

PFAS Update

Environmental Managers Association of BC
Monthly Education Session
March 2021

global **environmental** and **advisory** solutions



CSAP PFAS Guidance – May 2019

https://csapsociety.bc.ca/wp-content/uploads/Final-PFAS-Guidance-Documents-dated-2019-05-28_Readers-note.pdf



Basic Chemical Information

Interstate Technology & Regulatory Council

PFAS – Per- and Polyfluoroalkyl Substances

HOME

Welcome

Technical Resources for Addressing
Environmental Releases of Per- and
Polyfluoroalkyl Substances (PFAS)





Health & Environmental Research Online (HERO)

Home

Learn about HERO

Using HERO

Search HERO

Projects in HERO

Risk Assessment

Transparency & Integrity

Projects in HERO

HERO uses the term "Project" to define a collection of references used to support a report or document that the EPA is developing. The project pages listed below are further grouped based on the EPA programs they support. To learn more about navigating the references that are included on the project pages explore [Using HERO](#).

IRIS

NAAQS

OPPT

PFAS

Other

[5:3 acid \(914637-49-3\)](#)

[6:2/8:2 diPAP \(943913-15-3\)](#)

[6:2 diPAP \(57677-95-9\)](#)

[6:2 monoPAP \(57678-01-0\)](#)

[8:2 diPAP \(678-41-1\)](#)

[8:2 monoPAP \(57678-03-2\)](#)

[ADONA \(919005-14-4\)](#)

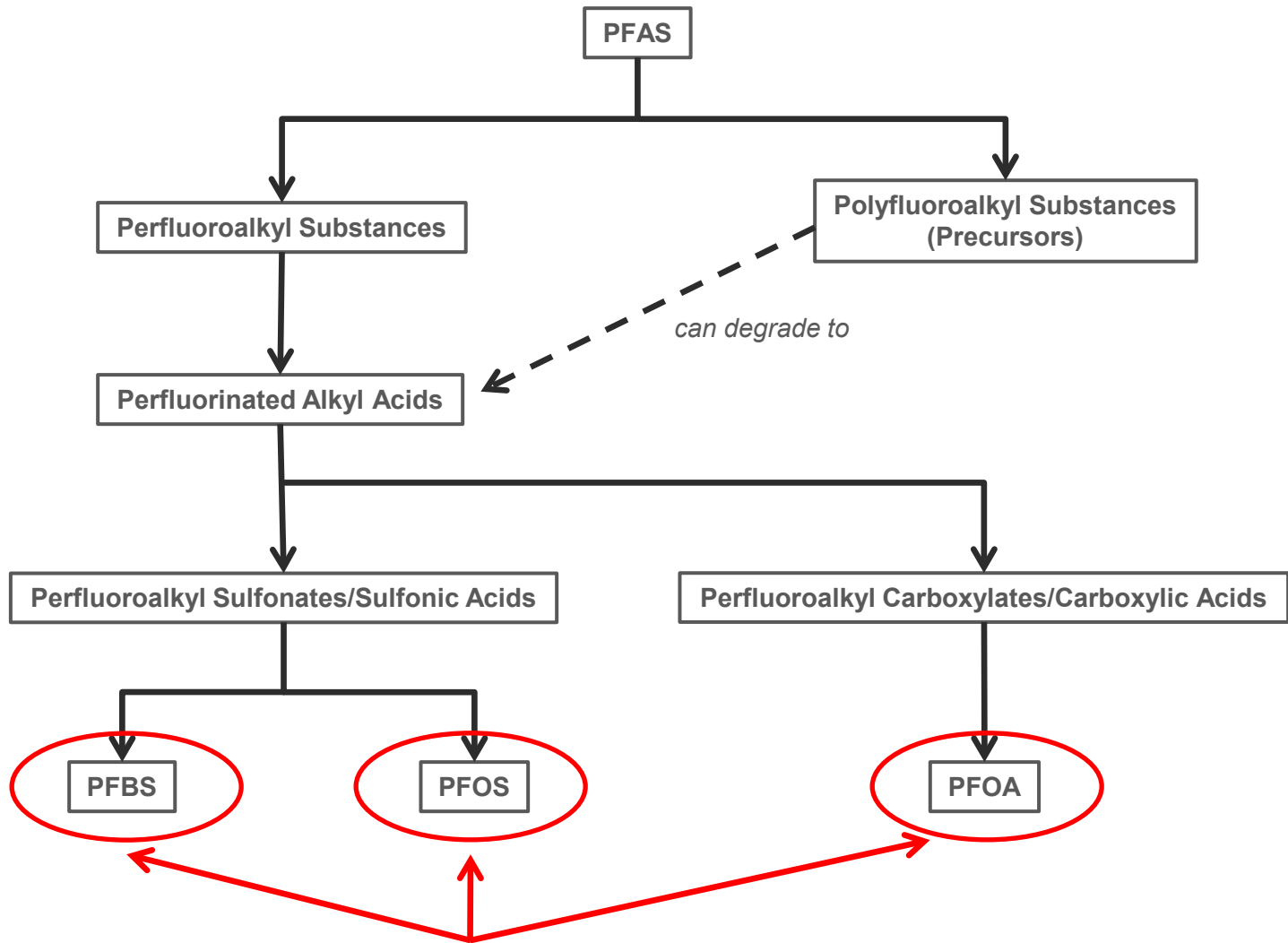
[FtOH 6:2 \(647-42-7\)](#)

