PFAS Groundwater Standards

Midwest Legislative Conference

Sea Grant
UNIVERSITY OF WISCONSIN

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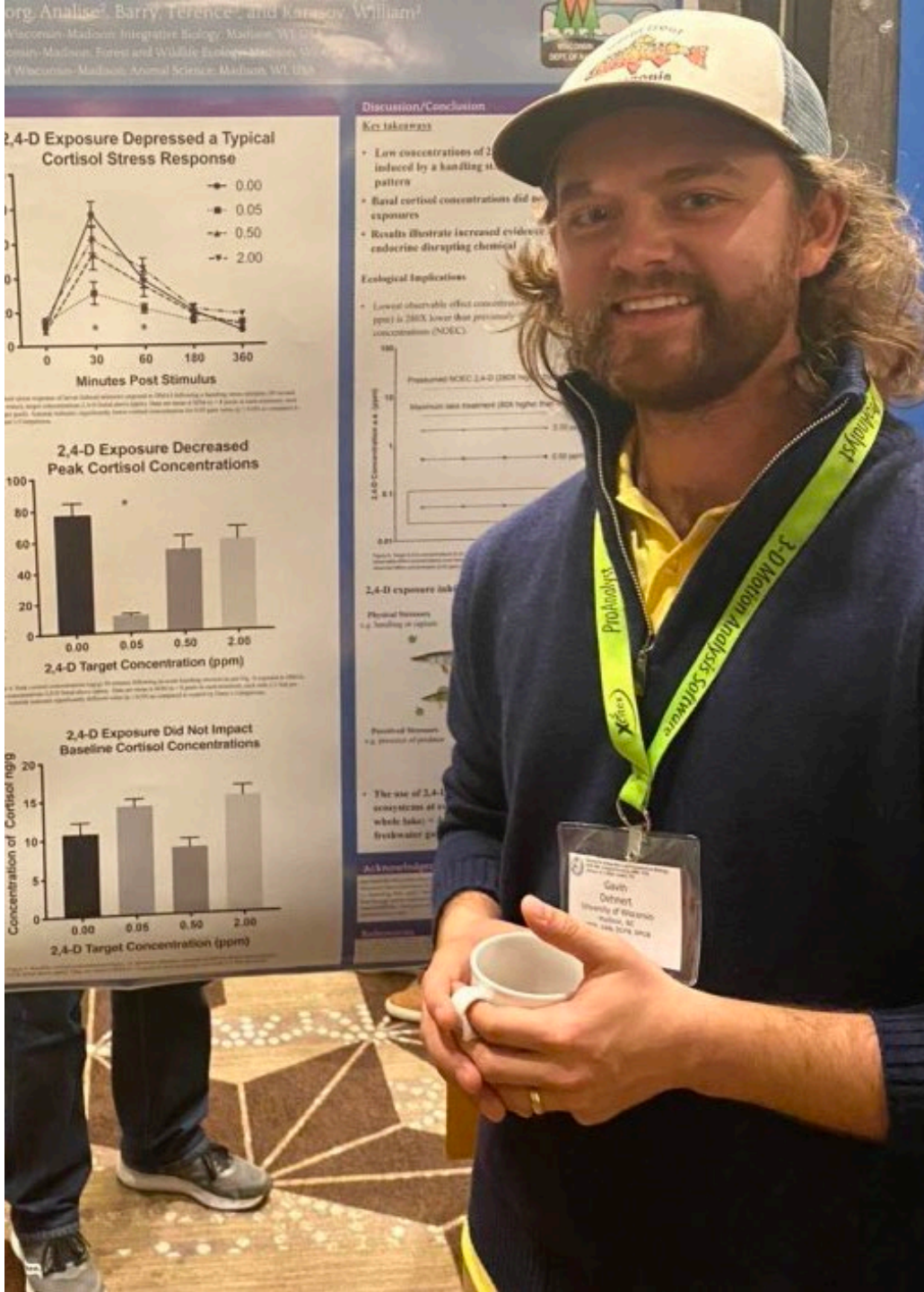


EPA Drinking Water Standards

- 2016 – EPA issued health advisory for PFOA and PFOS 70 ppt
- June 2022 - EPA issued a health advisory level 0.02 ppt for PFOS and 0.004 ppt for PFOA.
- 2024 – EPA announced Final National Primary Drinking Water Regulations

