

What's the quality of Cape Cod drinking water?



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

Key Findings

- STEEP tested water samples from 101 private wells in 12 towns across Cape Cod. About 46% of wells had detectable levels of at least 1 PFAS chemical, and 28% had 2 or more PFAS chemicals detected.
- The percentage of wells with detectable levels of 1 or more PFAS chemicals varied somewhat across different parts of the Cape, with the highest percentage in the Mid Cape and the lowest percentage in the Lower Cape.
- Wells with higher levels of nitrate had higher PFAS concentrations. Since nitrate is an indicator of septic system impact, this suggests that septic systems could be a source of PFAS in private wells.
- None of the wells exceeded current federal or state health guidelines for PFAS. Massachusetts has proposed a stricter groundwater standard, and around 3% of wells exceeded this proposed state standard.

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, waterproof clothing, cookware, food packaging, and even some 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.”

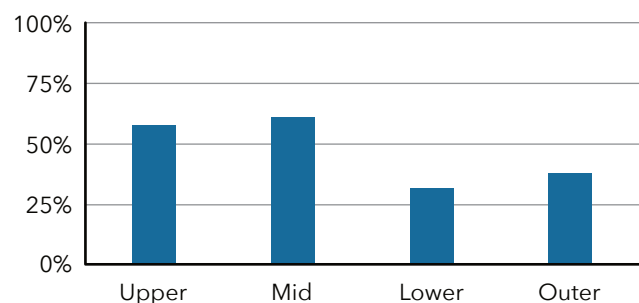
PFAS chemicals have been found in public water supplies across the U.S., including in Hyannis and Mashpee. A prior study by Silent Spring Institute in 2011 found PFAS in a majority of private wells tested on Cape Cod. Potential sources of PFAS contamination to Cape groundwater include septic systems, firefighting foams, and discharges from sewage treatment plants and landfills.

What did STEEP do?

STEEP tested untreated water samples from 101 private wells in 12 towns across Cape Cod. Water samples were analyzed for 25 PFAS chemicals, including the 5 PFAS chemicals in the Massachusetts drinking water guideline. Also measured were nitrate and boron, which indicate potential septic system influence, and some metals, such as lead and iron.

The U.S. Environmental Protection Agency (EPA) issued a health guideline of 70 parts per trillion (ppt) for PFOA and PFOS (combined), two PFAS chemicals frequently found in the environment and in people. In 2018, the Massachusetts Department of Environmental Protection (MassDEP) issued a health guideline of 70 ppt for the total amount of 5 PFAS chemicals (PFOA, PFOS, PFNA, PFHpA, and PFHxS) in public water supplies. In 2019, MassDEP proposed a stricter guideline for groundwater of 20 ppt for the total amount of these 5 PFAS chemicals plus a sixth (PFDA), and is working to develop a revised drinking water standard. Exposures to PFAS have been associated with higher cholesterol, effects on the liver and thyroid, decreased vaccine response in children, testicular and kidney cancer, changes in breast development, and other effects on growth and development.

Percent of wells with detectable PFAS



What did STEEP find?

STEPP found detectable levels of PFAS in 46% of the wells we tested. Approximately 33% of wells contained detectable levels of at least one of the 5 PFAS chemicals included in the Massachusetts drinking water guideline. The percentage of wells with detectable PFAS ranged from 32% in Lower Cape wells to 61% in Mid Cape wells.

Of the 25 PFAS chemicals tested for, 9 of these chemicals were detected at least once. Some of the chemicals detected, such as PFOS and PFOA, are no longer being manufactured in the U.S., while others, such as PFBS and PFHxA, are newer replacement chemicals that are now being used in products.

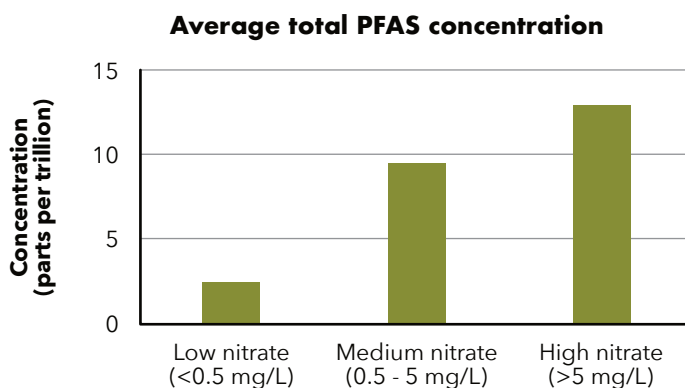
Wells with higher levels of nitrate and boron had higher PFAS concentrations on average. Wells with high levels of nitrate (above 5 milligrams per liter, or mg/L), had on average 5 times higher total PFAS concentrations than wells with low levels of nitrate. These findings suggest that septic systems could be an important source of PFAS to private wells on Cape Cod.

What can you do to limit your exposure?

Private well owners who are concerned about PFAS in their water can install water filters, such as reverse osmosis or activated carbon. 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.

Keeping PFAS chemicals from getting into the environment in the first place is another way to protect yourself. PFAS in consumer products can end up in household wastewater and be released from septic systems into groundwater. By choosing products that do not contain PFAS, Cape residents can safeguard the environment, while also reducing their direct exposures through the products they use. Learn more at: web.uri.edu/steep/resources/outreach.

	Chemical	Percent of wells	Maximum level (ppt)
Included in Mass. guideline	PFOS	17%	10
	PFOA	19%	25
	PFHxS	7%	8.7
	PFHpA	4%	11
	PFNA	0%	--
Not included in Mass. guideline	PFPeA	24%	15
	4:2 FtS	11%	16
	PFBS	13%	43
	PFHxA	13%	13
	PFBA	3%	8



What's next?

STEPP will test water samples from an additional 150 private wells across Cape Cod. Private well owners can learn more and sign up at: web.uri.edu/steep/wellwater. STEPP will conduct additional data analysis to learn more about the relationships between the levels of PFAS in well water and the proximity of wells to potential sources of PFAS contamination beyond septic systems, such as landfills and fire stations.

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