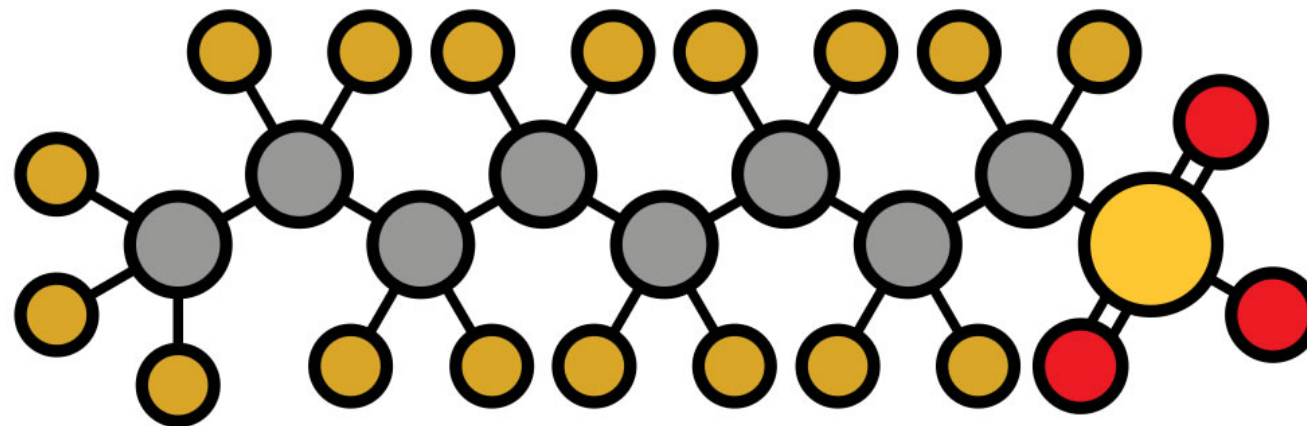


# Introduction to per- and polyfluoroalkyl substances (PFAS)

Meghan Williams  
Environmental Toxicologist  
Water Quality Bureau

# Today's presentation

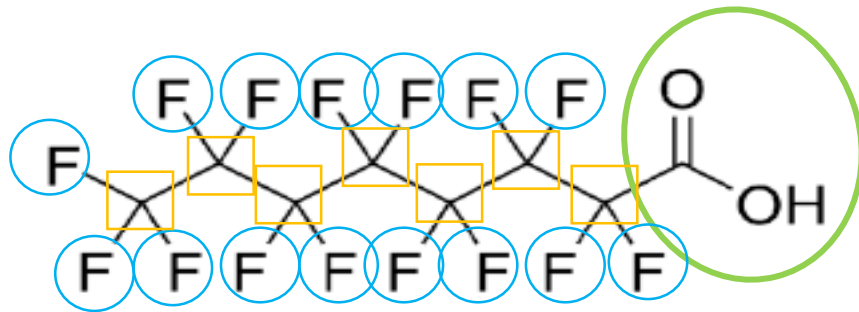
- What are PFAS and where did they come from?
- Why are PFAS a problem?



# What are PFAS?

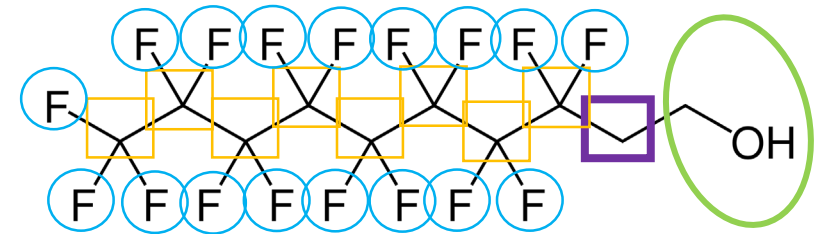
- General structure: **fluorinated carbon** chain (tail) attached to **functional group** (head)

**Perfluorinated** compounds:  
fully-fluorinated tail



PFOA (perfluorooctanoic acid)

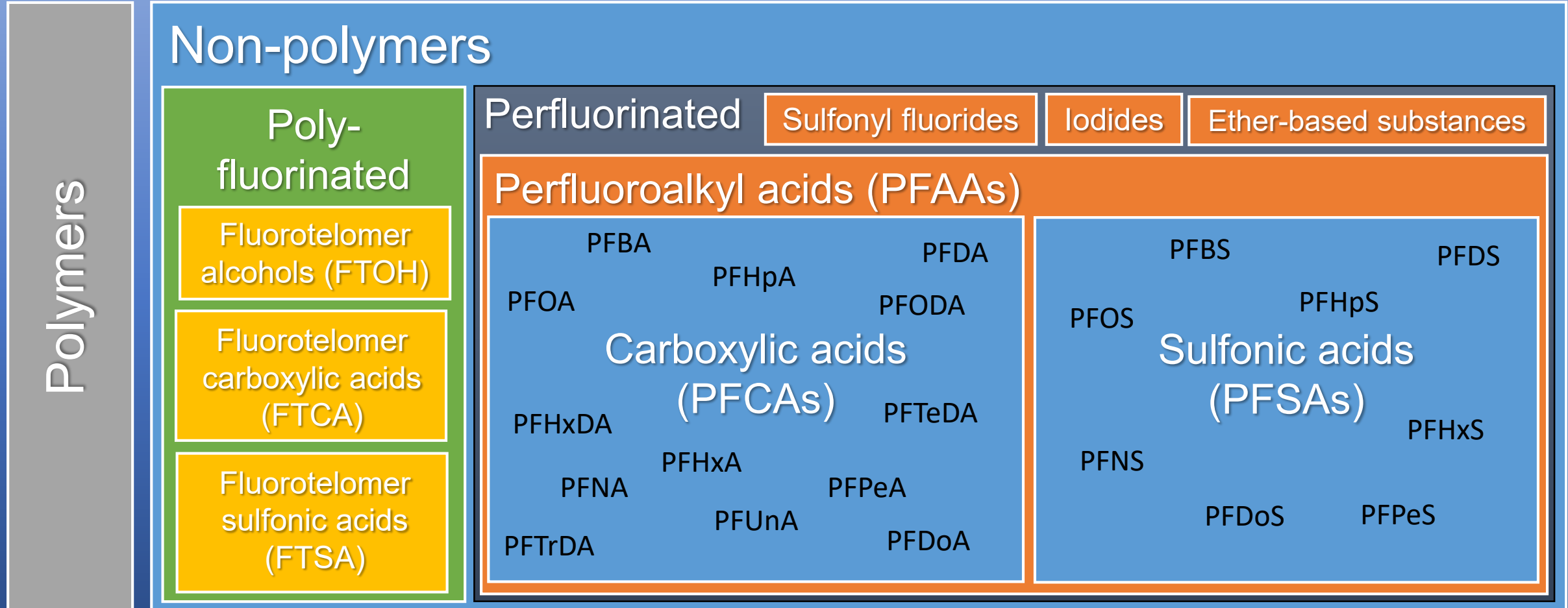
**Poly**fluorinated compounds: at least one carbon is **not attached** to a fluorine



8:2 FTOH (fluorotelomer alcohol)

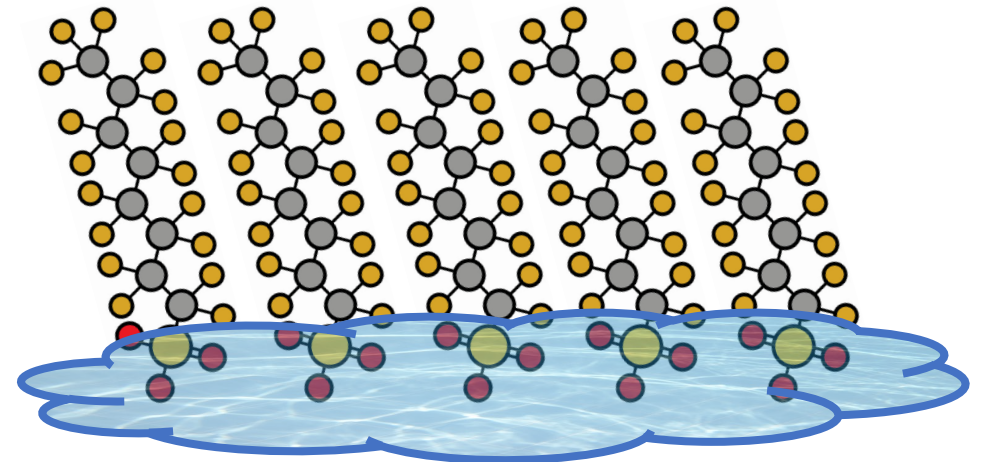
# PFOS and PFOA are only 2 of 4,000+ PFAS compounds

