & Standards Guideline (ORSG)	70 parts per trillion (Sum of all five)				
Vermont Primary Groundwater Enforcement Standard	20 parts per trillion (Sum of all five)				
New Jersey Maximum Contaminant Level	13 ppt	14 ppt	13 ppt		

Potential Health Effects Linked to PFASs

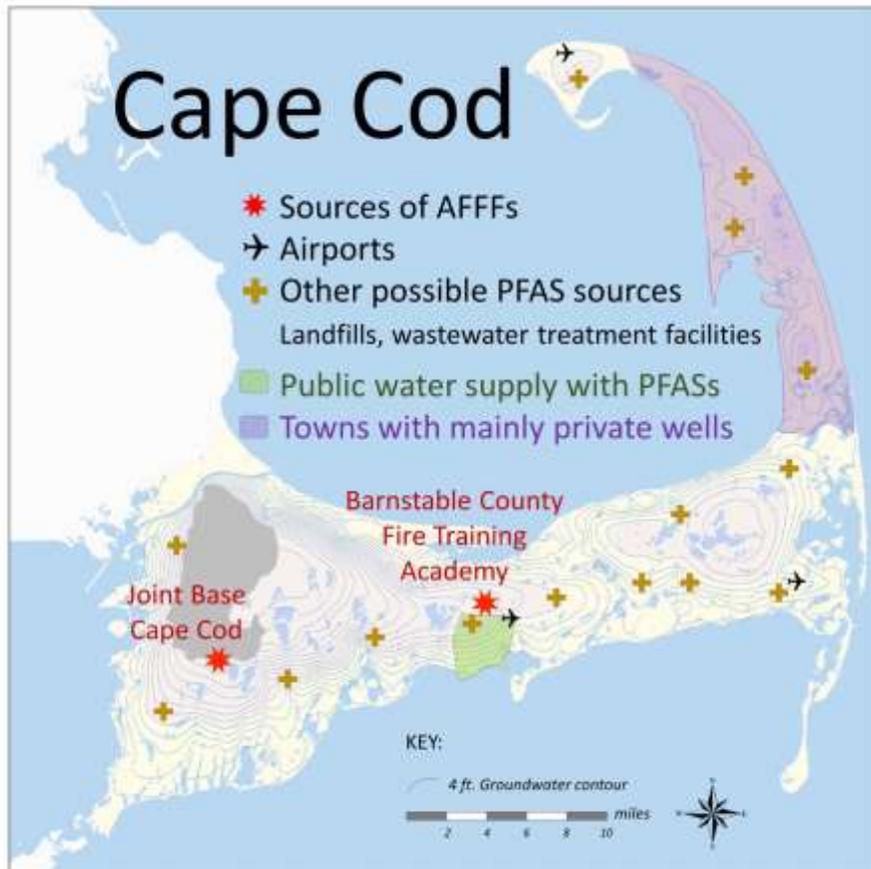
Evidence from population-based studies in humans

- Elevated serum cholesterol
- Ulcerative colitis
- Thyroid disease
- Kidney and testicular cancers
- Pregnancy-induced hypertension
- Immunotoxicity in children

