



Memphremagog
Conservation

NEWSVT Casella landfill site in Coventry, Vermont

Lake Memphremagog Fish Contamination and Environmental Justice

Pretreatment discharge permit no 3-1406

APPENDIX C2

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Lake Memphremagog Fish Contamination and Environmental Justice

One of the major contaminants is this family of PFAS made up of thousands of molecules of which only a limited number are subject to evaluation and control. NEWSVT and Vermont studies have revealed that PFAS are rarely removed in municipal wastewater treatment plants such as those in Newport.

Even, some of the PFAS which are the most toxic see their concentration increase through the degradation of precursors in some municipal wastewater treatment plants. We assess that significant quantities of PFAS could have been discharged into Lake Memphremagog at the Newport WWTF effluent.

This overdose of PFAS from the Coventry site is added to the PFAS from municipal wastewater, and from soil drainage during rains and melting snow. Although low in concentration in Lake Memphremagog, the 2021 Vermont study found significant bioaccumulation in the flesh of all poisons evaluated. Would levels of PFOS, one of the most toxic PFAS molecules, reach a threshold that would make human consumption of these fish risky?

Should Lake Memphremagog see its fish even more contaminated by significant inputs of PFAS from leachate generated by waste coming from municipalities in Vermont outside our lake basin and even from other states?

IS THIS ENVIRONMENTAL JUSTICE?

OVERDOSE

of leachate at Newport
WWTF has contributed to

MORE PFAS into Lake

Memphremagog

Sum of 5 PFAS for Influent and Effluent All Facilities

For many WWTF, PFAS-5 effluent concentration are higher than influent like in Newport WWTF.
 How can that be explain ?

- Some of the PFAS precursors not in the PFAS-5 could be transformed in PFAS-5 in the WWTF ?