[FtOH 8:2 \(678-39-7\)](#)

[FtS 6:2 \(27619-97-2\)](#)

[FtS 8:2 \(678-41-1\)](#)

Regulatory Efforts



CSR Regulated Parameters

BC CSR standards

- PFBS: soil (human soil ingestion), groundwater (drinking water)
- PFOA: groundwater (drinking water)
- PFOS: soil (human and eco matrix), groundwater (aquatic life and drinking water)

No changes between January 2019 and February 2021.

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6
Substance	Chemical Abstract Service # (CAS)	Aquatic Life ² (AW)	Irrigation ² (IW)	Livestock ² (LW)	Drinking Water ³ (DW)
perfluorobutane sulfonate [PFBS] ⁵⁷	375-73-5				80 ⁴
perfluorooctane sulfonate [PFOS] ⁵⁷	1763-23-1	60			0.3 ¹²
perfluorooctanoic acid [PFOA] ⁵⁷	335-67-1				0.2 ¹²

4 Standard is based on the 2015 United States (US) Environmental Protection Agency (EPA) "Regional Screening Levels" for tapwater. The EPA Regional Screening Levels for both non-carcinogenic and carcinogenic substances reflect the 1996 "Overview of CSST Procedures for the Derivation of Soil Quality Matrix Standards for Contaminated Sites" 20% (i.e., 0.2) Toxicity Reference Value (TRV) apportionment for drinking water exposure. For carcinogenic substances, the EPA Regional Screening Level is also adjusted to reflect section 18 (3) (a) of this regulation, with a human lifetime cancer risk of less than or equal to one in 100 000.

12 Standard is specific to protection of human health. Standard is derived with TRV protective of adults. Standard may not adequately protect other age groups.

57 Standards apply to a site used for an industrial or commercial purpose or activity set out in Schedule 2 as

- (a) item A4,
- (b) item C3,
- (c) item E10, or
- (d) item G1.

← ???

Schedule 2

[en. B.C. Reg. 131/2020, App. s. 9.]

Specified Industrial or Commercial Uses

A Chemical industries and activities

1. adhesives manufacturing, bulk storage, shipping or handling
2. chemical manufacturing, bulk storage, shipping or handling
3. ~~explosives or ammunition manufacturing, bulk storage, shipping or handling~~
4. fire retardant manufacturing, bulk storage, shipping or handling

C Metal smelting, processing or finishing industries and activities

1. foundries
2. galvanizing
3. metal plating or finishing

G Transportation industries, operations and related activities

1. aircraft maintenance, cleaning or salvage

E Miscellaneous industries, operations or activities

1. appliance, equipment or engine maintenance, repair, reconditioning, cleaning or salvage
2. ash deposit from boilers, incinerators or other thermal facilities
3. asphalt and asphalt tar manufacture, storage and distribution, including stationary asphalt batch plants
4. coal gasification (manufactured gas production)
5. medical, chemical, radiological or biological laboratories
6. outdoor firearm shooting ranges
7. road salt or brine storage
8. measuring instruments (containing mercury) manufacture, repair or bulk storage
9. dry cleaning facilities or operations and dry cleaning chemical storage, excluding locations at which clothing is deposited but no dry cleaning process occurs
10. contamination or likely contamination of land by substances migrating from an industrial or commercial site

