PFAS in Cape Cod Private Wells

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

March 2024

NEW FINDINGS FROM STEEP'S PRIVATE WELL STUDY ON CAPE COD

Key Findings

- In 2021, STEEP tested water samples from 65 private wells in 12 towns across Cape Cod. About 94% of wells had detectable levels of at least one PFAS chemical.
- The percentage of wells with detectable levels of at least one PFAS chemical varied slightly across different parts of the Cape, from 91% in the Lower Cape to 100% in the Upper Cape.
- Wells with higher levels of nitrate had higher levels of PFAS. Since nitrate is an indicator of septic system impact, this suggests that septic systems are an important source of PFAS in groundwater.
- One well exceeded the Massachusetts state drinking water standard for six common PFAS chemicals ("PFAS6"). As of March 2024, there are no federal drinking water standards for PFAS.

What are PFAS?

PFAS (per- and polyfluoroalkyl substances) are a large family of chemicals commonly added to nonstick, stain-resistant, and waterproof consumer products such as carpets and upholstery, rain jackets, cookware, food packaging, and even dental floss. They are also added to some firefighting foams used at military bases, airports, and fire training areas. Due to their extreme persistence in the environment, PFAS are often referred to as "forever chemicals."

Exposures to PFAS have been associated with a wide range of health effects, including higher cholesterol, decreased vaccine response in children, thyroid disruption, and kidney and testicular cancers.

PFAS in Cape Cod drinking water

PFAS have been found in public water supplies across the U.S. and throughout Cape Cod, including in Hyannis and Mashpee. Potential sources of PFAS contamination to Cape groundwater include firefighting foams, septic systems, and discharges from sewage treatment plants and landfills.

How are PFAS regulated?

In 2020, the Massachusetts Department of Environmental Protection (MassDEP) issued a standard of 20 parts per trillion (ppt) for the total amount of six PFAS chemicals ("PFAS6") in drinking water. This standard is among the strictest in the U.S. and applies to Massachusetts public water systems.

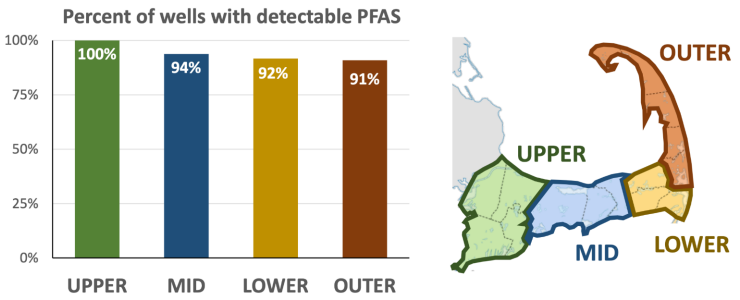
The U.S. Environmental Protection Agency (US EPA) has not yet adopted enforceable standards at the federal level for PFAS in drinking water. In March 2023, the EPA issued draft standards of 4 ppt for PFOS and PFOA, and a combined standard for four other PFAS (PFNA, PFHxS, PFBS, and GenX chemicals). As of March 2024, the EPA was in the process of finalizing these standards.

What did STEEP do?

In 2021, STEEP collected untreated water samples from 65 private wells in 12 towns across Cape Cod. Water samples were analyzed for 34 PFAS, including the six PFAS regulated in Massachusetts drinking water. We also measured nitrate and boron, which indicate septic system impact, and some metals, such as lead and copper.

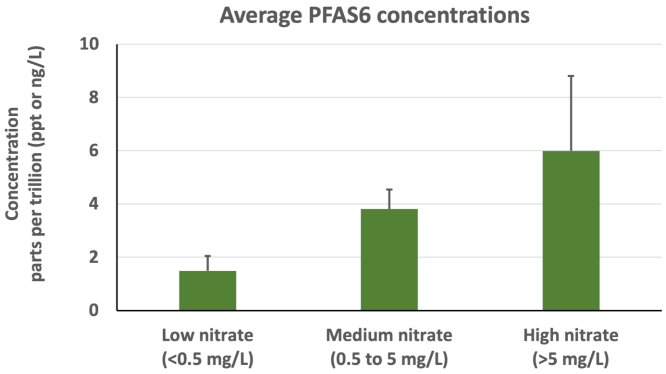
What did STEEP find?

We found detectable levels of PFAS in 94% of the wells we tested. 80% of wells contained detectable levels of at least one of the six PFAS included in the Massachusetts standard. The percent of wells with detectable PFAS ranged from 91% on the Outer Cape to 100% on the Upper Cape. Only one of the 65 wells exceeded the MA standard of 20 ppt for PFAS6.



Of the 34 PFAS tested for, 20 were detected at least once. Some of the detected chemicals, such as PFOS and PFOA, are no longer manufactured in the U.S. Other detected chemicals, such as PFBS and PFHxA, are newer replacement chemicals currently used in consumer products.

Wells with higher levels of nitrate and boron tended to have higher PFAS levels. Average concentrations of PFAS6 were more than three times higher in wells with high nitrate than in wells with low nitrate. These findings suggest that septic systems could be important sources of PFAS to private wells on Cape Cod.



Information for private well owners

Private well owners who are concerned about PFAS can get well water tested at a state-certified laboratory. The Barnstable County Water Quality Laboratory offers access to PFAS testing for Cape Cod private well owners. As of January 2024, the cost for this test is $265. For more information, contact the lab at (508) 375-6605. Please note that MassDEP recommends annual testing for nitrate and coliform bacteria for all private wells.

Private well owners who want to filter out PFAS can install a home water treatment. The most common home treatment systems for PFAS are activated carbon and reverse osmosis (RO). Activated carbon can be found in whole-home treatment systems or in point-of-use filters (for example, filters placed on a tap), while RO systems are mainly for point-of-use. When choosing a water treatment system, look for one that is "NSF P473 certified" or "NSF/ANSI 53 certified." Learn more at **www.nsf.org**.

How do these results compare to earlier STEEP findings?

In 2019, STEEP reported results of our first round of testing in 101 private wells in 12 towns on Cape Cod. This initial round of testing also found that PFAS were commonly detected in wells across the Cape. However, the percentage of wells with detectable PFAS was higher in this second round because we tested for more PFAS chemicals and were able to detect lower concentrations. In both rounds of testing, we found that wells with higher nitrate were more likely to have PFAS.

What's next?

STEEP researchers are testing for PFAS in fish and shellfish in water bodies on the Upper Cape near areas with PFAS groundwater contamination from firefighting foams at Joint Base Cape Cod. We also plan to study whether people may be exposed to PFAS through other pathways, for instance, through homegrown produce in areas with a history of PFAS water contamination.

A special thank you to all the private well owners who participated in this study!

THE UNIVERSITY OF RHODE ISLAND

Harvard John A. Paulson School of Engineering and Applied Sciences

SILENT SPRING INSTITUTE
Researching the Environment and Women's Health

NIH National Institute of Environmental Health Sciences
Superfund Research Program

STEEP is funded under award number P42ES027706.

Community Partners:
Massachusetts Breast Cancer Coalition
Sierra Club Cape Cod Group

04/2024

Learn more: **uri.edu/steep**