## PFAS









# Structure of PFAS imparts valuable properties

- Tail is hydrophobic and lipophobic, head is polar and hydrophilic
- Readily form films at air-water interface
- Unique structure means they have excellent water- and oil-repelling properties





# What are PFAS used for?

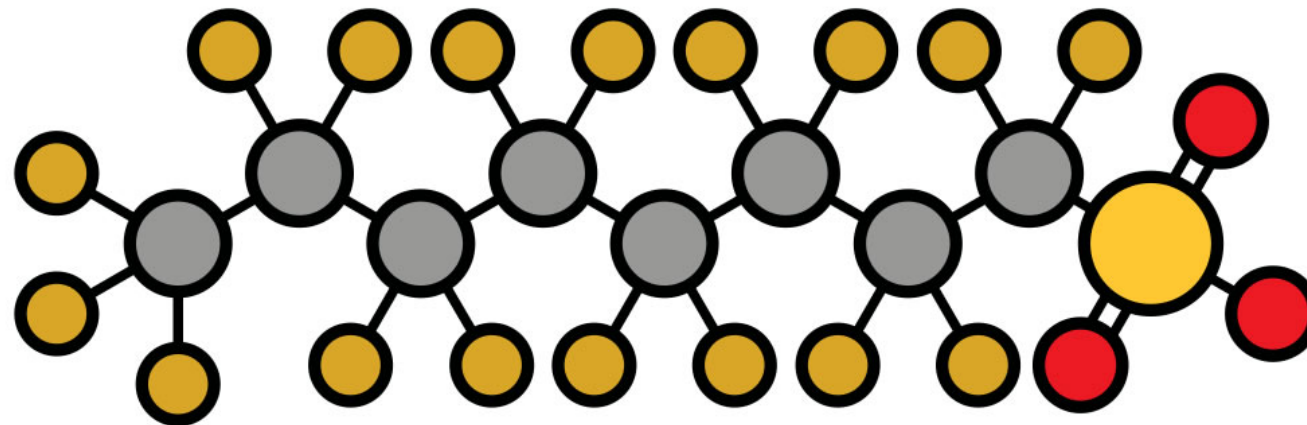
PFAS <sup>1</sup>	Development Time Period								
	1930s	1940s	1950s	1960s	1970s	1980s	1990s	2000s	
PTFE	Invented	Non-Stick Coatings 			Waterproof Fabrics 				
PFOS		Initial Production	Stain & Water Resistant Products	Firefighting foam				U.S. Reduction of PFOS, PFOA, PFNA (and other select PFAS <sup>2</sup> )	
PFOA		Initial Production	Protective Coatings 						
PFNA					Initial Production	Architectural Resins			
Fluoro-telomers					Initial Production	Firefighting Foams		Predominant form of firefighting foam	
Dominant Process <sup>3</sup>		Electrochemical Fluorination (ECF)							Fluoro-telomerization (shorter chain ECF)
Pre-Invention of Chemistry /			Initial Chemical Synthesis / Production			Commercial Products Introduced and Used			

[https://pfas-1.itrcweb.org/wp-content/uploads/2017/11/pfas\\_fact\\_sheet\\_history\\_and\\_use\\_11\\_13\\_17.pdf](https://pfas-1.itrcweb.org/wp-content/uploads/2017/11/pfas_fact_sheet_history_and_use_11_13_17.pdf)  
[https://commons.wikimedia.org/wiki/File:US\\_Navy\\_021022-N-5362A-011\\_Fire\\_fighting\\_training\\_during\\_Diligent\\_Warrior\\_2003.jpg](https://commons.wikimedia.org/wiki/File:US_Navy_021022-N-5362A-011_Fire_fighting_training_during_Diligent_Warrior_2003.jpg)  
[https://upload.wikimedia.org/wikipedia/commons/6/6b/Imos\\_Pizza\\_in\\_the\\_box\\_1.jpg](https://upload.wikimedia.org/wikipedia/commons/6/6b/Imos_Pizza_in_the_box_1.jpg)

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<https://www.fontesia.com/wp-content/uploads/2018/01/70-0714-9234-5-600x600.png>  
[https://crdms.images.consumerreports.org/c\\_fill,w\\_240,h\\_175/prod/products/cr/models/399723-frying-pans-nonstick-amazonbasics-nonstick-10008298](https://crdms.images.consumerreports.org/c_fill,w_240,h_175/prod/products/cr/models/399723-frying-pans-nonstick-amazonbasics-nonstick-10008298)

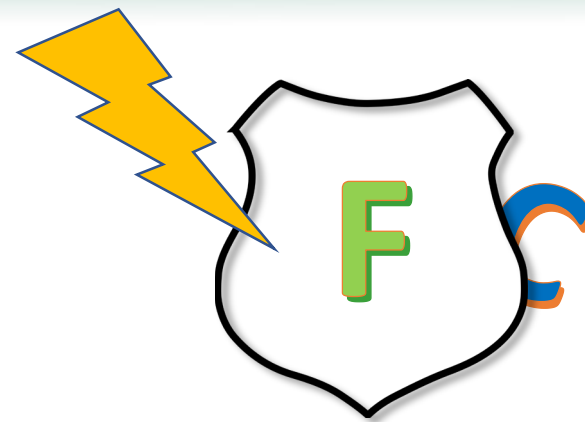
# Today's presentation

- What are PFAS and where did they come from?
- **Why are PFAS a problem?**



# Why are PFAS a problem?

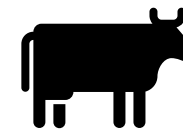
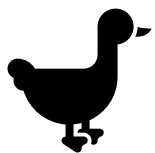
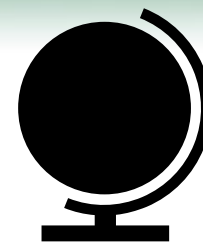
- Carbon-fluorine bond is incredibly strong
  - Fluorine atoms “shield” carbon from chemical reactions
- PFAS do not undergo biotic or abiotic degradation
- Thermally degrade only at high temperatures
- Very persistent
- Some PFAS are highly bioaccumulative





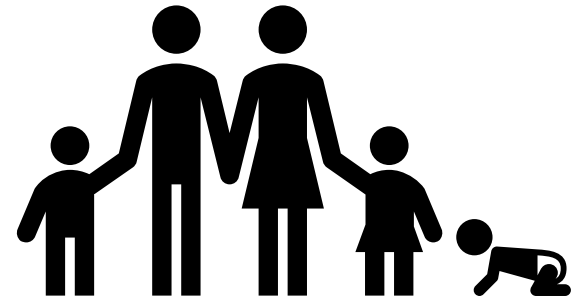
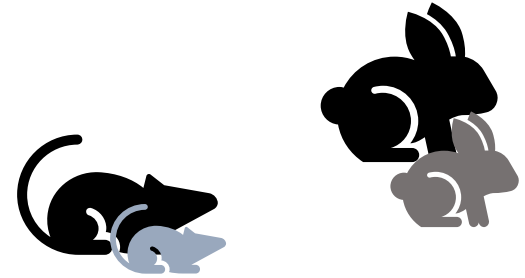
# Why are PFAS a problem?