Final National Primary Drinking Water Regulations

Compound	Final MCLG	Final MCL (enforceable levels)
PFOA	Zero	4.0 parts per trillion (ppt) (also expressed as ng/L)
PFOS	Zero	4.0 ppt
PFHxS	10 ppt	10 ppt
PFNA	10 ppt	10 ppt
HFPO-DA (commonly known as GenX Chemicals)	10 ppt	10 ppt
Mixtures containing two or more of PFHxS, PFNA, HFPO-DA, and PFBS	1 (unitless) Hazard Index	1 (unitless) Hazard Index

Health Canada Drinking Water Guidelines

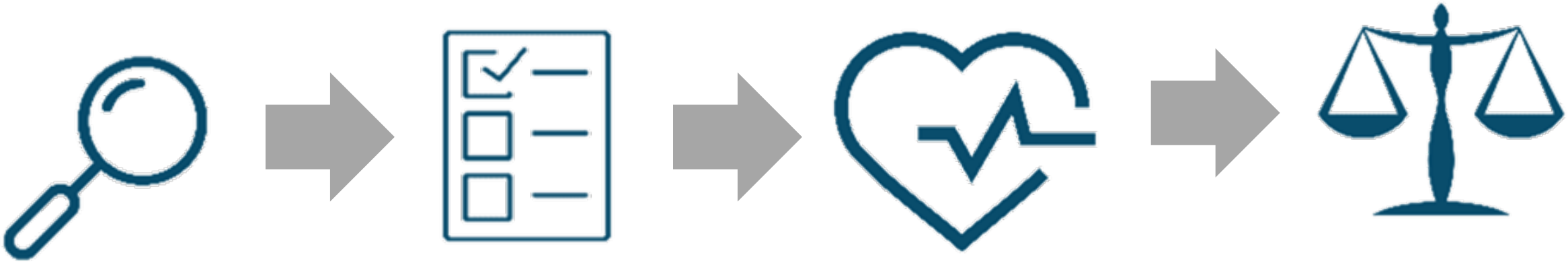
- 2008 - Maximum acceptable concentration (MAC) guideline values for two PFAS; PFOA (200 ng/L) and PFOS (600 ng/L)
- In April 2021, Health Canada announced their intention to revisit drinking water guidelines for PFAS.
- Health Canada released a proposed objective value for total PFAS for public consultation in February 2023.
- The proposed objective value is 30 ng/L for the sum of total PFAS in drinking water

State Drinking Water Standards

- States can have additional PFAS standards for drinking water and stricter guidelines
- Each state has a different process to adopt drinking water standards

Wisconsin's groundwater standards process

The process for developing groundwater standards is specified in State Statute.



Agencies identify substances that are or may be in groundwater.

DNR requests DHS review.

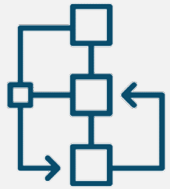
DHS develops recommended standards.

DNR proposes rules.

DHS follows a four-step process to develop the recommended standards.

DHS develops recommended standards.

Gather relevant scientific information.



Select the appropriate standards.

Document findings.

Share recommendations.

Wisconsin's groundwater standards have two parts.

Enforcement Standard

Preventive Action Limit

The enforcement standard is established from available health information.

Enforcement standards can be based on:

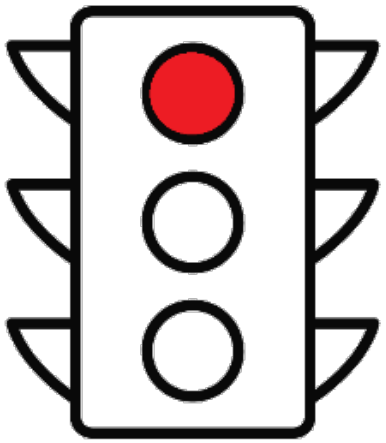
Federal number

State drinking water standard

EPA value

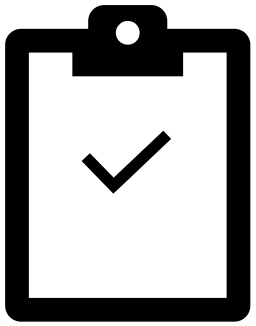
Technical information

Cancer risk



Enforcement Standard

=

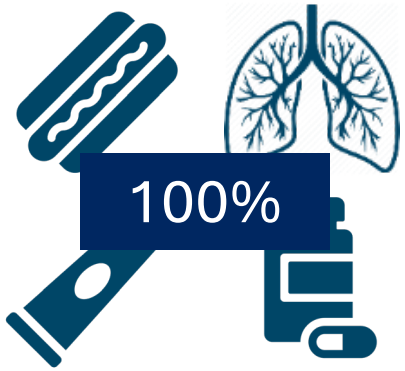


Acceptable daily intake

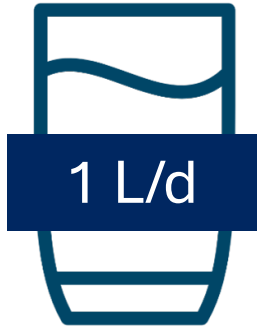
×

Body weight

×



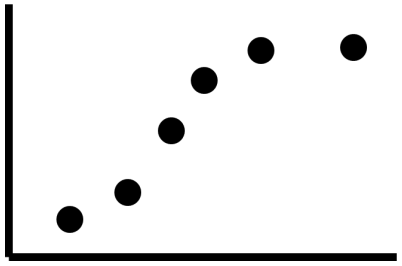
Relative source contribution



Water consumption

Values are specified in statute

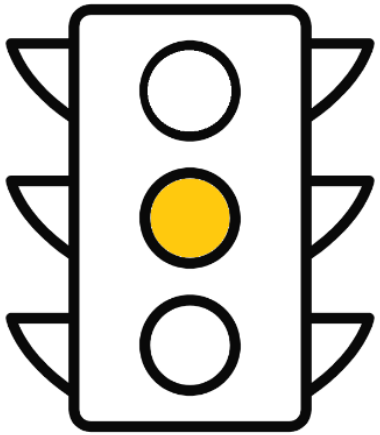
Acceptable
Daily Intake



Toxicity value

Uncertainty factor

The preventive action limit is set at a percentage of the enforcement standard.

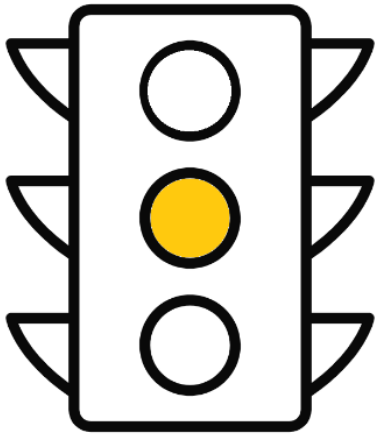


Preventive action limit

= 10%

of the enforcement standard

Substances that cause carcinogenic, mutagenic, teratogenic, or interactive effects



Preventive action limit

= 20%

of the enforcement standard

All other substances

Wisconsin has taken steps to address PFAS in drinking water.

