



# PFASs in drinking water on Cape Cod, Massachusetts

Laurel Schaider, Ph.D.



**SILENT SPRING INSTITUTE**  
Researching the Environment and Women's Health

# Massachusetts Breast Cancer Coalition founded Silent Spring Institute in 1994



Silent Spring Institute is a nonprofit research organization dedicated to identifying the links between the environment and women's health, especially breast cancer.



# Silent Spring Institute Research Areas



Study chemicals that are  
mammary gland carcinogens



Study chemical exposures from  
everyday products



Develop best practices for  
sharing results with community

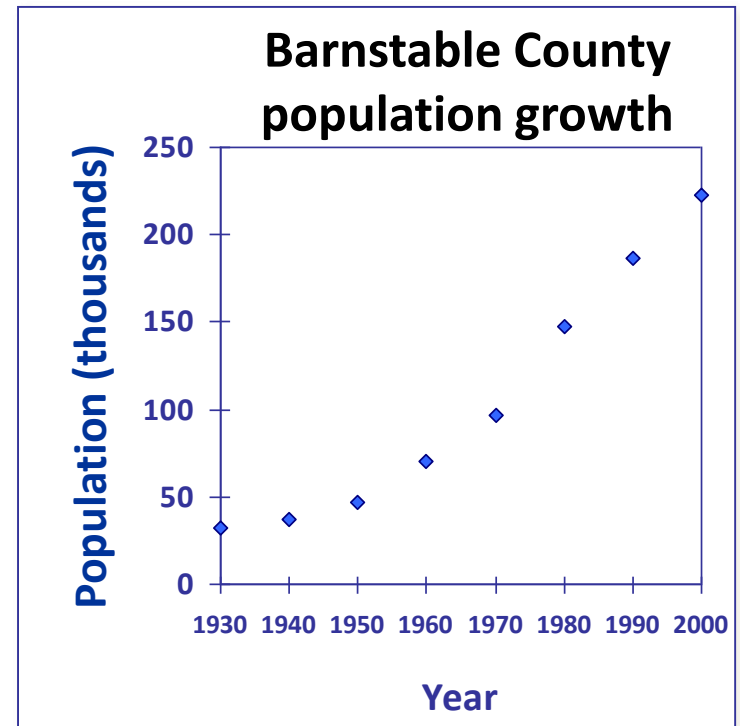


Study endocrine disrupting  
chemicals in water sources

# What makes Cape drinking water vulnerable?

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- Rapid development
- Sand and gravel sole source aquifer
- 85% of homes have septic systems
- All residents drink groundwater, including 20% on private wells



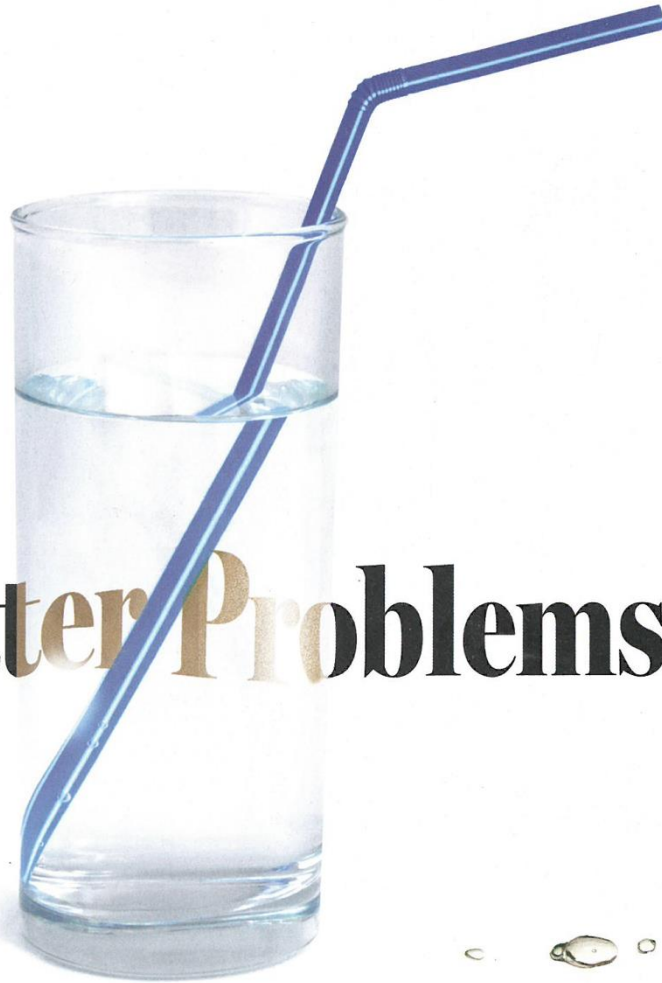


# Globe Magazine

THE BOSTON GLOBE / AUGUST 7, 2016

Sunny Skies.  
Sandy Beaches.