Evidence from laboratory studies in animals

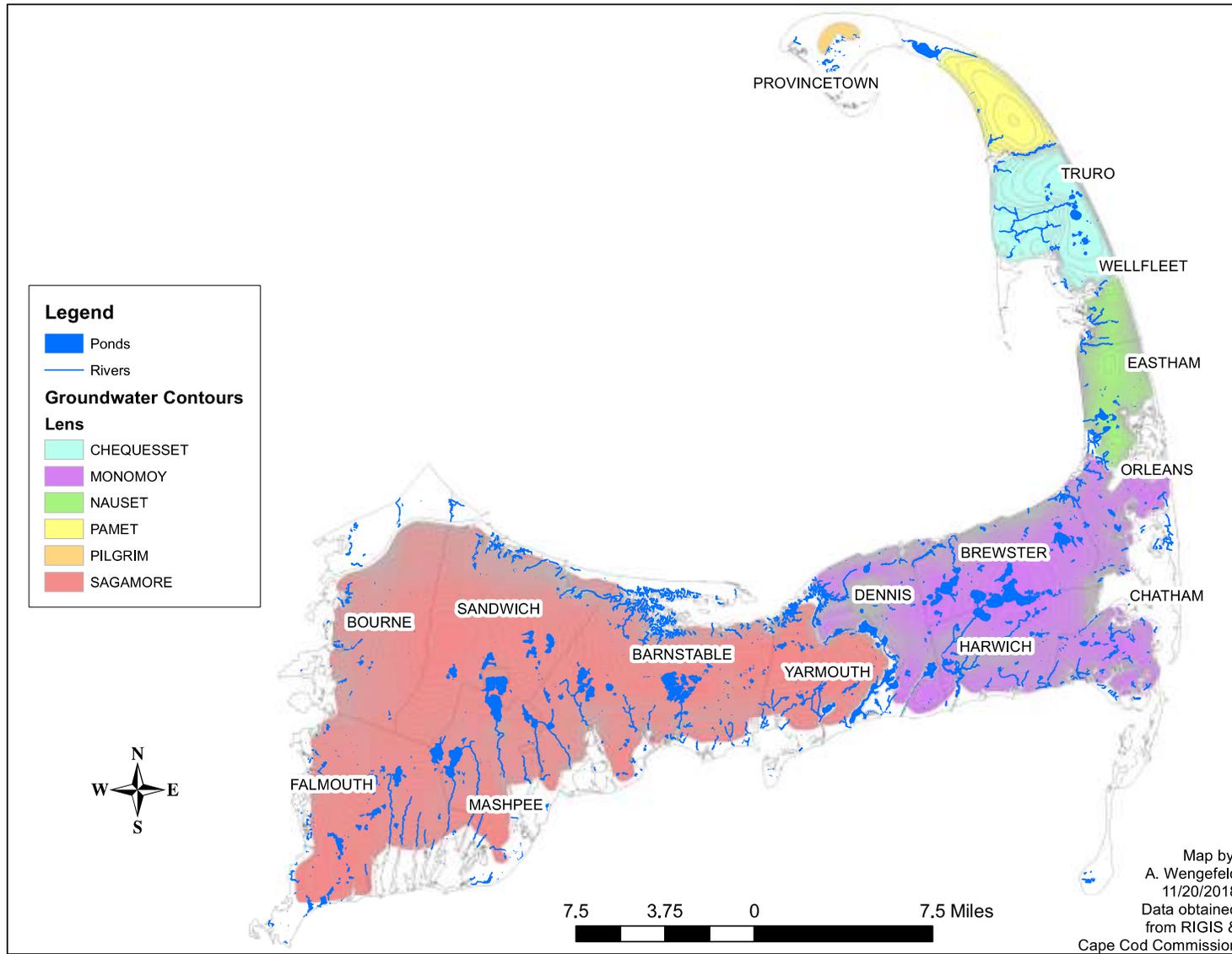
- Liver, testicular, and pancreatic cancers
- Liver enlargement
- Altered mammary gland development
- Immunosuppression
- Changes in serum lipids