Schedule 2 – February 2021 Update

E

Miscellaneous industries, operations or activities

1. appliance, equipment or engine maintenance, repair, reconditioning, cleaning or salvage
2. ash deposit from boilers, incinerators or other thermal facilities
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10. contamination or likely contamination of land by substances migrating from an industrial or commercial site
11. fire training facilities at which fire retardants are used

Source Identification - Update

Environmental
Science
Processes & Impacts









PAPER

[View Article Online](#)
[View Journal](#)

 Check for updates

Cite this: DOI: 10.1039/d0em00291g

An overview of the uses of per- and polyfluoroalkyl substances (PFAS)[†]

Juliane Glüge, *^a Martin Scheringer, ^a Ian T. Cousins, ^b Jamie C. DeWitt,^c
Gretta Goldenman,^d Dorte Herzke, ^{ef} Rainer Lohmann, ^g Carla A. Ng, ^h
Xenia Trierⁱ and Zhanyun Wang^j

Glüge et al (2020) identified 200 use/sub-use categories for over 1400 individual PFAS

Other Guideline Updates – BC ENV



Ministry of Environment and Climate Change Strategy
Water Protection & Sustainability Branch



PFOS

Surface water
(freshwater) =
3.4 $\mu\text{g/L}$

Aquatic life fish
tissue =
4700 $\mu\text{g/kg ww}$

Wildlife diet items =
4.6 $\mu\text{g/kg food ww}$

Other Guideline Updates - Federal

- CEPA *Prohibition of Certain Toxic Substances Regulation* (PFOS, PFOA) – postponed until Fall 2021
- CCME draft Canadian Soil and Groundwater Quality Guidelines for PFOS - to be finalized soon (?)
- Health Canada Soil Screening Values – updated May 2019

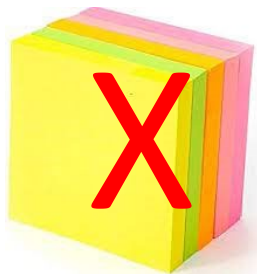
Field Sampling



Definitely not ...



Seriously??? No.



Nope

Per- and polyfluoroalkyl substances in environmental sampling products: Fact or fiction?

Elizabeth Denly¹ | Jim Occhialini² | Phil Bassignani² | Michael Eberle³ | Nidal Rabah⁴



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Letter

Field Sampling Materials Unlikely Source of Contamination for Perfluoroalkyl and Polyfluoroalkyl Substances in Field Samples

Alix E. Rodowa, Emerson Christie, Jane Sedlak, Graham F. Peaslee, Dorin Bogdan, Bill DiGuseppi, and Jennifer A. Field*

Laboratory Analysis

Laboratory Methods - Update

Organics

Revision Date: Sept 15, 2017

Perfluoroalkyl Substances (PFAS) in Soils by LC/MS/MS - PBM

Parameter	Perfluoroalkyl Substances (Perfluorobutane Sulfonate (PFBS), Perfluorooctane Sulfonate (PFOS), Perfluorooctanoic Acid (PFOA)) in Soils
Analytical Method	Methanol Extraction, Solid Phase Extraction (SPE) Clean-up, LC//MS/MS
Introduction	This method is applicable to the quantitative determination of perfluorinated alkyl substances in soils and solids.