## Big Water Problems.



In the aquifer and septic systems under Cape Cod's idyllic landscape lie deep environmental challenges. Here's why fixing them won't be easy.

BY BARBARA MORAN

## The Cape's Big Drinking Water Problem

When you live on what's essentially a sandbar, pollution, septic systems, and political roadblocks add up to one tough challenge.

By Barbara Moran

# Globe Magazine

THE BOSTON GLOBE / AUGUST 7, 2016



Sunny Skies.

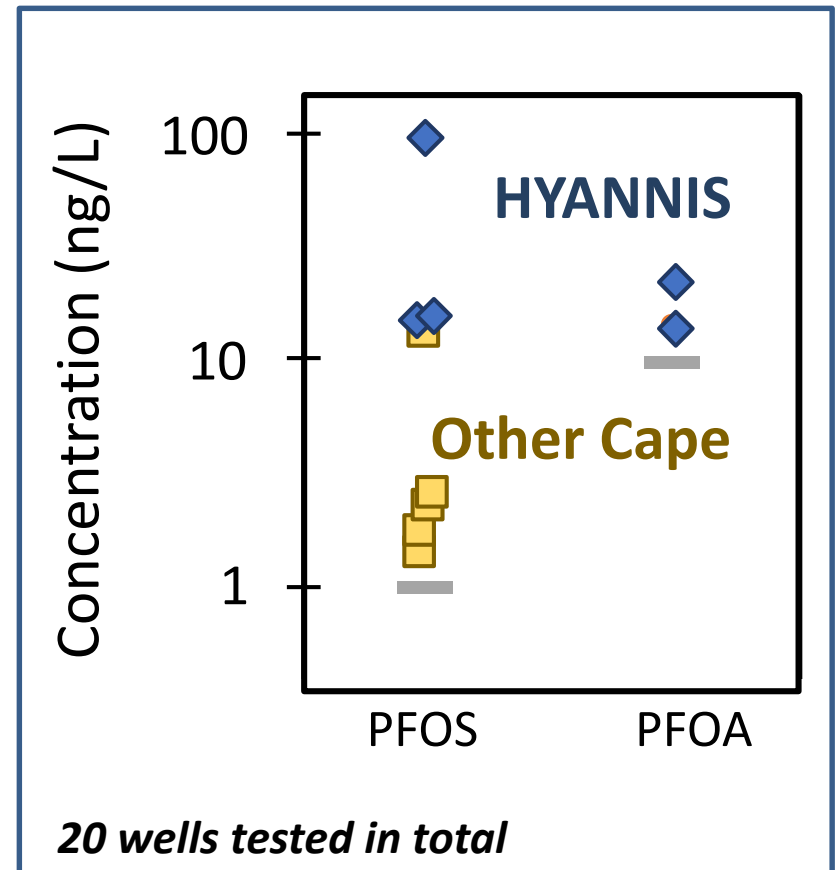
## The Cape's Big Drinking Water Problem

"I think what concerns me most is the mixture — that there's not just one chemical, that we're getting a mixture that we don't really understand," says Julia Brody, executive director and senior scientist at the Silent Spring Institute. "And that's a reason why federal guidelines may be inadequate, because they're taking the chemicals one at a time, but that's not how they show up in your glass of water."

BY BARBARA MORAN

# Our 2010 public wells study was the first to find PFASs in Cape Cod water

- Highest levels found in Hyannis wells
  - AFFF from county fire training area and municipal airport
- Other sources
  - Septic systems
  - Wastewater treatment plant
  - What else?



# Mass. drinking water (*UCMR3 data*)

- 170 public water supplies tested in Mass.
- PFASs detected in 5 supplies

## PFAS concentrations (parts per trillion)

Water system	PFOS	PFHxS	PFOA	PFHpA
Danvers			22–25	14–16
Hudson			40–50	10
<b>Hyannis</b>	<b>60–430</b>	<b>32–270</b>	<b>20–62</b>	<b>12–58</b>
<b>Mashpee</b>		<b>33</b>		
Westfield	120–160	100–170	43	11

Note: these are concentrations in individual sources and may not reflect concentrations in tap water





## Hyannis residents warned about water quality

Posted May. 24, 2016 at 3:05 PM

HYANNIS — Barnstable officials are recommending that pregnant women, nursing mothers and infants in Hyannis not drink or cook with well water until further notice after a federal agency changed thresholds for two contaminants in the drinking water.

