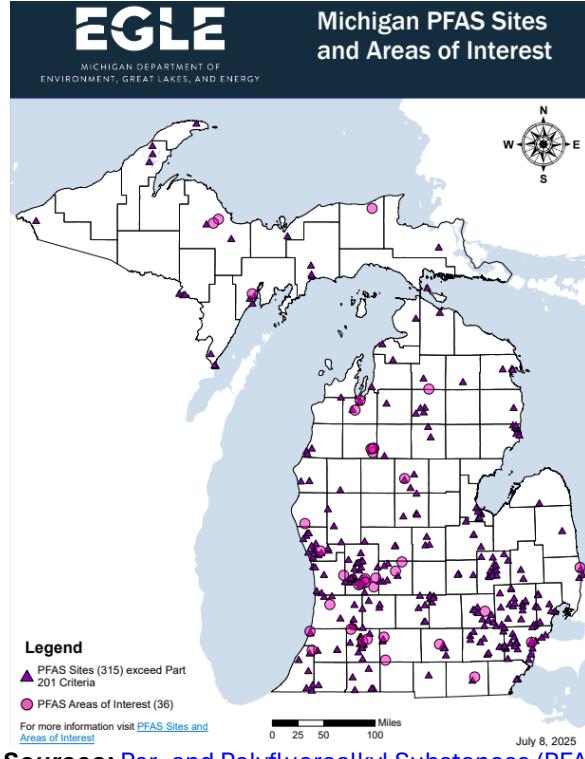


PFAS Exposures and Impact on Health

Per- and Polyfluoroalkyl substances (PFAS) are man-made chemicals used in a wide variety of industrial and consumer products since the 1940's. Recent epidemiological studies have suggested exposure to high levels of PFAS are associated with adverse health risks, and additional research is needed to fully understand the health effects of PFAS exposure. Increased awareness of what these chemicals are and how people are commonly exposed can help limit exposure and the risks associated with it.

Did You Know?

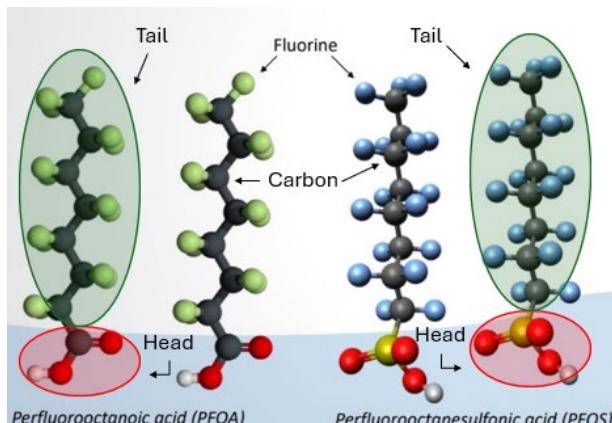
- PFAS are so common and widely used that most people in the U.S. have been exposed and have PFAS in their blood
- PFAS can dissolve in water and once released into the environment can enter surface water like lakes and rivers as well as underground aquifers, which affects well water
- There are 315 sites in Michigan that exceed one or more of Michigan's seven PFAS ground water cleanup criteria, 3 are in Grand Traverse County
- There are 36 areas of interest in Michigan that have the potential for PFAS contamination affecting residential wells, 2 are in Grand Traverse County



What are PFAS and Why are They Harmful?

PFAS are a class of synthetic chemicals that are mainly used to coat products to make them water or oil resistant. There are thousands of different PFAS, but the two most researched and associated with negative health outcomes are perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS). To understand why these chemicals are used and how they could be harmful to people, we first need to look at the structure of these compounds.