2017

November

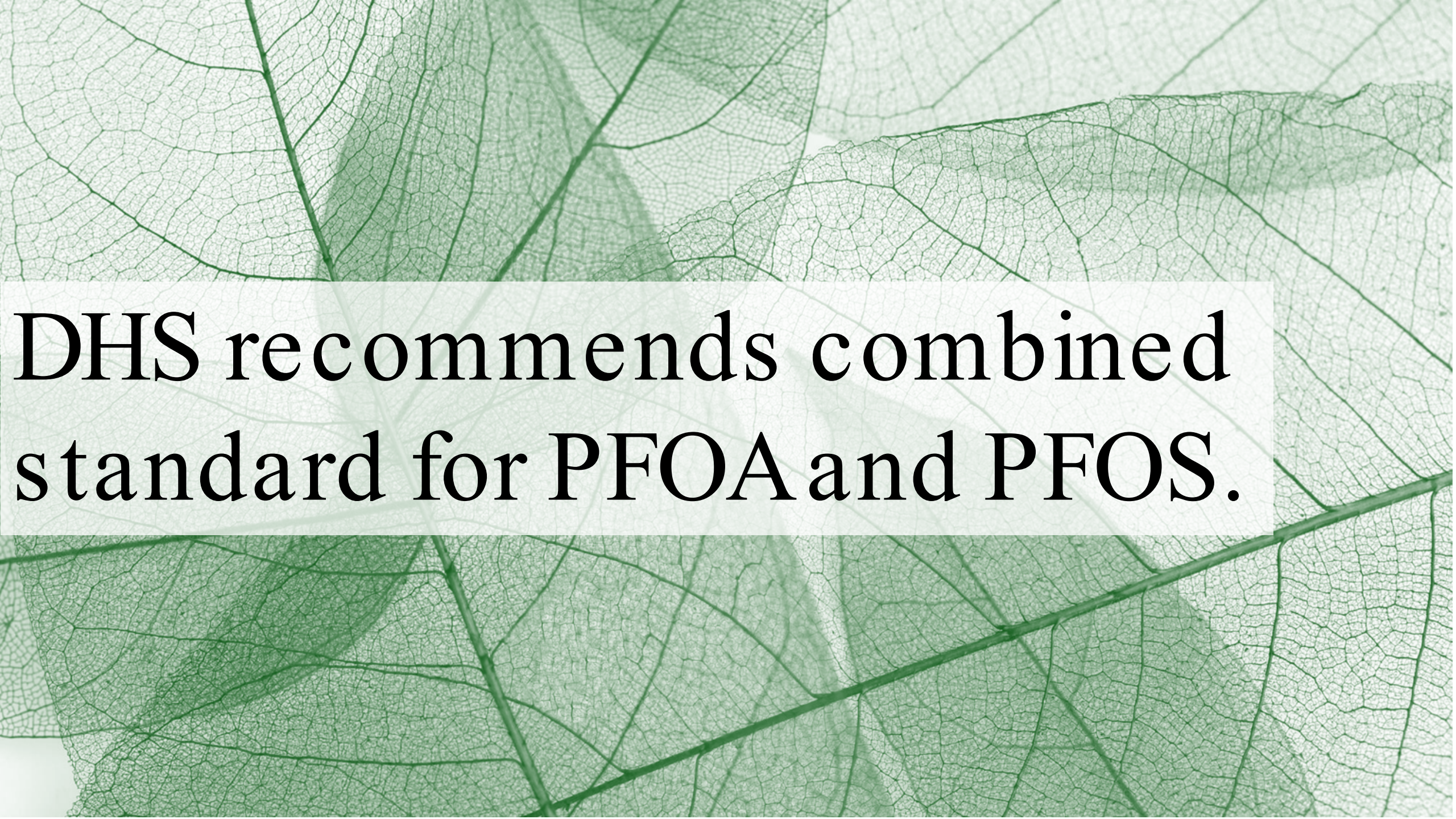
The DNR identified Wisconsin's first major PFAS site in Marinette County.

2017 2018 2019

June

DHS recommended groundwater standards for PFOA and PFOS (Cycle 10).

PFOA = Perfluorooctanoic acid
PFOS = Perfluorooctane sulfonic acid


DHS recommends combined standard for PFOA and PFOS.

These recommendations are based on:

Federal number

State drinking water standard

EPA value

Technical information

Cancer risk

DHS recommends a combined enforcement standard of 20 ng/L for PFOS and PFOA.

2017 2018 2019 2020

June

DHS recommended groundwater standards for 16 additional PFAS (Cycle 11).


DHS recommends individual standards for 12 PFAS.

These recommendations are based on:

Federal number

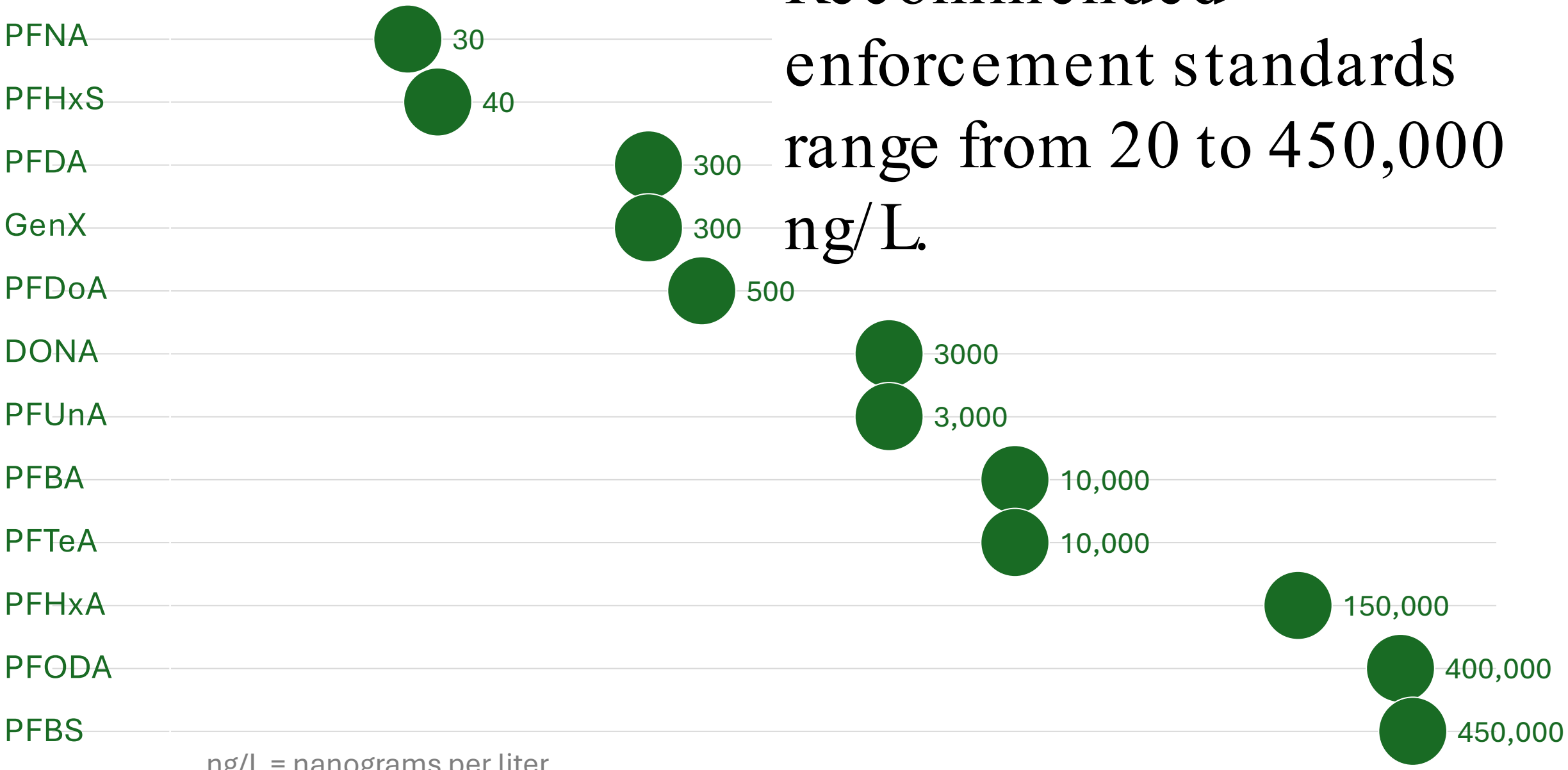
State drinking water standard

EPA value

Technical information

Cancer risk

Recommended enforcement standards range from 20 to 450,000 ng/L



ng/L = nanograms per liter

Axis in shown in log scale

DHS recommends a combined enforcement standard of 20 ng/L for FOSA, NEt-FOSA, NEt-FOSAA, NEt-FOSE, PFOS, and PFOA.

2017 2018 2019 2020

November

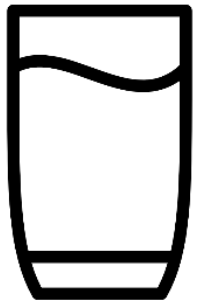
DHS began using a hazard index approach to evaluate the risk of PFAS mixtures in drinking water.

Hazard Index Approach

The hazard index approach provides a measure to evaluate the risk of specific PFAS in drinking water.

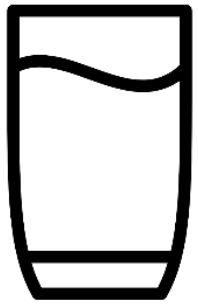
Hazard Index =

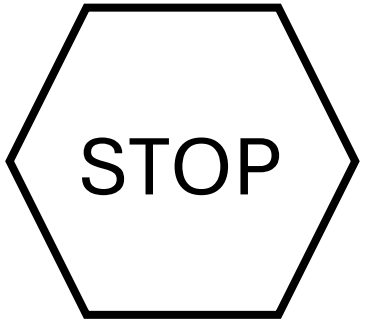
Hazard Index =



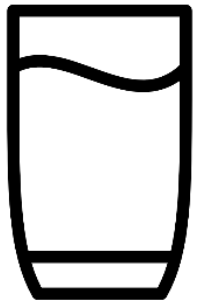
Level of PFAS 1 in drinking water

$$\text{Hazard Index} = \frac{\text{Level of PFAS 1 in drinking water}}{\text{Health guideline for PFAS 1}}$$