On Thursday, the U.S. Environmental Protection Agency changed its advisory level for perfluorinated compounds, known as PFOS and PFOAs, from 0.2 micrograms per liter and 0.4 micrograms per liter to 0.07 micrograms per liter for both.

The change put a well at the Mary Dunn well field above the new contaminant limit, according to Daniel Santos, director of the town's Department of Public Works.

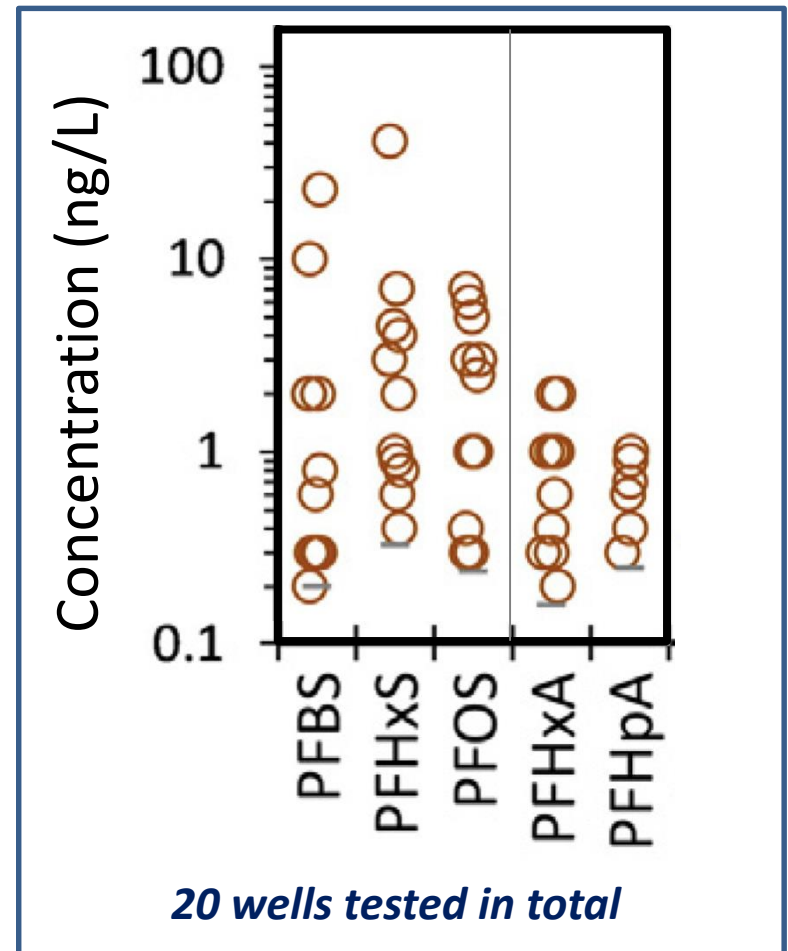
# Other potential sources of PFASs

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- In Hyannis
  - Wastewater from treatment plant and septic systems
- Joint Base Cape Cod
  - Private wells from plume of firefighting foams
- Gasoline spills
- Other fire training activities
- Landfills
- Septic systems from homes and businesses