PFAS Structure and Common Uses

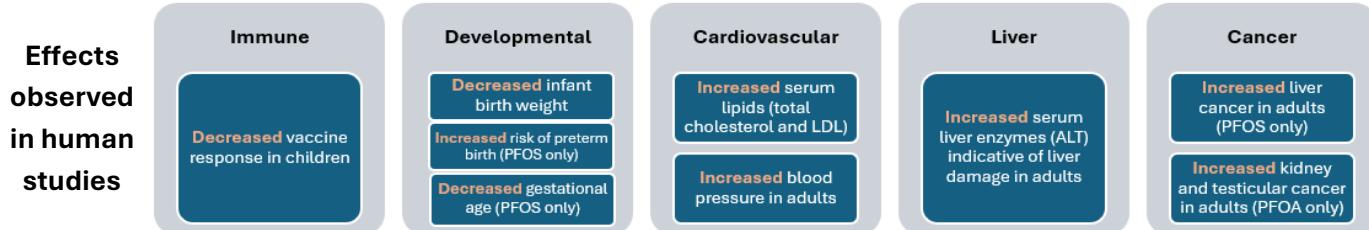


- PFAS are made by taking compounds that have long hydrocarbon chains and replacing the hydrogen carbon bonds with fluorine carbon bonds
- The fluorine carbon bond is extremely strong and stable. This makes the compound resistant to decomposition in the environment and in humans
- PFAS are amphipathic, meaning they have **hydrophobic (water hating) tails** and **hydrophilic (water loving) heads**. This property makes PFAS excellent at repelling water and oils
- Despite being amphipathic, PFAS can still be dissolved in water
- PFAS are commonly used in food packaging, carpets, clothing, and cookware because of their ability to repel water and oils
- PFAS are also found in firefighting foams called aqueous film forming foam (AFFF), and are used in some industrial processes

Sources: [An Introduction to Per- and Polyfluoroalkyl Substances \(PFAS\)](#)
[4 Physical and Chemical Properties – PFAS – Per- and Polyfluoroalkyl Substances](#)

PFOA and PFOS Human Health Effects and Maximum Contaminant Levels

Since PFAS are so stable the human body is unable to break them down, meaning they can remain in your body for months and up to years. While there is still a lot to be learned about PFAS, the EPA has reviewed over 700 human and animal studies for PFOA and PFOS. These studies have identified associations with PFAS exposures and negative health effects. Specifically, exposure to PFOA and PFOS in human studies was associated with negative health effects on the immune system, development of children, heart, liver, and was associated with several types of cancer.



In Michigan, the Department of Environment, Great Lakes, and Energy (EGLE) created a science advisory workgroup that reviewed and evaluated human and animal studies of PFAS. Using all available research, this workgroup developed maximum contaminant levels (MCL) for seven PFAS, including PFOS and PFOA. These MCL's apply to approximately 2,700 public drinking water supplies in Michigan and are also used in defining PFAS sites of contamination.

Sources: [Human Health Toxicity Assessment for Perfluorooctane Sulfonic Acid \(PFOS\) fact sheet](#)
[Human Health Toxicity Assessment for Perfluorooctanoic Acid \(PFOA\) fact sheet](#)
[Maximum Contaminant Levels \(MCLs\)](#)

Specific PFAS	Drinking Water MCL (Parts Per Trillion-ppt)
PFOA	8 ppt
PFOS	16 ppt

Case Study: Carl's Retreading, Grawn MI

Background

Carl's Retreading was a scrap tire collection site that operated for several years in the city of Grawn, MI in the 1990's. The site is located near Blair Elementary School and residential areas that use a mixture of private wells and the township's water supply system. In 1995, a fire started resulting in a prolonged blaze. The fire department initially used AFFF, containing PFAS. However, that was not effective. The fire was eventually extinguished by spraying it with water and burying the burning tires.

Timeline

- December 1995 – A fire began that set stacks of tires on fire and burned for weeks.
- Fall of 2002 – approximately 36,000 tons of tires and 86,000 tons of contaminated soil were excavated and disposed of at a landfill
- May 2018 – EGLE conducted ground water investigation in the area down gradient from the site. Samples detected both PFOS and PFOA
- July-October 2018 – Blair Elementary was sampled and did not detect any PFAS. 30 other samples were collected from residential wells, with three samples detecting PFOA and/or PFOS
- March 2019 – seven permanent monitoring wells were installed
- July 2020 – 12 homes where PFAS were detected were connected to the Blair Township water system



Conclusions

This case highlights how PFAS can enter underground aquifers, and how long they can remain in the environment. Additionally, once the area was sampled and showed evidence of PFAS contamination, local and state agencies acted to mitigate exposure to affected households by supplying bottled water/filters and connecting those affected to a public water source. This case shows how state and local agencies play an active role in limiting PFAS exposure to the public.