- Persistence + bioaccumulation = global distribution
  - PFAS have been found in wildlife on all continents
  - PFAS have been found in surface waters globally
  - PFAS have been found in blood samples from humans across the world



# Why are PFAS a problem?

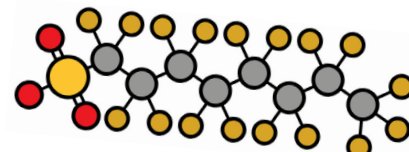
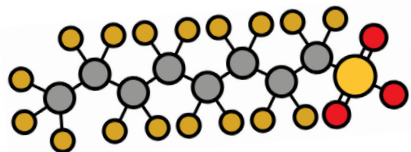
- PFAS have documented toxicity
  - Animal studies have shown negative effects on:
    - Liver
    - Immune system
    - Reproduction and development
    - Thyroid (endocrine system)
    - Cancers
  - Probable links to human health effects:
    - Childhood growth and development
    - Pregnancy-related hypertension
    - Hormone regulation
    - Increased cholesterol levels
    - Immune system effects
    - Cancer risk



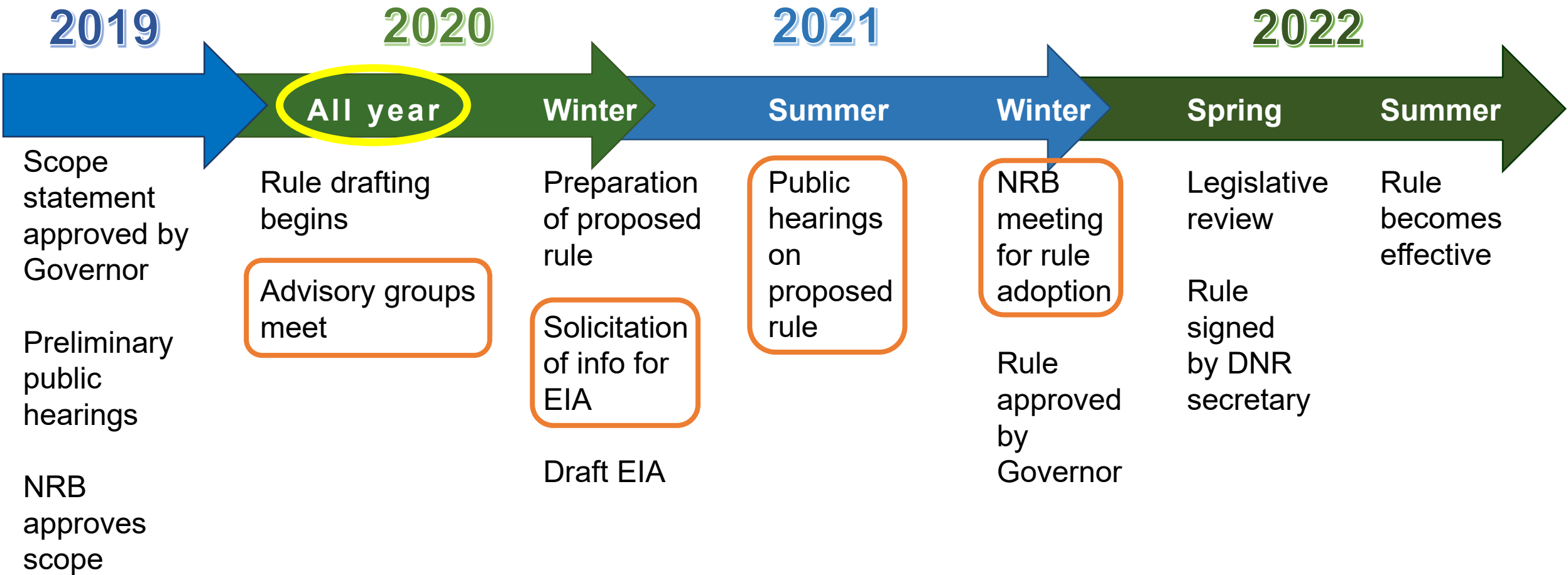


# Summary

- PFAS are a family of 4,000+ human-made compounds
- Their unique chemical structure gives them useful properties
- They are extremely resistant to degradation and some are highly bioaccumulative
- PFAS have been found almost everywhere
- PFAS cause adverse health effects in animals and humans



# Rulemaking process and timeline



# NR 809 – Safe Drinking Water

Subchapter I — Maximum Contaminant Levels, Monitoring and Analytical Requirements for Primary Drinking Water Contaminants

Subchapter V — Reporting, Consumer Confidence Reports and Record Keeping

Subchapter VII — Public Notification of Drinking Water Violations

Chapter NR 809  
SAFE DRINKING WATER

NR 809.01	Purpose.	NR 809.546	Public education and supplemental monitoring requirements.
NR 809.02	Departmental justification.	NR 809.547	Monitoring requirements for lead and copper in tap water.
NR 809.03	Applicability.	NR 809.548	Monitoring requirements for water quality parameters.
NR 809.04	Definitions.	NR 809.549	Monitoring requirements for lead and copper in source water.
NR 809.05	Coverage.	NR 809.55	Reporting requirements for lead and copper.
NR 809.06	General requirements.		
<b>Subchapter I — Maximum Contaminant Levels, Monitoring and Analytical Requirements for Primary Drinking Water Contaminants</b>			
NR 809.07	Maximum contaminant level goal for primary contaminants.	<b>Subchapter III — Maximum Contaminant Levels, Maximum Residual Disinfection Byproducts, Disinfection Residuals and Stage 1 and Stage 2 DBP</b>	
NR 809.09	Applicability of primary treatment contaminants in tap water.	NR 809.561	Maximum residual disinfection level (MRDL) for disinfection byproducts and treatment.
NR 809.10	Use of treated water.	NR 809.562	General requirements for disinfection byproducts and disinfection residuals Stage 1 DBP.
NR 809.11	Inorganic chemical maximum contaminant levels and RALs.	NR 809.563	Analytical requirements for disinfection byproducts and disinfection residuals Stage 1 DBP and Stage 2 DBP.
NR 809.115	Monitoring requirements for inorganic contaminants.	NR 809.565	Monitoring requirements for disinfection byproducts and disinfection residuals Stage 1 DBP.
NR 809.117	Compliance requirements for inorganic contaminants.	NR 809.566	Compliance requirements for disinfection byproducts and disinfection residuals Stage 1 DBP.
NR 809.118	Sodium monitoring, reporting and notification requirements.	NR 809.567	Reporting and recordkeeping requirements for disinfection byproducts and disinfection residuals Stage 1 DBP.
NR 809.119	Materials identification for corrosivity characteristics.	NR 809.569	Treatment techniques for control of disinfection byproduct precursors.
NR 809.201	Synthetic organic contaminants that meet contaminant levels and RALs.	NR 809.60	General requirements for Stage 2 DBP disinfection byproducts control.
NR 809.203	Analytical requirements for synthetic organic contaminants.	NR 809.61	Rotative monitoring for Stage 2 DBP.
NR 809.207	Compliance requirements for synthetic organic contaminants.	NR 809.62	Monitoring plan for Stage 2 DBP.
NR 809.209	Visible organic contaminant maximum contaminant levels and RALs.	NR 809.63	Additional disinfection byproducts monitoring for conversion systems under Stage 2 DBP.
NR 809.243	Analytical requirements for visible organic contaminants.	NR 809.64	Operational evaluation levels for disinfection byproducts under Stage 2 DBP.
NR 809.245	Monitoring requirements for visible organic contaminants.	NR 809.66	Requirements for training on reduced TTHM and HAA5 monitoring based on Stage 1 DBP results.
NR 809.247	Compliance requirements for visible organic contaminants.	NR 809.67	Requirements for monitoring on increased TTHM and HAA5 monitoring based on Stage 1 DBP results.
NR 809.25	Special monitoring and reporting for selected organic contaminants and sulfate.	NR 809.68	Reporting and recordkeeping requirements for Stage 2 DBP.
NR 809.30	Distribution system microbiological assessment maximum contaminant level.	<b>Subchapter IV — Miscellaneous Chemical Monitoring Requirements, Raw Surface Water Standards, and Certified Laboratories</b>	
NR 809.31	Distribution system microbiological assessment monitoring requirements.	NR 809.70	Secondary synthetic chemical and physical standards.
NR 809.311	Analytical requirements for microbiological contaminants.	NR 809.71	Sampling and analytical requirements for secondary standards.
NR 809.312	Compliance reporting for microbiological contaminants.	NR 809.72	Additional requirements for other chemicals or disinfection byproducts.
NR 809.313	Guidelines for microbiological monitoring.	NR 809.73	Raw surface water standards.
NR 809.314	Guidelines for microbiological monitoring.	NR 809.74	Laboratory certification.
NR 809.32	Technical and compliance with distribution system microbiological monitoring.	NR 809.75	Monitoring of consecutive public water systems.
NR 809.323	Analytical requirements for groundwater source microbiological contaminants.	<b>Subchapter V — Reporting, Consumer Confidence Reports and Record Keeping</b>	
NR 809.325	Groundwater source microbiological monitoring requirements.	NR 809.80	Reporting requirements.
NR 809.327	Compliance requirements for groundwater source microbiological monitoring.	NR 809.81	Record maintenance.
NR 809.329	Technical compliance for groundwater source microbiological monitoring.	NR 809.82	Consumer confidence report applicability and deadlines.
NR 809.33	Reporting and recordkeeping requirements for groundwater source microbiological monitoring.	NR 809.83	Consumer confidence report applicability and deadlines.
NR 809.331	Surface water microbiological monitoring.	NR 809.84	Required additional health information for consumer confidence reports.
NR 809.332	Surface water source monitoring.	NR 809.85	Consumer confidence report delivery and recordkeeping.
NR 809.333	Sampling schedules for surface water source monitoring.	NR 809.86	Conditional waivers.
NR 809.334	Sampling locations for surface water source monitoring.	NR 809.87	Conditional waivers from the maximum contaminant levels for nitrate.
NR 809.335	Analytical methods for surface water source monitoring.	<b>Subchapter VI — Conditional Waivers and Variances</b>	
NR 809.336	Approved laboratories for surface water source monitoring.	NR 809.90	General public notification requirements.
NR 809.35	Reporting source water monitoring results.	NR 809.91	Ter 1 public notice—item, manner, and frequency of notice.
NR 809.50	Sanitary survey requirements for public water systems.	NR 809.92	Ter 2 public notice—item, manner, and frequency of notice.
NR 809.51	Maximum contaminant levels, compliance dates and RALs for radon, nitrate and nitrite.	NR 809.93	Ter 3 public notice—item, manner, and frequency of notice.
NR 809.52	Radon monitoring, frequency and compliance requirements for community water systems.	NR 809.94	Public notice content.
NR 809.53	Analytical methods for radon.	NR 809.95	Notice to new billing units or new customers.
NR 809.54	Radon monitoring, frequency and compliance requirements for community water systems.	NR 809.96	Special notice of the availability of completed contaminant monitoring results.
<b>Subchapter II — Control of Lead and Copper</b>			
NR 809.541	General requirements for the control of lead and copper.	<b>Subchapter VII — Public Notification of Drinking Water Violations</b>	
NR 809.542	Monitoring and analytical requirements for lead and copper.	NR 809.951	General public notification requirements.
NR 809.543	Applicability of corrosion control treatment steps for small, medium and large-size water systems.	NR 809.952	Ter 1 public notice—item, manner, and frequency of notice.
NR 809.544	Source water treatment requirements.	NR 809.953	Ter 2 public notice—item, manner, and frequency of notice.
NR 809.545	Lead service line replacement requirements.	NR 809.954	Ter 3 public notice—item, manner, and frequency of notice.
		NR 809.955	Public notice content.
		NR 809.956	Notice to new billing units or new customers.
			Special notice of the availability of completed contaminant monitoring results.