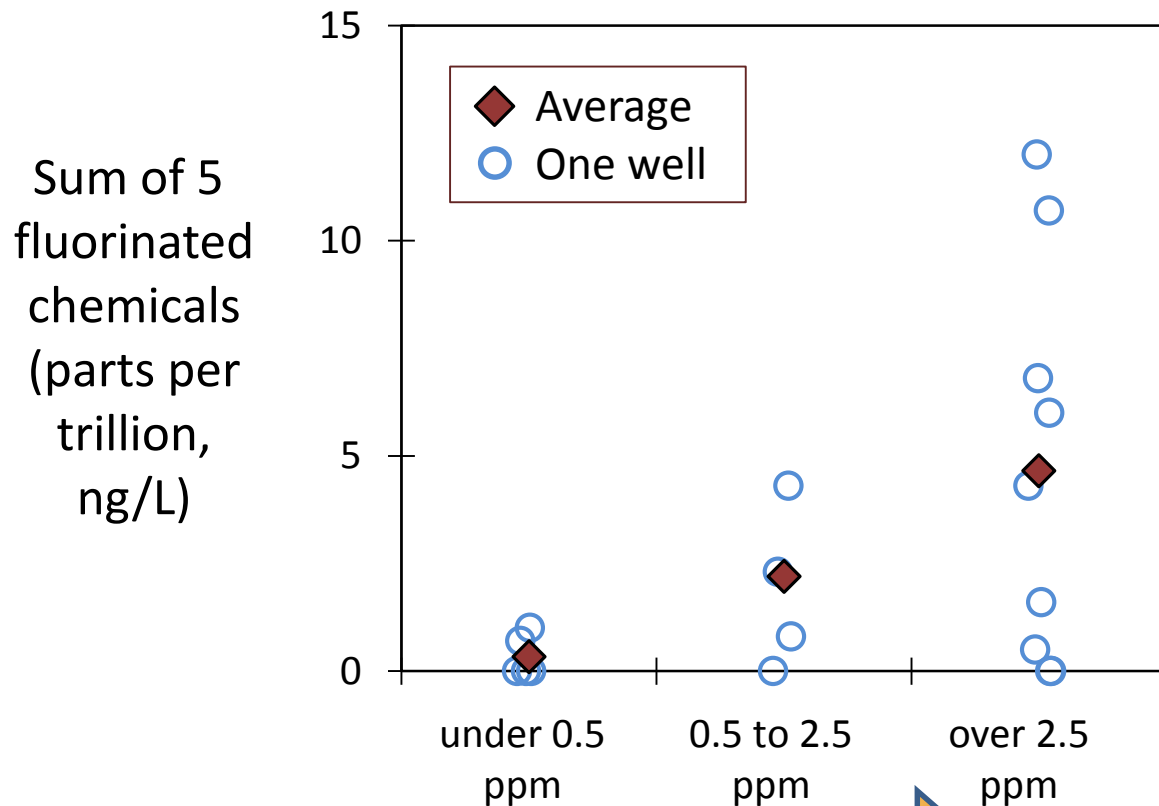
# Our 2011 private wells study found older and replacement PFASs

- 5 PFASs detected in half of wells, including both long and short chain
- Septic systems likely main source