Source: [Carl's Retreading \(Grawn, Grand Traverse County\)](#)

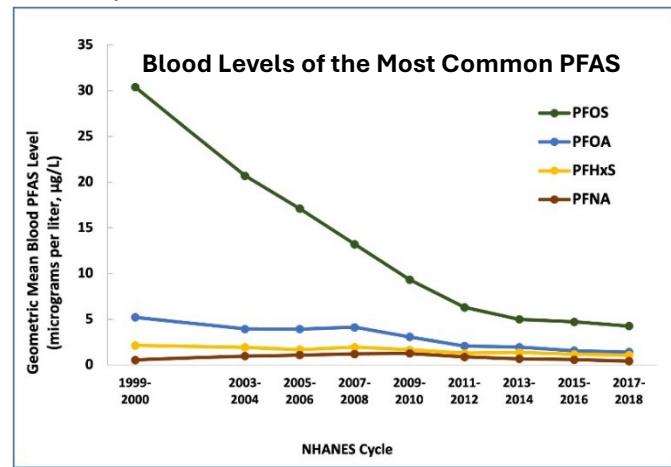
PFAS Outlook in Grand Traverse County

Currently, the Michigan PFAS Actions Response Teams (MPART) have identified three sites in Grand Traverse County where groundwater monitoring samples have exceeded one or more of Michigan's seven PFAS ground water cleanup criteria. Those three sites are the Carl's Retreading location, the United States Coast Guard Air Station, and the Cherry Capital Airport. All three of these sites used or stored AFFF, contaminating the ground and water below. Similar actions that were taken in addressing contamination at Carl's Retreading have also taken place at the airport and Coast Guard station.

Identifying and mitigating exposure sites plays a significant role in protecting our community. However, limiting production and use of PFAS also helps to protect our community. Since 2002, the production of PFOS and PFOA has significantly declined, and the results from blood monitoring studies show blood levels for PFOS and PFOA have declined by 85% and 70% respectively. Blood levels of PFAS can decrease over time, but limiting exposure to PFAS remains essential to do so.

Sources: [PFAS Sites and Areas of Interest](#)

[Fast Facts: PFAS in the U.S. Population | PFAS and Your Health | ATSDR](#)



FAQ

Q: How can I reduce my exposures to PFAS?

A: The most common way PFAS enter the body are by swallowing them. Contact with skin does not result in the PFAS entering the body. To reduce the risk of ingesting PFAS: **avoid foam on lakes, follow the MDHHS eat safe fish guidelines, avoid nonstick cookware that have PFAS, and reduce the amount of food you eat containing grease-resistant wrapping.** Additionally, if you have well water, consider getting your water tested for PFAS. If you are concerned about your water containing PFAS, consider installing a filter certified to remove PFAS from your home water system.

[PFAS Sources and Tips to Reduce Exposure](#)

Q: Should I be tested for PFAS?

A: Receiving a blood test for PFAS will tell you how much of certain PFAS are in your blood, but it won't provide any information about possible health effects, specific health problems, or provide information for treatment. **Blood tests for PFAS are most useful when they are a part of a scientific investigation or health study.** Nearly all people in the United States have measurable amounts of PFAS in their blood, and there is no medical treatment to remove PFAS from blood. If you are considering a blood test, consult your primary care physician about the limitations and benefits of testing.

[Testing for PFAS | PFAS and Your Health | ATSDR](#)

Q: How can I get my well water tested well?

A: If your area is under official investigation by the Michigan PFAS Action Response Team (MPART), testing will be done for you by MPART and the results will be shared. If you are not, **MPART has a list of certified laboratories that can perform EPA method 537.1 which tests for PFAS in water.** Be aware, each laboratory has its own fee schedule for testing. MPART also has directions for home sampling guidance.

[Laboratories Offering Home Testing](#)

[Residential-Well-Residents.pdf](#)