Published under s. 35.92, Stats. Updated on the first day of each month. The Register date on each page is the date the chapter was last published. Entire code is always current. The Register date on each page is the date the chapter was last published.

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# Wisconsin Statute 280

[280.11\(1\)](#) The department shall, after a public hearing, prescribe, publish and enforce minimum reasonable standards and rules and regulations for methods to be pursued in the obtaining of pure drinking water for human consumption and the establishing of all safeguards deemed necessary in protecting the public health against the hazards of polluted sources of impure water supplies intended or used for human consumption, including minimum reasonable standards for the construction of well pits. It shall have general supervision and control of all methods of obtaining groundwater for human consumption including sanitary conditions surrounding the same, the construction or reconstruction of wells and generally to prescribe, amend, modify or repeal any rule or regulation theretofore prescribed and shall do and perform any act deemed necessary for the safeguarding of public health.

# Maximum Contaminant Level (MCL)



The maximum permissible level of a contaminant in water which is delivered to any user of a public water system.



# Synthetic Organics MCLs

**NR 809.20 Synthetic organic contaminant maximum contaminant levels and BATS. (1) APPLICABILITY.** The following maximum contaminant levels for synthetic organic contaminants apply to community water systems and non-transient non-community water systems.

<b>Contaminant</b>	<b>MCL (mg/L)</b>
Alachlor	0.002
Atrazine	0.003
Benzo[a]pyrene	0.0002
Carbofuran	0.04
Chlordane	0.002
2,4-D	0.07
Dalapon	0.2
Dibromochloropropane	0.0002
Di(2-ethylhexyl)adipate	0.4
Di(2-ethylhexyl)phthalate	0.006
Dinoseb	0.007
Diquat	0.02

<b>Contaminant</b>	<b>MCL (mg/L)</b>
Endothall	0.1
Endrin	0.002
Ethylene Dibromide	0.00005
Glyphosate	0.7
Heptachlor	0.0004
Heptachlor epoxide	0.0002
Hexachlorobenzene	0.001
Hexachlorocyclopentadiene	0.05
Lindane	0.0002
Methoxychlor	0.04
Oxamyl	0.2
Pentachlorophenol	0.001
Picloram	0.5
Polychlorinated biphenyls (PCBs)	0.0005
Simazine	0.004
2,3,7,8-TCDD (Dioxin)	$3 \times 10^{-8}$
Toxaphene	0.003
2,4,5-TP	0.05



# Analytical Methods

(2) ANALYTICAL METHODS. Analysis for the synthetic organic contaminants listed in s. [NR 809.20](#) shall be conducted using the methods prescribed in Table CM.

**Table CM**  
**SDWA Approved Methodology for Synthetic Organic Contaminants**

<b>Contaminant</b>	<b>EPA Methods<sup>1</sup></b>	<b>SM<sup>9</sup></b>	<b>SM Online<sup>10</sup></b>	<b>ASTM</b>	<b>Other</b>
<b>Regulated Parameters:</b>					
<b>Synthetic Organic Chemicals</b>					



# Reporting and Recording Keeping

## Subchapter V

- Reporting results to DNR
- Maintain record of results
- Consumer confidence reports





# Public Notification

## Subchapter VII

- Public notices
  - An MCL violation
  - Failure to monitor



# Who will be affected?

- Municipal water systems (cities, townships, sanitary districts)
- Mobile home parks, apartment buildings, condominium associations
- Small businesses that are public water systems
- Laboratories certified to perform PFAS analysis in drinking water
- Wisconsin Department of Natural Resources
- Wisconsin Department of Health Services
- Wisconsin Department of Safety and Professional Services
- Treatment installation businesses
- Public
  - Benefits to public health from reduction in PFAS exposure via drinking water



# Surface Water Quality PFAS Rules

## Revisions to NR 105, NR 106, and NR 219

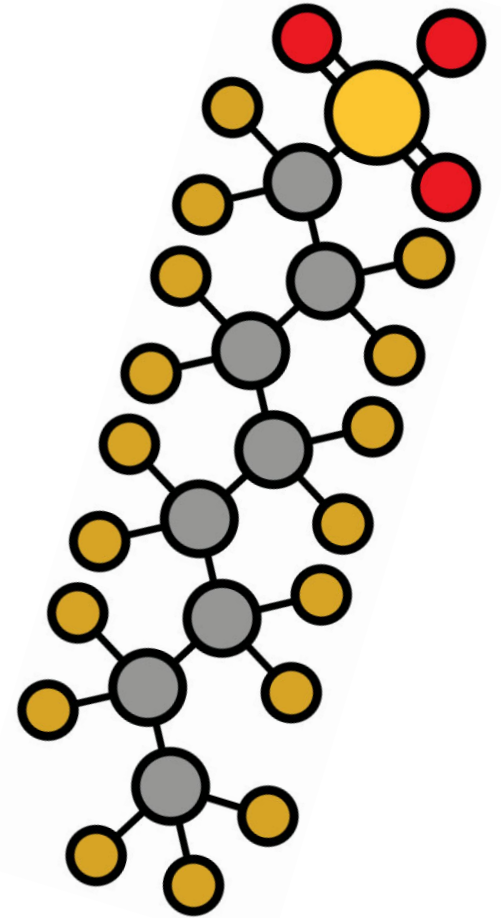
Marcia Willhite

Water Evaluation Section Chief

Water Quality Bureau

# Today's presentation

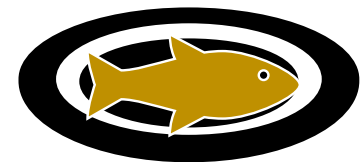
- Chapter revisions
- Authority for water quality standards
- What does NR 105 say about standard development?
- How will these new standards be used?