# PFASs associated with nitrate

## Silent Spring Institute, private wells study, 2011

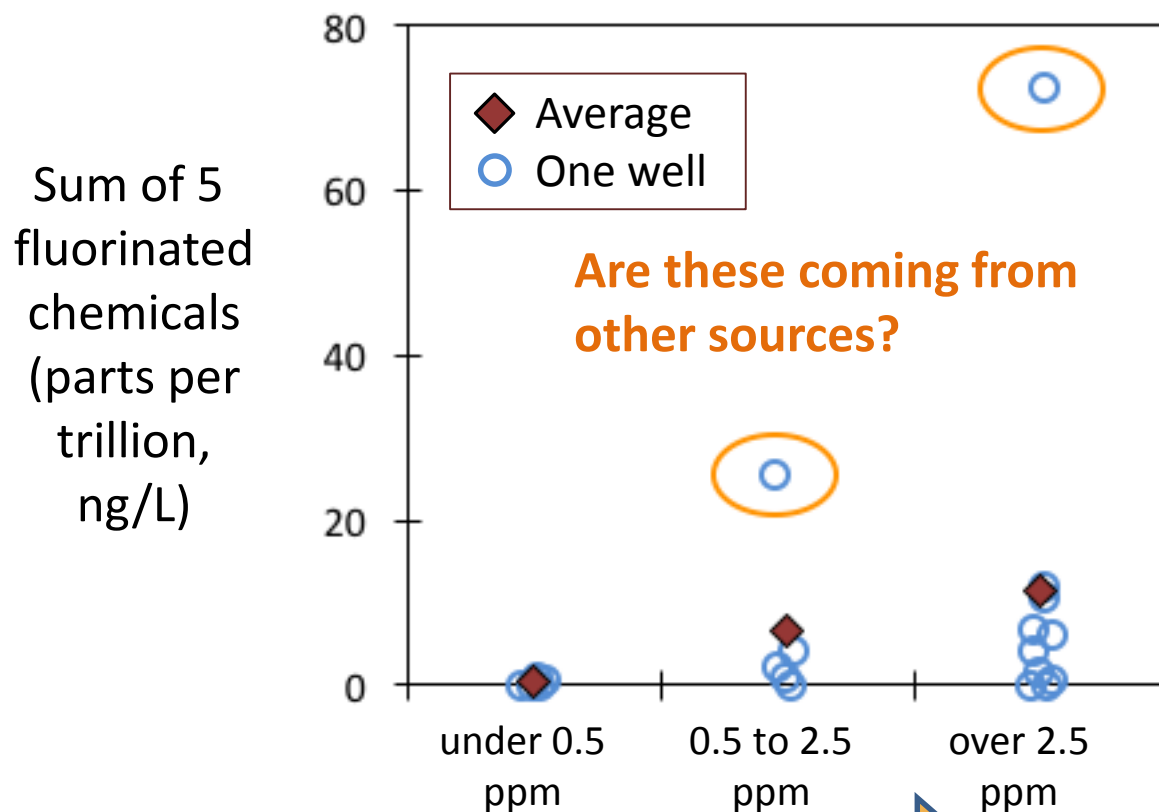


For most private wells we tested, there's a relationship between nitrate and total fluorinated chemicals, suggesting septic systems as a source

**Nitrate**

# ...and other sources of PFASs?

## Silent Spring Institute, private wells study, 2011



**Landfills and commercial wastewater may be contributing to these two wells**

**Other studies have shown fluorinated chemicals in landfill leachate**

**Nitrate**





## **Why wait for our water to be tainted?**

By Laurel Schaider and Cheryl Osimo  
September 16, 2016

“Even without exceeding health guidelines, who wants landfill leachate, firefighter foams or wastewater in their drinking water? The big question is how to address all these different emerging contaminants that have the potential to enter our drinking water and cause health effects, including cancer and developmental and reproductive problems.”

# The Barnstable Patriot

## Silent Spring Institute holds water quality summit in Hyannis



# CAPE COD TIMES

## Silent Spring: many sources of water contamination

HYANNIS — Researchers from Silent Spring Institute presented an annual update on Cape Cod's drinking water quality on Thursday, indicating sources other than the Barnstable County Fire and Rescue Training Academy may be contributing to Hyannis' recent water woes. The Newton-based...

Oct. 13, 2016

# Questions I hear

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- Is my water safe?
- Should I filter my water?
- Did my water make me / my neighbors sick?
- My friends and I have had breast cancer, can you study us?

## Everyday Chemical Exposures

[Household Exposure Study](#)

[Household Exposure Study in  
Richmond and Bolinas, California](#)

[Testing Exposure Reduction  
Strategies](#)

[Flame Retardants](#)

[Ethics in Community Research](#)

[Reporting Individual Exposure  
Results](#)

[Digital Exposure Report-Back  
Interface \(DERBI\)](#)

[Data Sharing and Privacy Protection](#)

## Chemicals and Breast Cancer

[Chemical Effects on Mammary  
Gland Development](#)

[Tools for Green Chemistry: High  
Throughput Screening](#)

[Mammary Gland Carcinogens List](#)

[Science Reviews and Database](#)

[Guide to Cohort Studies](#)

## Environmental Justice

## Water Quality

[Public Drinking Water Supplies](#)

[Private Drinking Water Wells](#)

[Ponds](#)

## Water Research

**Pharmaceuticals, hormones, and consumer product chemicals are showing up in drinking water throughout the U.S. Our wastewater and our drinking water are connected through the same water cycle. How can we safely treat and dispose of our waste without damaging our drinking water quality?**

To protect Cape Cod's coastal marine sanctuary, wastewater is disposed on land, primarily in septic systems. These systems allow pollutants to seep through porous soils, often reaching shallow drinking water wells. Silent Spring Institute is undertaking a number of initiatives aimed at understanding the role that polluted water may play in the disproportionately high levels of breast cancer on Cape Cod.

Drinking water for Cape Cod residents comes from a sole-source aquifer. Because the Cape has a shallow water table and sandy,



## RELATED CONTENT

### Press Release

[Drugs and other contaminants found in private drinking wells on Cape Cod](#)

[Contaminants pervasive in Cape Cod's drinking water supply, Silent Spring Institute finds](#)

## RELATED SCIENTIFIC RESOURCES

### Scientific Article or Summary

[Septic systems as sources of organic wastewater compounds in domestic drinking water wells in a shallow sand and gravel aquifer.](#)

[Historical reconstruction of wastewater and land use impacts to groundwater used for public drinking water: exposure assessment using chemical data and GIS](#)

[Identification of alkylphenols and](#)