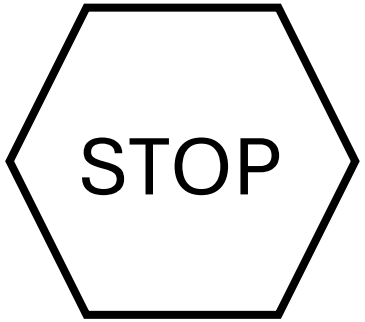




Hazard Index =



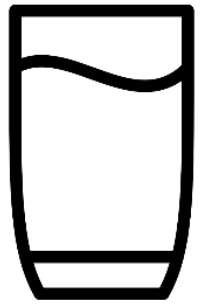
Level of PFAS 1 in drinking water

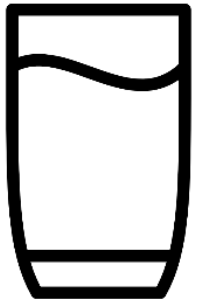


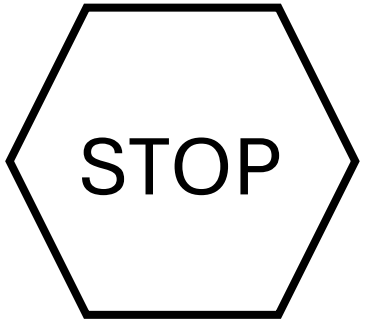
Health guideline for PFAS 1

+

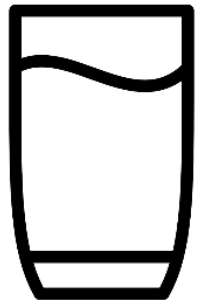
$$\text{Hazard Index} = \frac{\text{Level of PFAS 1 in drinking water}}{\text{Health guideline for PFAS 1}} + \frac{\text{Level of PFAS 2 in drinking water}}{\quad}$$

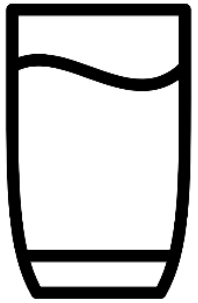


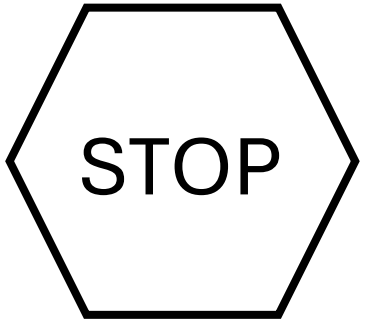


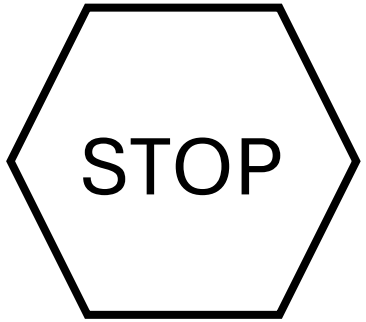


$$\text{Hazard Index} = \frac{\text{Level of PFAS 1 in drinking water}}{\text{Health guideline for PFAS 1}} + \frac{\text{Level of PFAS 2 in drinking water}}{\text{Health guideline for PFAS 2}}$$

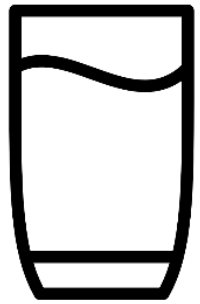


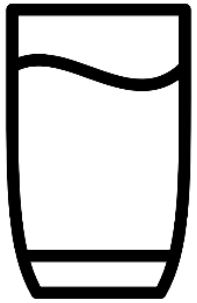


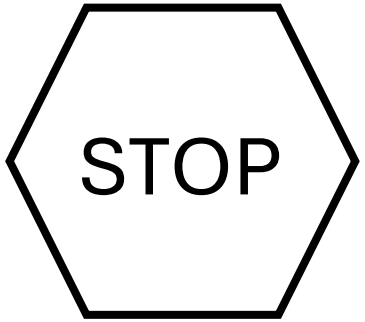


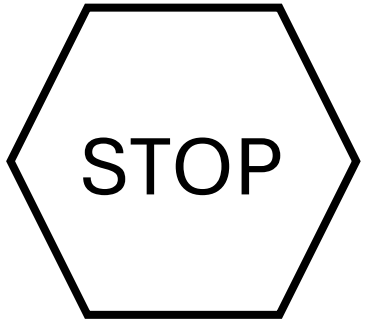


$$\text{Hazard Index} = \frac{\text{Level of PFAS 1 in drinking water}}{\text{Health guideline for PFAS 1}} + \frac{\text{Level of PFAS 2 in drinking water}}{\text{Health guideline for PFAS 2}} + \ldots$$