# Chapter NR 105: Surface Water Quality Criteria and Secondary Values for Toxic Substances

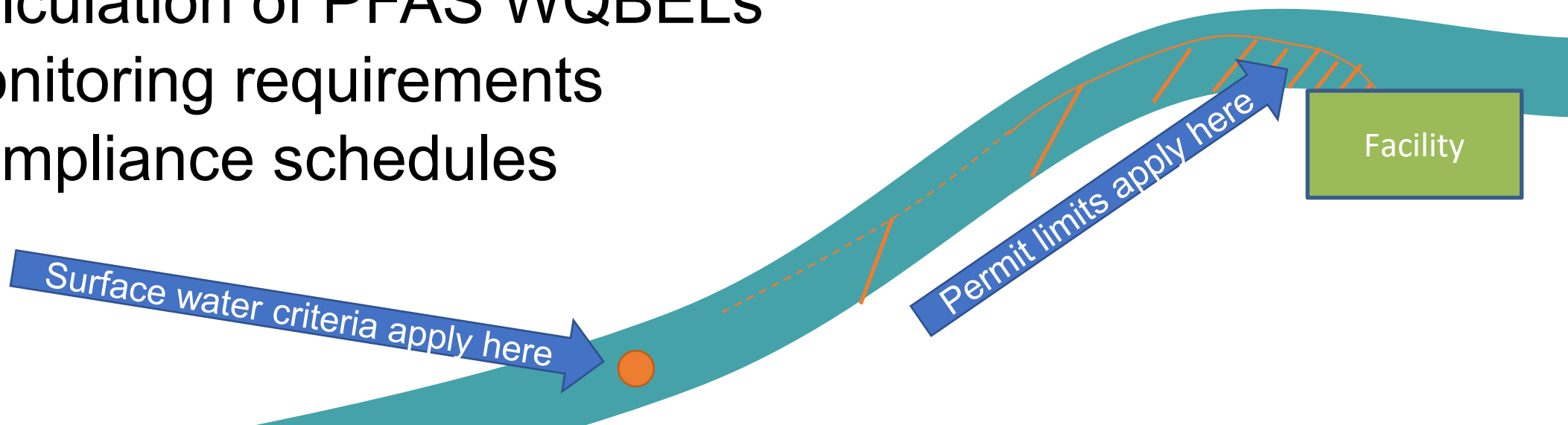
- Create surface water quality criteria for PFOS and PFOA
- Protect humans from adverse effects of PFOS and PFOA resulting from:
  - Contact with surface water
  - **Ingestion of fish from surface waters**





# Chapter 106: Procedures for Calculating WQBELs for Point Source Discharges to Surface Waters

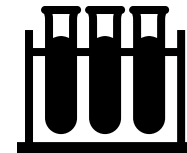
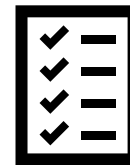
- Develop procedures to implement new criteria in WPDES permits
  - Calculation of PFAS WQBELs
  - Monitoring requirements
  - Compliance schedules





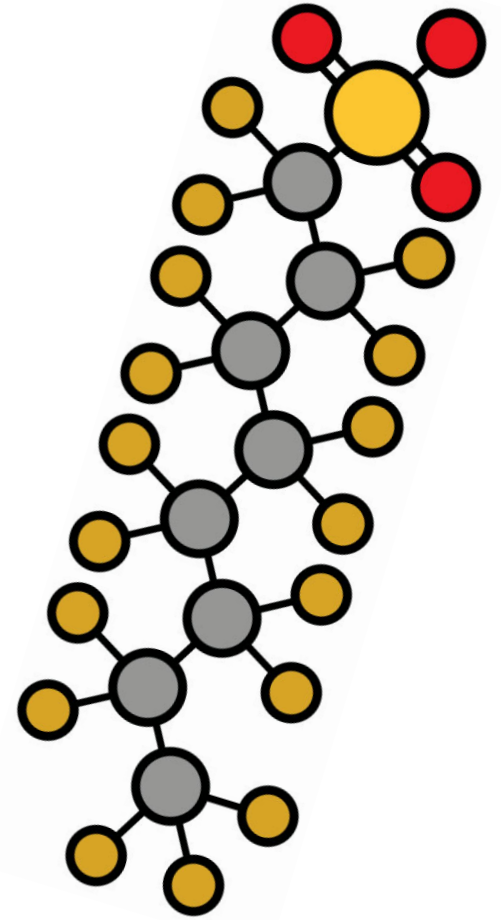
# Chapter NR 219: Analytical Test Methods and Procedures

- Additions to the list of approved test methods for detecting PFAS in:
  - Surface waters
  - Wastewater effluent
  - Biosolids



# Today's presentation

- Chapter revisions
- **Authority for water quality standards**
- What does NR 105 say about standard development?
- How will these new standards be used?



# Authority for WQS Development

- Federal Clean Water Act:

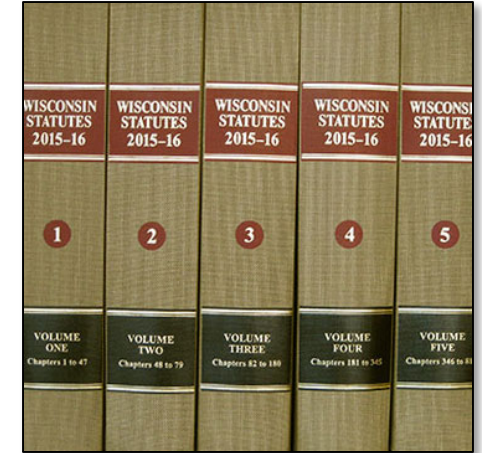
*“The objective of this Act is to restore and maintain the chemical, physical, and biological integrity of the nation’s waters.”*

- State must identify designated uses
- State must establish criteria to protect designated uses



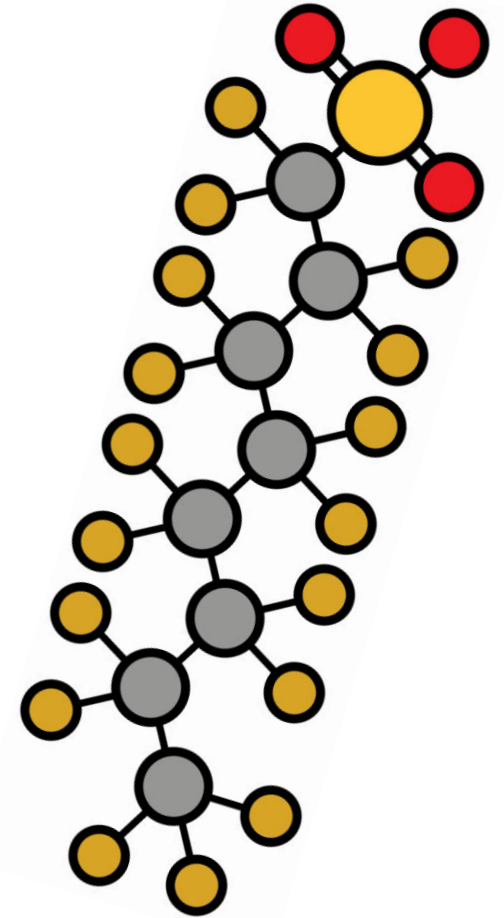
# Authority for WQS Development

- Wisconsin §281.15: water quality standards
  - The Department shall develop water quality standards to protect public health and welfare.
  - The Department must consider information on likely social, economic, energy usage, and environmental costs associated with attaining criteria.
  - The Department shall establish criteria which are no more stringent than reasonably necessary to assure attainment of the designated use for the waterbodies in question.



# Today's presentation

- Chapter revisions
- Authority for water quality standards
- **What does NR 105 say about standards development?**
- How will these new standards be used?