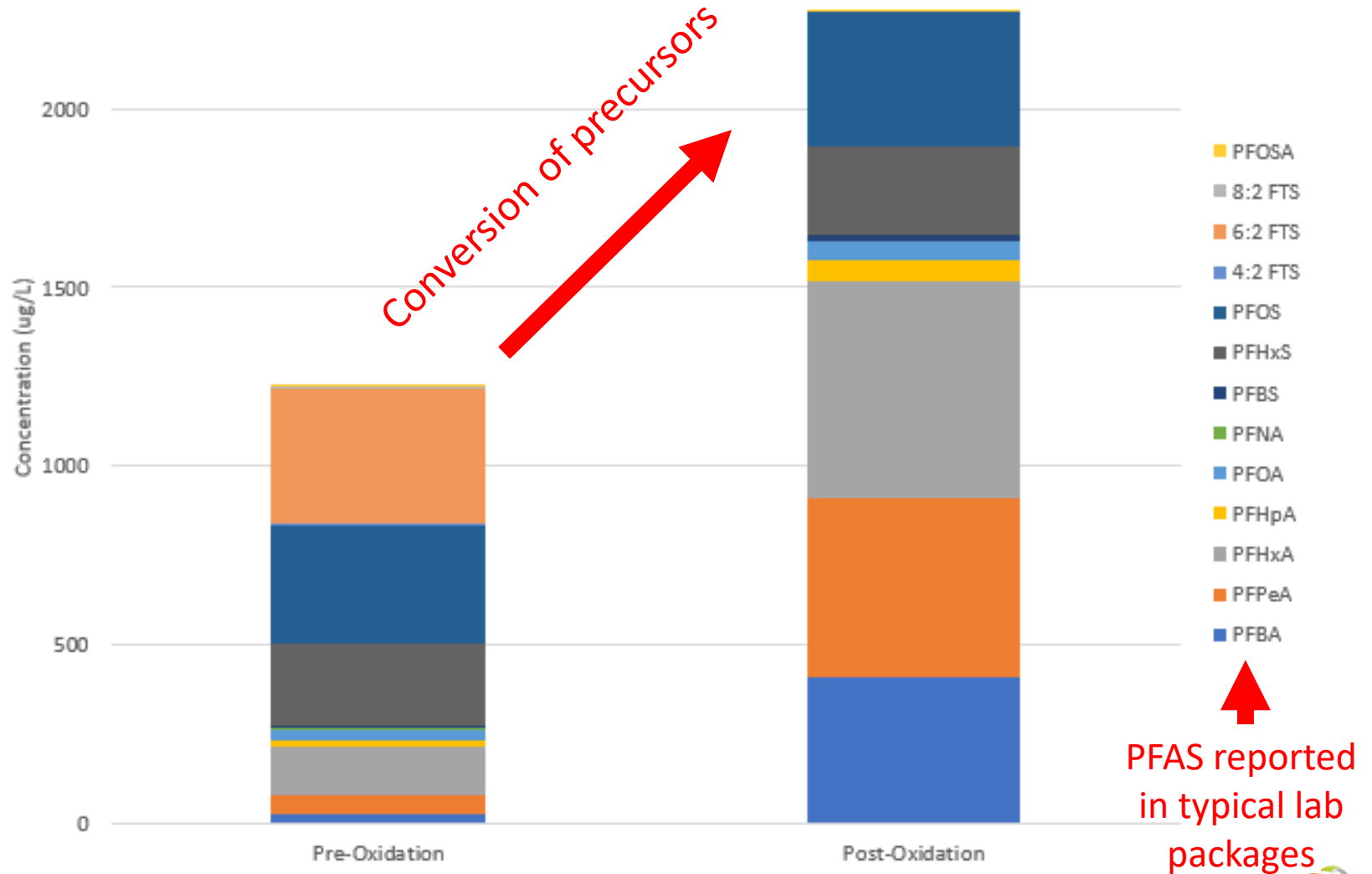
Organics

Revision Date: Sept 15, 2017

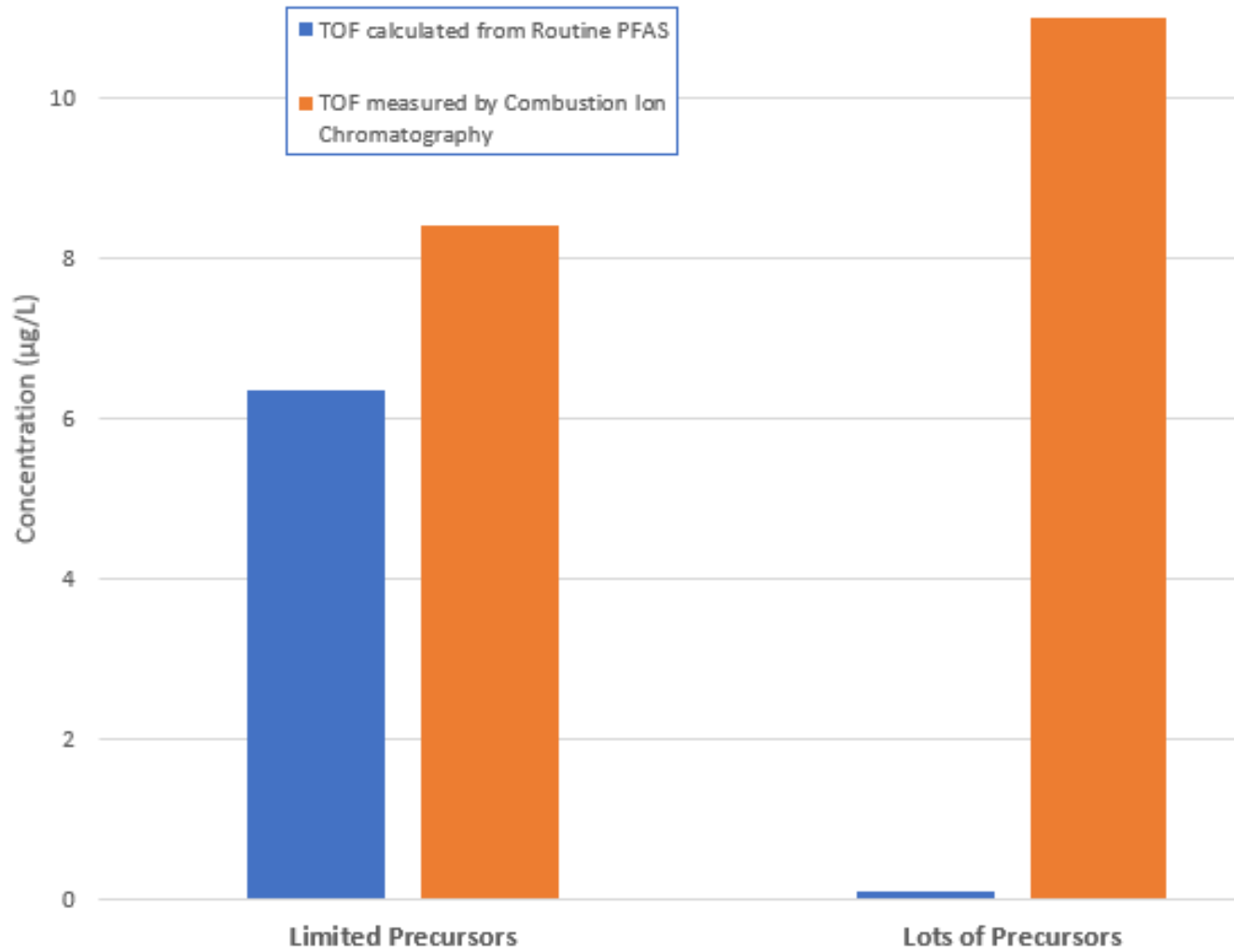
Perfluoroalkyl Substances (PFAS) in Water by LC/MS/MS - PBM

Parameter	Perfluoroalkyl Substances (Perfluorobutane Sulfonate (PFBS), Perfluorooctane Sulfonate (PFOS), Perfluorooctanoic Acid (PFOA)) in Waters
Analytical Method	Solid Phase Extraction (SPE), LC/MS/MS
Introduction	This method is applicable to the quantitative determination of perfluorinated alkyl substances in waters.

TOP Assay



Total Organic Fluorine



Site Investigation

Observations from Firefighting Foam Sites

- PFBS > CSR = Rare (if ever).
- PFOS > CSR soil standard for human soil ingestion and toxicity to plants & invertebrates = Rare.
- PFOS > CSR soil standard for AW = Rare.
- PFOS > CSR soil standard for DW = Highly Contaminated Areas Only.

Observations from Firefighting Foam Sites

- Groundwater PFBS > DW = Rare.
- Groundwater PFOS AW & DW > Soil PFOS.
- Federal groundwater PFOS AW \approx Federal soil PFOS AW.
- Health Canada DW groundwater > CSR DW groundwater

Observations about Background Levels - PFOS

Media	Background	Source Affected	Environmental Criteria
Groundwater	ND - < 0.02 µg/L	1 - 1000 µg/L	0.3 µg/L
Soil	ND - < 0.01 mg/kg	0.1 - 50 mg/kg	0.35 mg/kg
Surface Water	ND - < 0.02 µg/L	1 - 100 µg/L	3.4 µg/L

Remediation

Technology Demonstrations Since 2019

Soil:

- In situ and ex situ thermal treatment (e.g. smouldering, thermal desorption)
- Ball milling

Water:

- It's a long list...

Risk Assessment

Ecological Risk Assessment

- ECCC research projects are reportedly underway to better understand biological effects and bioaccumulation of short-chain PFAS in invertebrates, amphibians, and birds.



- US DoD SERDP ecotoxicity research – studies published in 2020.

Thank You!

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