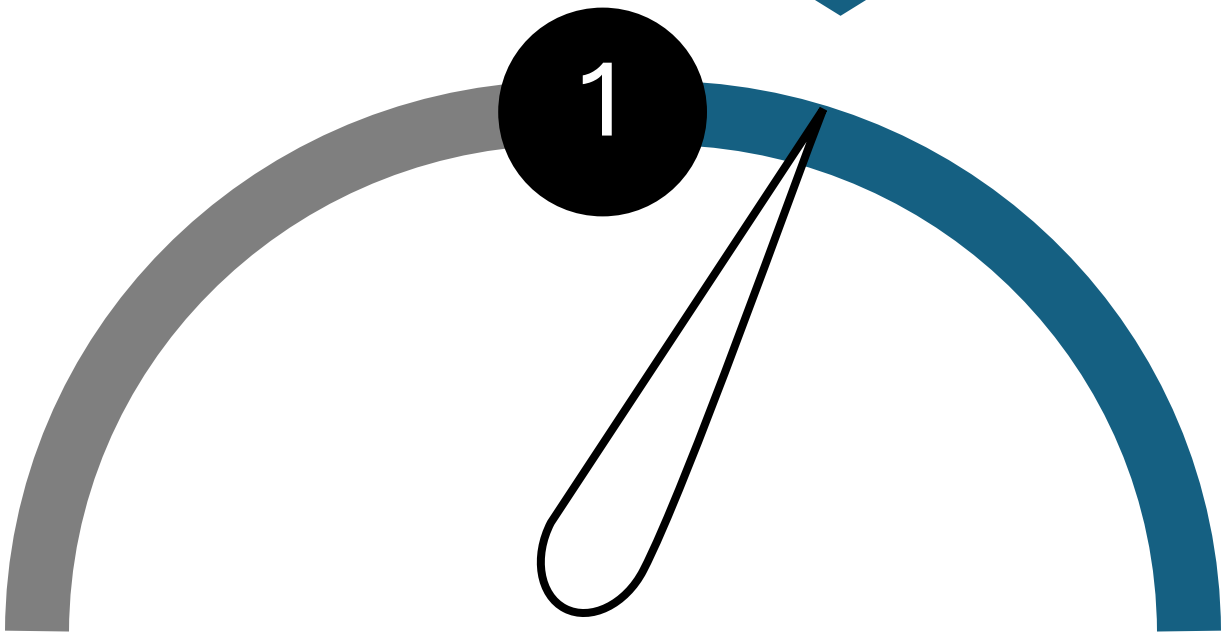








When the hazard index is 1 or greater, there is potential for health impacts.



Hazard Index

2017 2018 2019 2020 2021

February

The NRB did not approve the groundwater standards rule for PFOA and PFOS.

2017 2018 2019 2020 2021

February

The NRB changed the proposed drinking water standards for PFOA and PFOS.

2017 2018 2019 2020 2021 2022

March - July

DNR offered free testing to municipal water systems.

2017 2018 2019 2020 2021 2022

June

EPA released interim health advisories for PFOA and PFOS and final health advisories for GenX and PFBS.

2017 2018 2019 2020 2021 2022

August

Wisconsin’s maximum contaminant level for PFOA and PFOS became effective.

2017 2018 2019 2020 2021 2022

August

DNR starts a new rule for groundwater standards for four PFAS.

Individual States and Provinces

- Michigan has 7 drinking water standards for PFAS ranging from 6 ppt to 400,000 ppt (PFNA, PFOA, PFOS, PFHxA, PFHxS, PFBS, and HFPO-DA).
- Minnesota has MCLs for 5 PFAS in drinking water ranging from 4ppt to 10 ppt (PFOS, PFOA, PFNA, PFHxS, and HFPO-DA)
- Ontario has interim drinking water guideline of a sum of 11 different PFAS was above 70 ng/L.