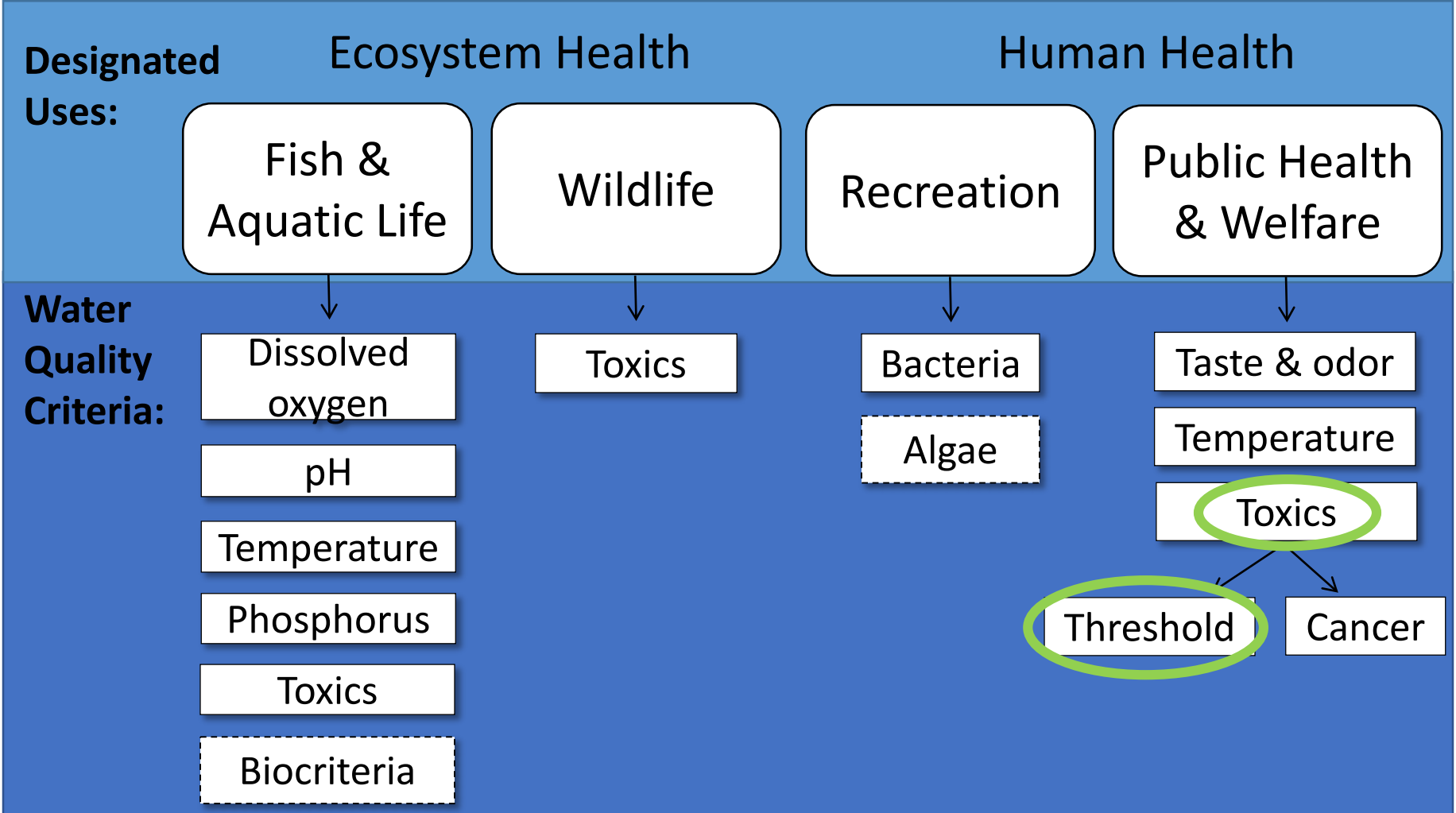






# NR 105: Surface Water Quality Criteria for Toxic Substances

- Contains current criteria for public health and aquatic life protection
- Contains methods for developing human health, aquatic life, and wildlife criteria
- Establishes how bioaccumulation factors shall be determined



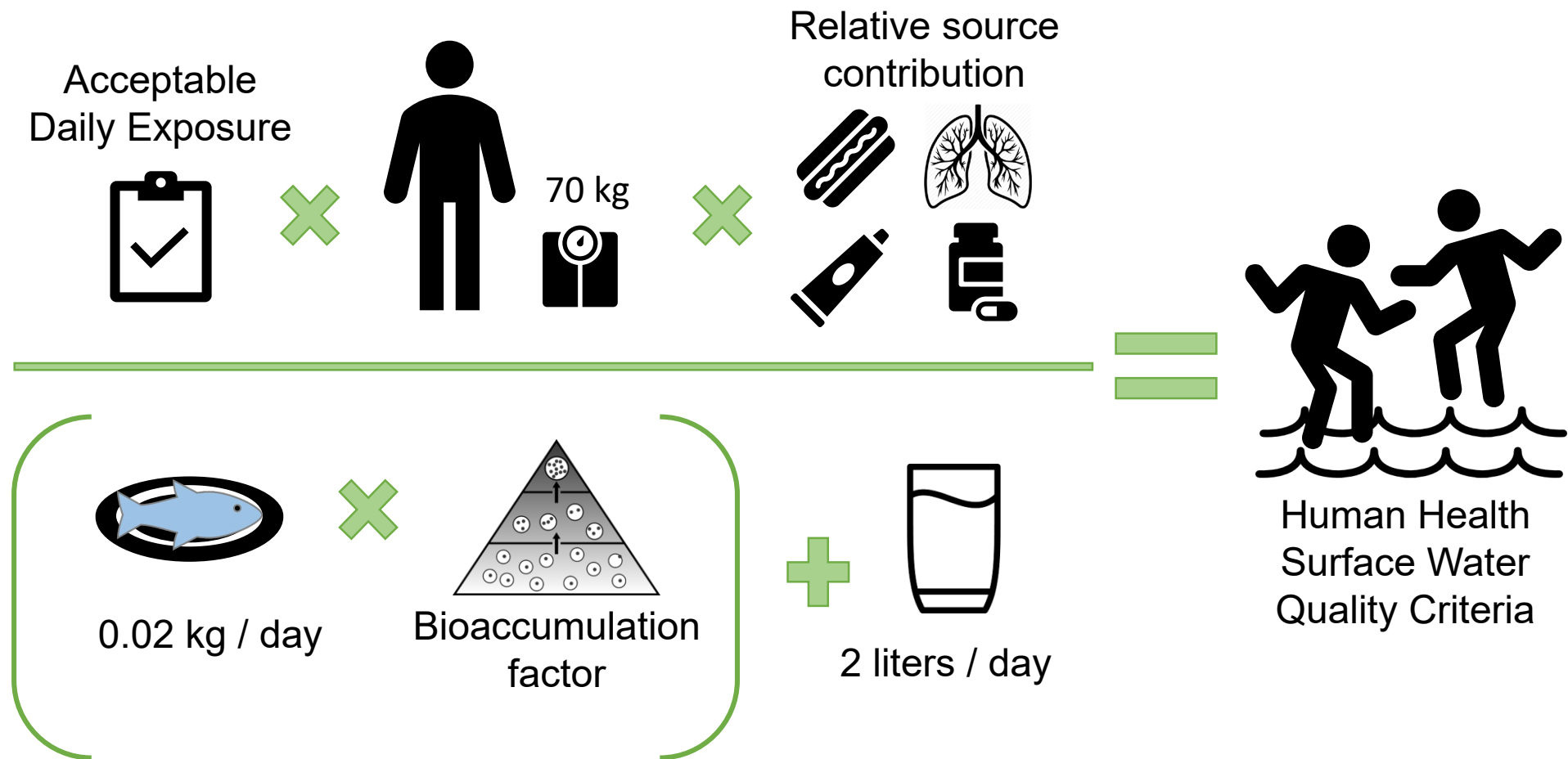


# NR 105.08: Human Threshold criteria

- Maximum concentration of a substance that will protect humans from adverse effects of:
  - Contact with or ingestion of surface water
  - Ingestion of aquatic organisms taken from those waters
- Science indicates a threshold below which no adverse effect is likely

# NR 105.08: Human Threshold criteria

How are criteria calculated?