STEEP's Focus on Cape Cod



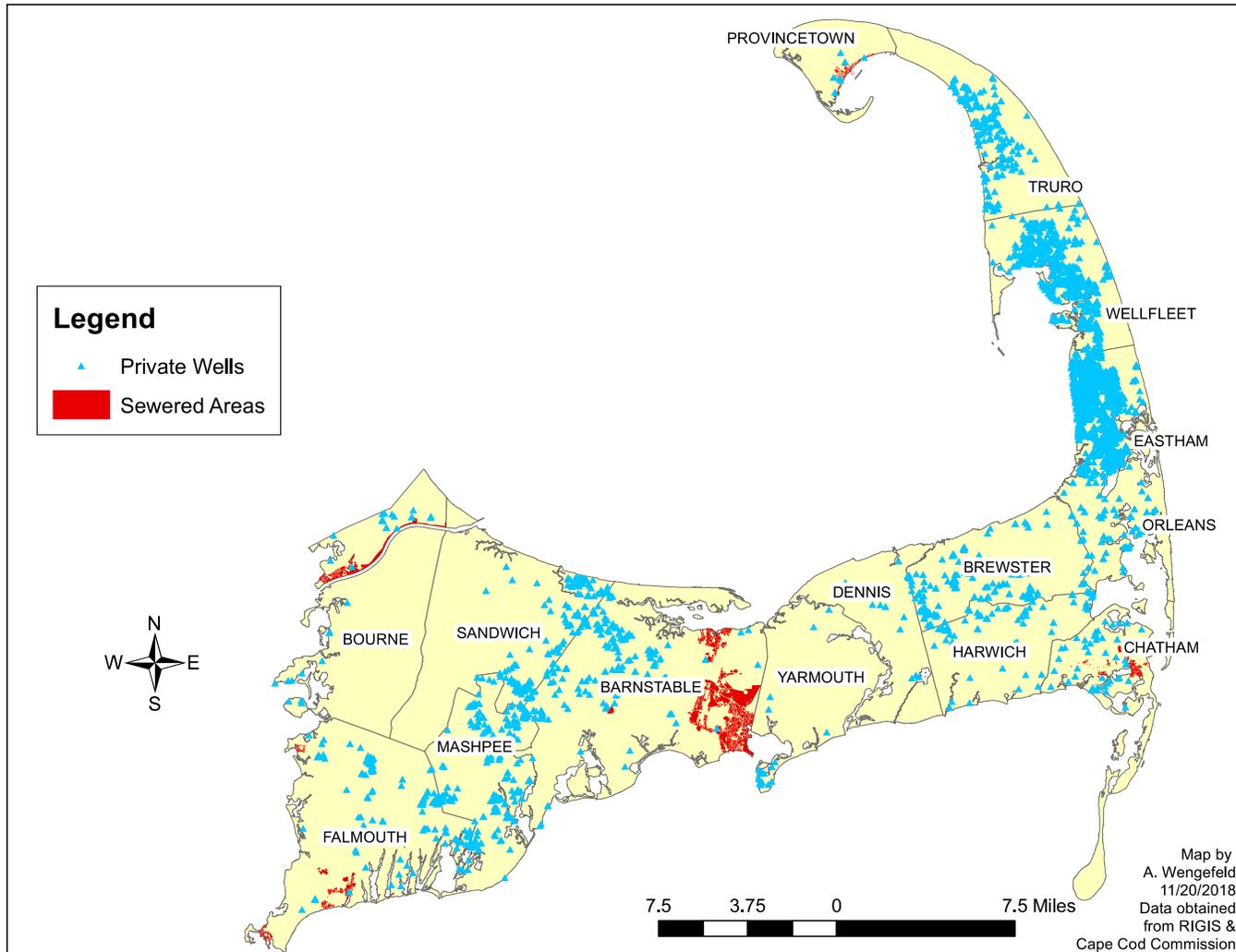
- Vulnerable sole-source aquifer
- AFFF contamination of public and private drinking water wells
- Strong record of community engaged research by Silent Spring Institute, including studies in 2010 and 2011 that found PFASs in public and private drinking water wells
- Community concerns about water quality and health

Cape Cod Groundwater Resources



Private Well Service Areas

- STEEP's Community Engagement Core Focus



CEC Cape Cod Private Well Testing

Goals:

- Test 250 wells (over 5 years) for over 20 PFASs and markers of septic system impact (nitrate, boron)
- Provide residents with a better understanding of the extent of potential PFAS exposure and contamination
- Evaluate potential sources of PFASs in coordination with research project 1
- Inform decision makers related to drinking water protection and wastewater management



WHAT'S IN YOUR WELL WATER?

Find out! Volunteer for FREE private well testing.

Why study well water?
In some areas of Cape Cod, PFASs have been found in drinking water.

What are PFASs?
PFASs are chemicals found in household products and firefighting foam. They've been around for 60 years, but their harmful health effects have only drawn concern in the last 20 years.

How can PFASs get into my well water and what are the harmful effects?
They can seep into the ground and move through groundwater to your well. They suppress certain immune system functions, particularly in kids, impact metabolic and liver functions, and are linked to some cancers and adverse effects on pregnancy, such as low birth weight.

Who can participate and how much time will it take?
Private well owners who live in Barnstable County on Cape Cod are eligible to participate, and participation will take about three hours.

What's the purpose of this study?
To test 50 private wells on Cape Cod each year over the next 5 years. Wells will be chosen from areas in Barnstable County that may be impacted by PFASs. The benefit to Cape Cod residents is a better understanding of PFAS exposure and contamination.