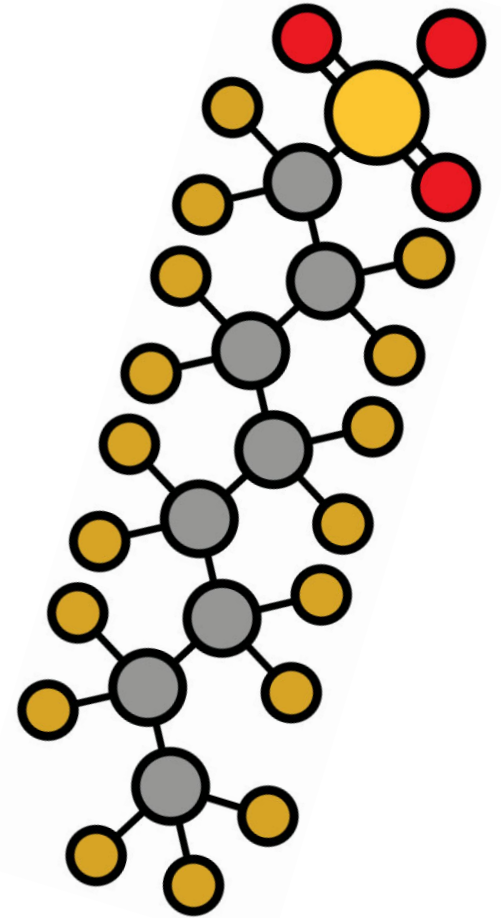
# NR 105.08: Human Threshold criteria

## Acceptable daily exposure

- Very prescriptive about how to determine ADE
  - What weight to give toxicity studies
  - How to translate animal studies to human exposure
  - How to apply uncertainty factors
- Specifies that the Department shall select an ADE based on sound scientific judgment

# Today's presentation

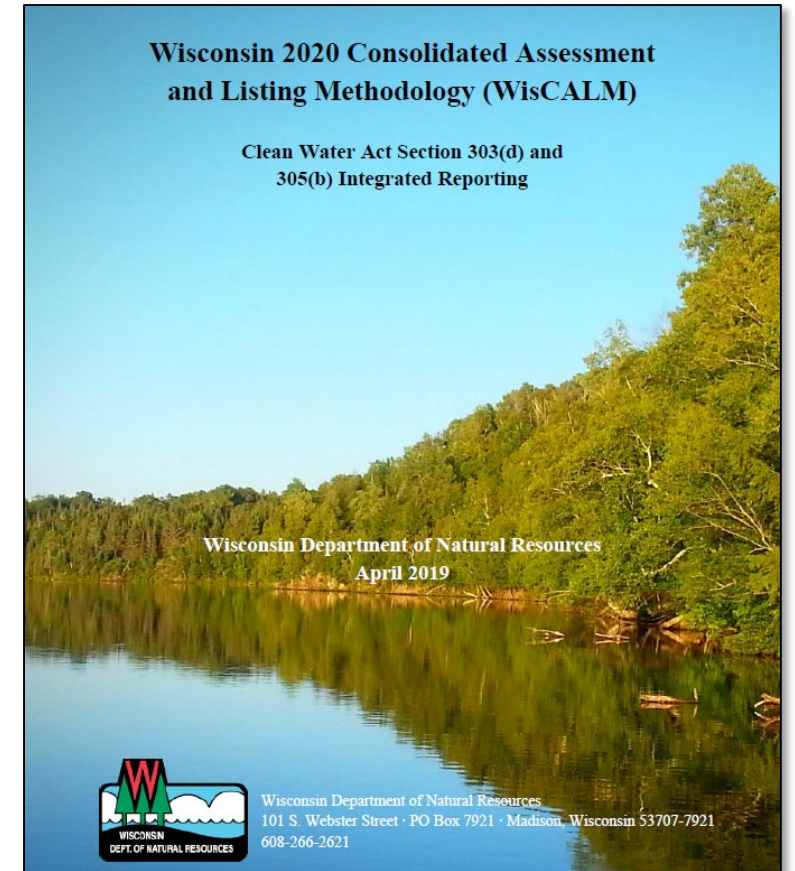
- Chapter revisions
- Authority for water quality standards
- What do these rules say about standard development?
- **How will these new standards be used?**





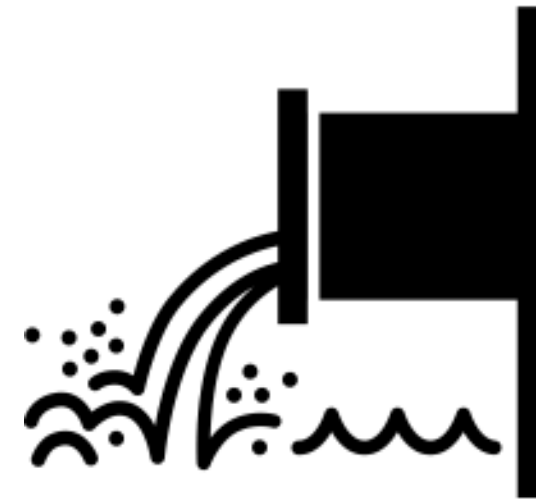
# Assessing attainment of designated use

- Designated Use: Public Health and Welfare
- Impairment: exceedance of WQS in rivers, lakes, or streams
  - Waterbodies with exceedances appear on Wisconsin's list of impaired waters as required by the Clean Water Act



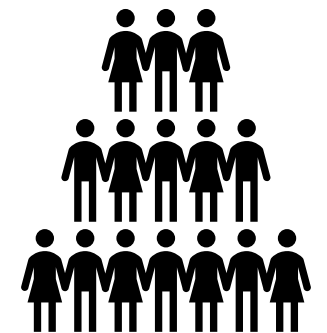
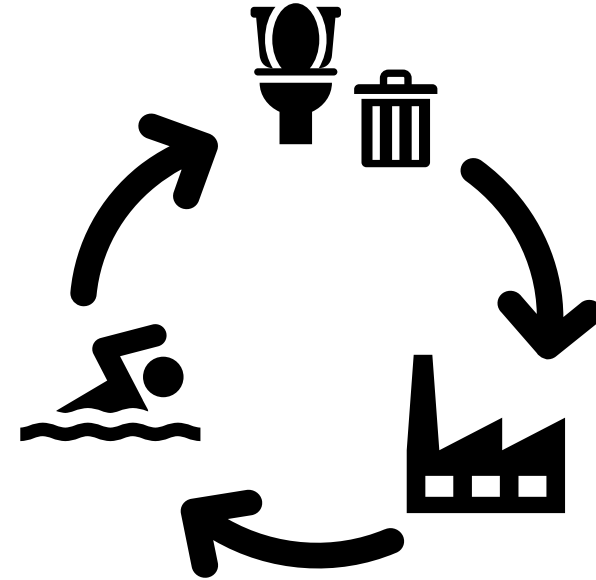
# Calculating WQBELs for point source discharges to surface waters (NR 106)


- 106.05: Determination of the necessity for WQBELs for toxics
- 106.06: Calculation of WQBEL for toxics
  - Bioaccumulative chemicals of concern
  - Limits based on chronic toxicity
- 106.07: Application and compliance with WQBEL in permits



# Affected entities

- Business/industry and municipalities
  - Facilities that discharge PFAS to surface waters
  - May be required to conduct monitoring
  - May receive PFAS WQBELs
- Public
  - Benefits to public health from reduction in PFAS exposure via surface waters





# Groundwater Quality Rules

## Revisions to NR 140

Bruce Rheineck

Groundwater Section Chief

Drinking Water & Groundwater Bureau

# NR 140 presentation

- Authority for groundwater quality standards
- What guides groundwater standard development?
- Chapter revisions
- How will these standards be used?