Who is doing the study?
The STEEP project is part of a National Institutes of Health Superfund Research Project led by the University of Rhode Island. URI and Silent Spring Institute will collect well water samples and Harvard University will analyze them.

Will I receive the test results?
We will report individual results and interpret them for each participant. We will share summaries of our findings with Cape residents in reports and public meetings. Names and addresses of participants will be kept confidential.

For more info, or to apply, contact either:

Laurel Schaidler, Ph.D. Research Scientist Silent Spring Institute schaidler@silentspring.org	Alyson McCann Water Quality Program Coordinator University of Rhode Island alyson@uri.edu
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(617) 332-4288 x224 (401) 874-5398 www.uri.edu/steepp

THE UNIVERSITY OF RHODE ISLAND HARVARD T.H. CHAN SCHOOL OF PUBLIC HEALTH SILENT SPRING INSTITUTE Researching the Environment and Human Health

STEPP is funded by the Superfund Research Program, National Institute of Environmental Health Sciences under award number P42ES027726. This is URI research approved by URI's Institutional Review Board.

CEC Cape Cod Private Well Testing

Timeline:

- 100 wells to be sampled by end of 2018
- Summary of preliminary findings to be shared in Spring 2019

STEELP
Sources, Transport, Exposure & Effects of PFAS
UNIVERSITY OF RHODE ISLAND SUPERFUND RESEARCH PROGRAM

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(617) 332-4288 x224 **(401) 874-5398** **www.uri.edu/steep**



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Local News Coverage

The Barnstable Patriot

Cape Cod study offers free private well testing

By **Bronwen Howells Walsh** bwalsh@barnstablepatriot.com

Posted Apr 25, 2018 at 3:18 PM

Updated Apr 25, 2018 at 3:40 PM

Private well owners in Barnstable County may sign up to have their well water tested for the presence of harmful chemicals through a federally-funded research study of drinking water contaminants.



CAPE COD TIMES

Free Cape well testing program launched

By **Geoff Spillane**

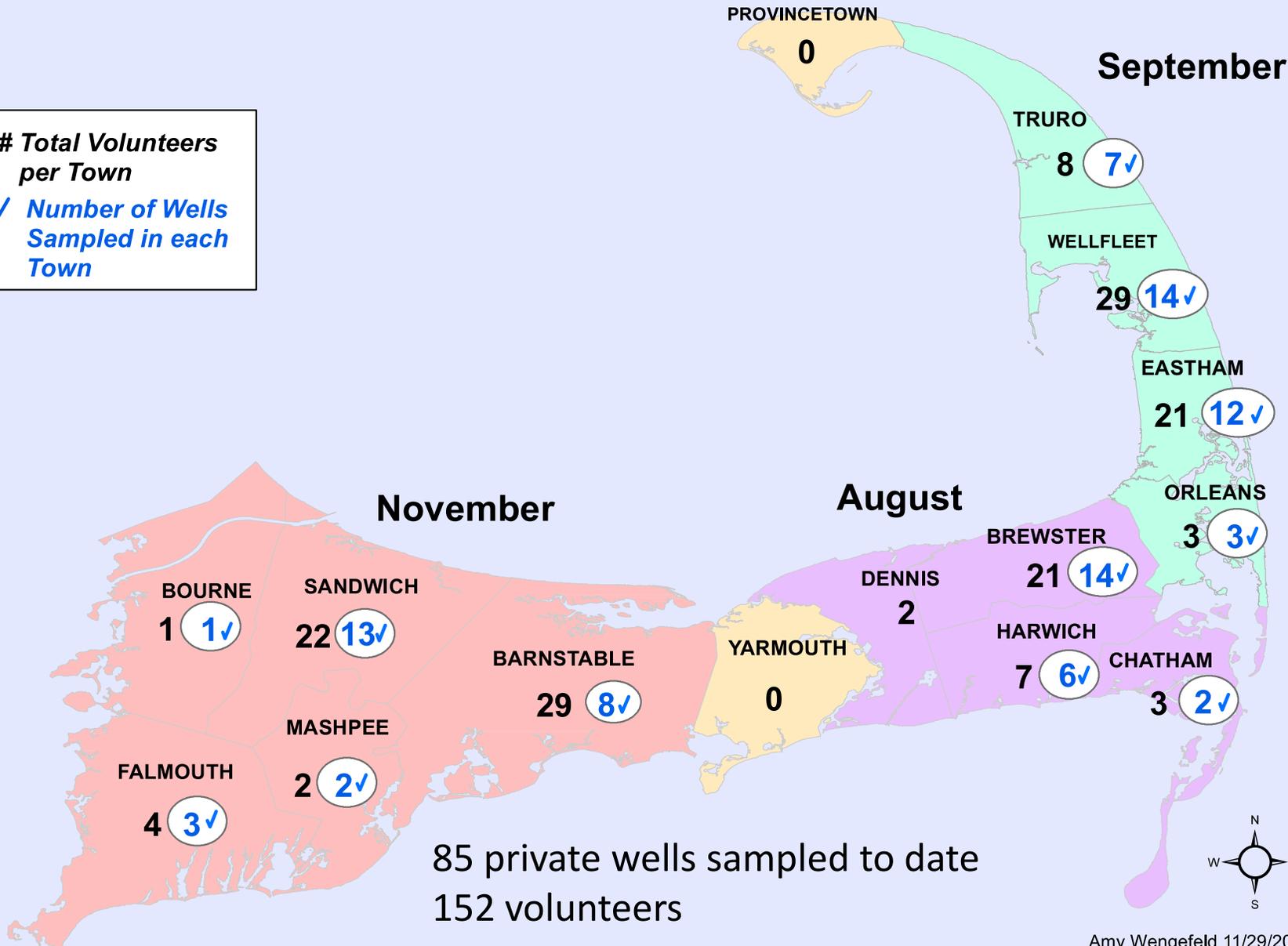
Posted Apr 25, 2018 at 7:10 PM

Updated Apr 26, 2018 at 6:27 AM

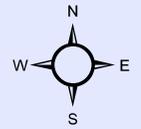
HYANNIS — Cape Cod residents with private wells may be eligible for free testing to determine if potentially harmful substances found in items ranging from firefighting foams to nonstick cookware are present in their drinking water.

STEEP Private Well Water Testing

Total Volunteers per Town
 ✓ Number of Wells Sampled in each Town



85 private wells sampled to date
 152 volunteers



Amy Wengfeld 11/29/2018

What are we hearing from our volunteers?

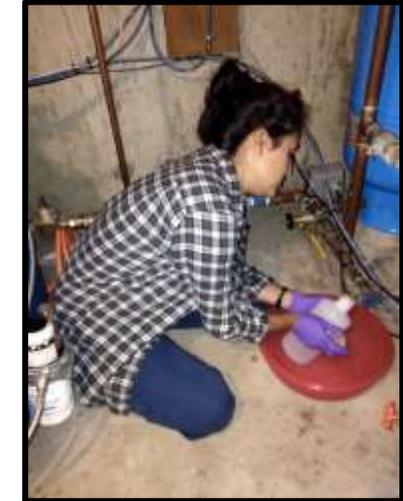


- Conversations with well owners reveal perceptions of water quality challenges and barriers to water testing and treatment, including:
 - Is my water safe to drink?
 - What do I do if my well is contaminated?
 - Cancer rate on Cape concerns people

ASK • LEARN • ACT

Private well owner interested in volunteering?

- ✓ Complete online consent form and questionnaire about well
- ✓ STEEP team members will come to your home to collect water samples
 - PFASs, Nitrate, and Boron
- ✓ Receive detailed online report with your results and information about treatment and how to reduce PFAS exposure



To learn more or sign up:
web.uri.edu/stEEP/wellwater

Protect Your Water Tap Into Science

JOIN US—STEEP SCIENCE DAY

- Learn about effects of PFAS chemicals
- Hear another community's story
- Be inspired by future scientists
- Meet and greet STEEP experts
- Share your concerns

**BARNSTABLE TOWN HALL
THURSDAY, JUNE 7, 2018**

367 Main Street
Hyannis MA 02601

10:00 AM – 4:30 PM

FREE and open to the public

—SCHEDULE—

www.uri.edu/stEEP/science-day

ASK • LEARN • ACT



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NIH
National Institute of
Environmental Health Sciences
Superfund Research Program: CDEP at Barnstable County Green/PFAS/OTIS

Community Partners: - Massachusetts Street Cancer Coalition / Town Club Cape Cod Group



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