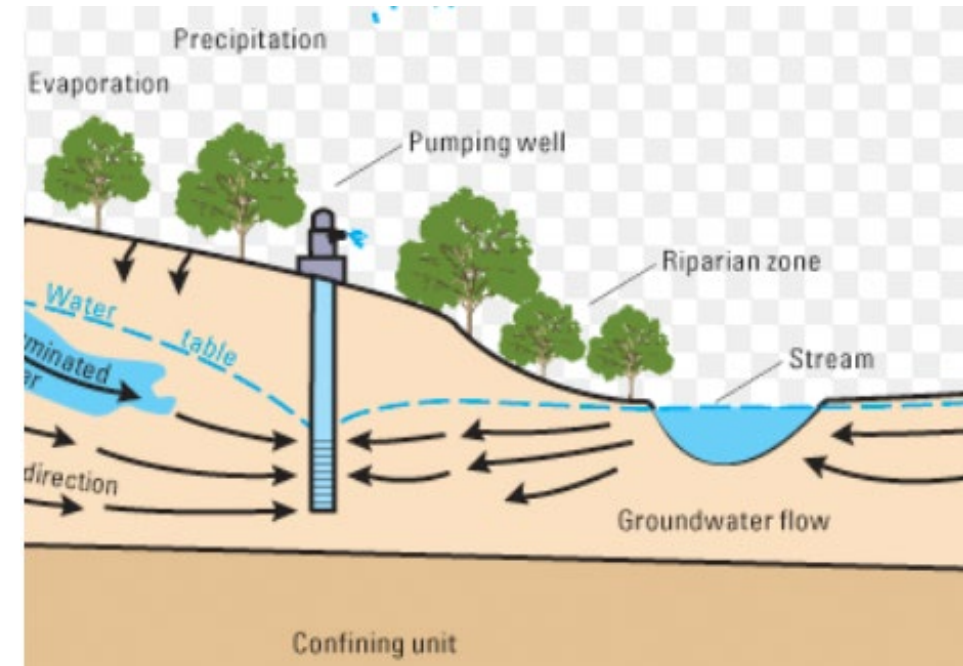
# Authority for Groundwater Quality Standards

- Wisconsin §160: Groundwater Protection Standards
  - Set numerical standards for use by all groundwater regulatory programs
  - Minimize concentration of polluting substances in groundwater
  - Protect public health, welfare and the environment



# NR 140 presentation

- Authority for groundwater quality standards
- **What guides groundwater standard development?**
- Chapter revisions
- How will these standards be used?





# Groundwater Quality Standard Development

- **Wisconsin §160.05:**
  - DNR compiles list of substances related to regulated activities detected in or which have a reasonable probability of entering groundwater
- **Wisconsin §160.07:**
  - DNR requests Department of Health Services (DHS) to review and recommend public health based standards
  - DNR sets or revises standards based on DHS recommendations



# Groundwater Quality Standard Development

- §160.07 – §160.13: DHS reviews literature & scientific information
  - Gather all available data, which can mean hundreds of scientific journal articles
  - Review specific concentrations set by the U.S. Environmental Protection Agency and other health-based guidelines
  - Follows process to select appropriate standard, scientific process is specified if a federal number or state drinking water standard is not available
  - Uses the most recent federal number unless there is significant technical and scientifically valid information that was not considered
  - Writes documents explaining findings and recommendations for each recommended standard and makes available to public

# NR 140 presentation

- Authority for groundwater quality standards
- What guides groundwater standard development?
- **Chapter revisions**
- How will these standards be used?







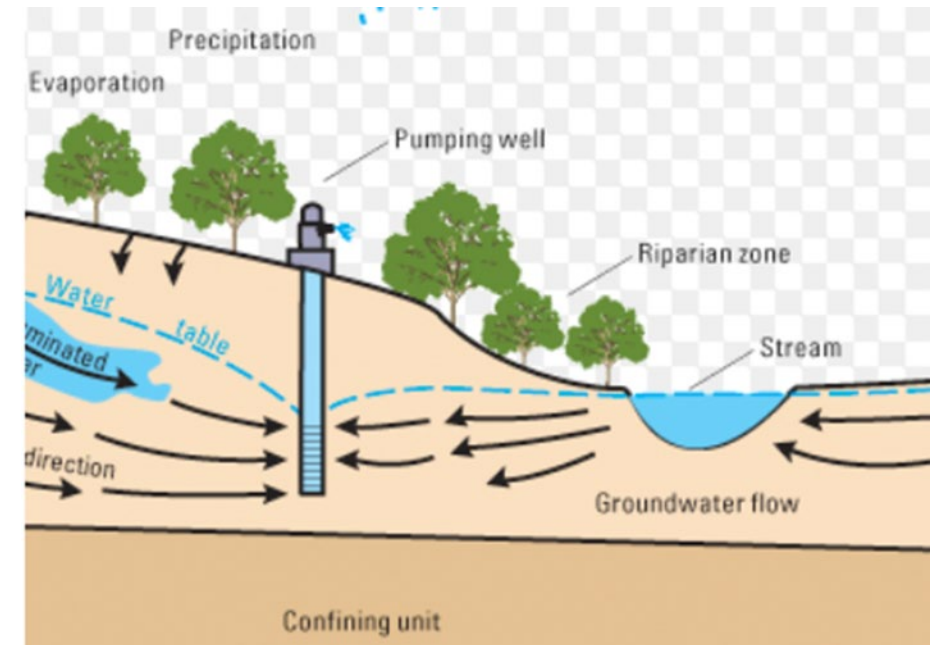




Substance	New or existing	Enforcement Standard Recommended Value	Preventive Action Limit Recommended Value
1,1-Dichloroethane	Existing	No change 850 µg/L	85 µg/L
1,2,3-Trichloropropane	Existing	↓ 0.3 ng/L	0.03 ng/L
1,4-Dioxane	Existing	↓ 0.35 µg/L	0.035 µg/L
Aluminum	Existing	No change 200 µg/L	20 µg/L
Bacteria (Total coliform)	Existing	No change 0	0
Bacteria ( <i>E. coli</i> )	New	n/a 0	0
Barium	Existing	No change 2 mg/L	0.4 mg/L
Boron	Existing	↑ 2,000 µg/L	400 µg/L
Clothiandin	New	n/a 1,000 µg/L	200 µg/L
Cobalt	Existing	No change 40 µg/L	4 µg/L*
Dacthal MTP and TPA degradates	New	Combine with dacthal 70 µg/L	7 µg/L*
Glyphosate	New	n/a 10 mg/L	1 mg/L
Glyphosate AMPA degradate	New	n/a 10 mg/L	2 mg/L
Hexavalent chromium	New	n/a 70 ng/L	7 ng/L
Imidacloprid	New	n/a 0.2 µg/L	0.02 µg/L
Isoxaflutole & Isoxaflutole Diketonitrile (DKN)	New	n/a 3 µg/L	0.3 µg/L
Isoxaflutole Benzoic Acid (BA)	New	n/a 800 µg/L	160 µg/L
Molybdenum	Existing	No change 40 µg/L	4 µg/L*
PFOA & PFOS	New	n/a 20 ng/L	2 ng/L
Strontium	New	n/a 1,500 µg/L	150 µg/L
Sulfentrazone	New	n/a 1,000 µg/L	100 µg/L
Tetrachloroethylene (PCE)	Existing	↑ 20 µg/L	2 µg/L
Thiamethoxam	New	n/a 100 µg/L	10 µg/L
Thiencarbazone-methyl	New	n/a 10 mg/L	2 mg/L
Trichloroethylene (TCE)	Existing	↓ 0.5 µg/L	0.05 µg/L

# NR 140 presentation

- Authority for groundwater quality standards
- What guides groundwater standard development?
- Chapter revisions
- **How will these standards be used?**



# How are standards used?

- Used by all state agencies regulating facilities and activities that may affect groundwater quality
- Each agency uses existing rules or revises/adopts rules following Wisconsin §160.21
- Used as standards for bottled water and well compensation grant program



# Examples of Facilities and Activities

- Spills and remediation sites
- Solid and hazardous waste management
- Land application of wastewater
- Mining operations
- Pesticide applications





# How are standards used?

- If PAL exceeded, agencies must take site specific action(s) from responses listed in NR 140.24
  - No action (if certain conditions met)
  - Require installation of wells and groundwater sampling/ site investigation
  - Require a change or increase in monitoring
  - Require change in design, construction or operational procedures
  - Prohibit an activity or close a facility
  - Require remedial action/ natural attenuation
  - Revise rules



# How are standards used?

- If ES exceeded, agencies must take site specific action(s) from responses listed in NR 140.26
  - Change in design, construction or management practice
  - Prohibit an activity or close a facility
  - Require remedial action / natural attenuation
  - Revise rules
- And may also
  - Require installation of wells and groundwater sampling/ site investigation
  - Require a change or increase in monitoring
- But cannot take no action





# Wrap up and Next Steps

- Next stakeholder meeting will be announced shortly. It should be in March.
- We plan to hold separate meetings for each of the rules after that.
- Information on upcoming meetings will be on the websites.
  - [NR809 rule webpage](#)
  - [NR105 rule webpage](#)
  - [NR140 rule webpage](#)



# Questions