 Influent
 Effluent

No removal of PFAS-5 at Newport WWTF

Weston & Sampson

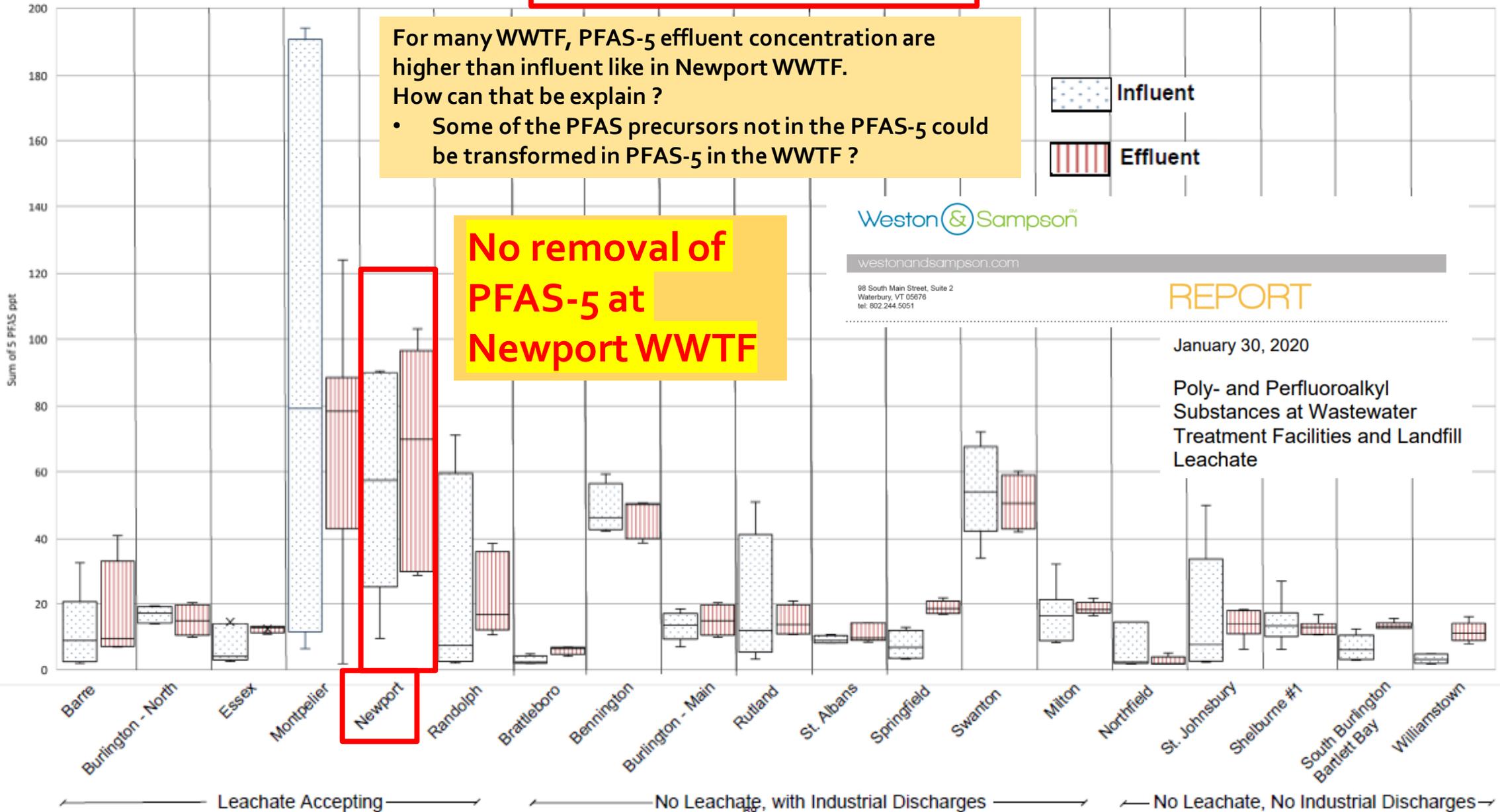
westonandsampson.com

98 South Main Street, Suite 2
 Waterbury, VT 05676
 tel: 802.244.5051

REPORT

January 30, 2020

Poly- and Perfluoroalkyl Substances at Wastewater Treatment Facilities and Landfill Leachate

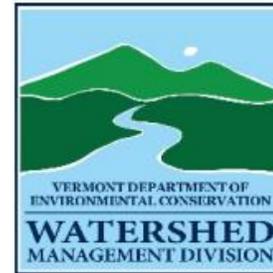


Evaluation from

VERMONT AGENCY OF NATURAL RESOURCES

**2021 Vermont Per- and Polyfluoroalkyl Substances (PFAS)
Surface Water, Fish Tissue, and
Wastewater Treatment Facility Effluent
Monitoring Report**

April 4, 2022



2021 Vermont PFAS Surface Water, Fish Tissue, and WWTF Effluent Monitoring Report

Table 9. Concentrations of PFAS in Fish Tissue Samples ($\mu\text{g}/\text{kg}$)

Site Name and Location

Fish Tissue ($\mu\text{g}/\text{kg}$), wet weight

In Lake Memphremagog Watershed

PFOS

n=29	$\mu\text{g}/\text{kg}$	ng/kg or ppt
Mean	1,48	1 477
Median	1,27	1 270
Minimum	0,346	346
Maximum	4,93	4 930

Wikipedia pictures



Yellow Perch



Largemouth Bass



Brown Bullhead



Rock Bass

LAKE MEMPHREMAGOG WATERSHED

1 µg = 1000 ng		PFOS	PFOS	PFOS
	<u>n</u>	<u>Mean</u>	<u>Minimum</u>	<u>Maximum</u>
		<u>µg/kg</u>	<u>µg/kg</u>	<u>µg/kg</u>
Yellow Perch	6	1,25	0,363	2,83
Largemouth Bass	12	1,89	0,997	4,93
Brown Bullhead	10	1,16	0,346	1,98
Rock Bass	1	1,08	1,08	1,08
	29	1,48	0,346	4,93

Brown Bullhead

Between **35% and 45%** of the mature brown bullhead in Lake Memmremagog have **melanoma, a skin cancer**



Abagael Giles / Vermont Public

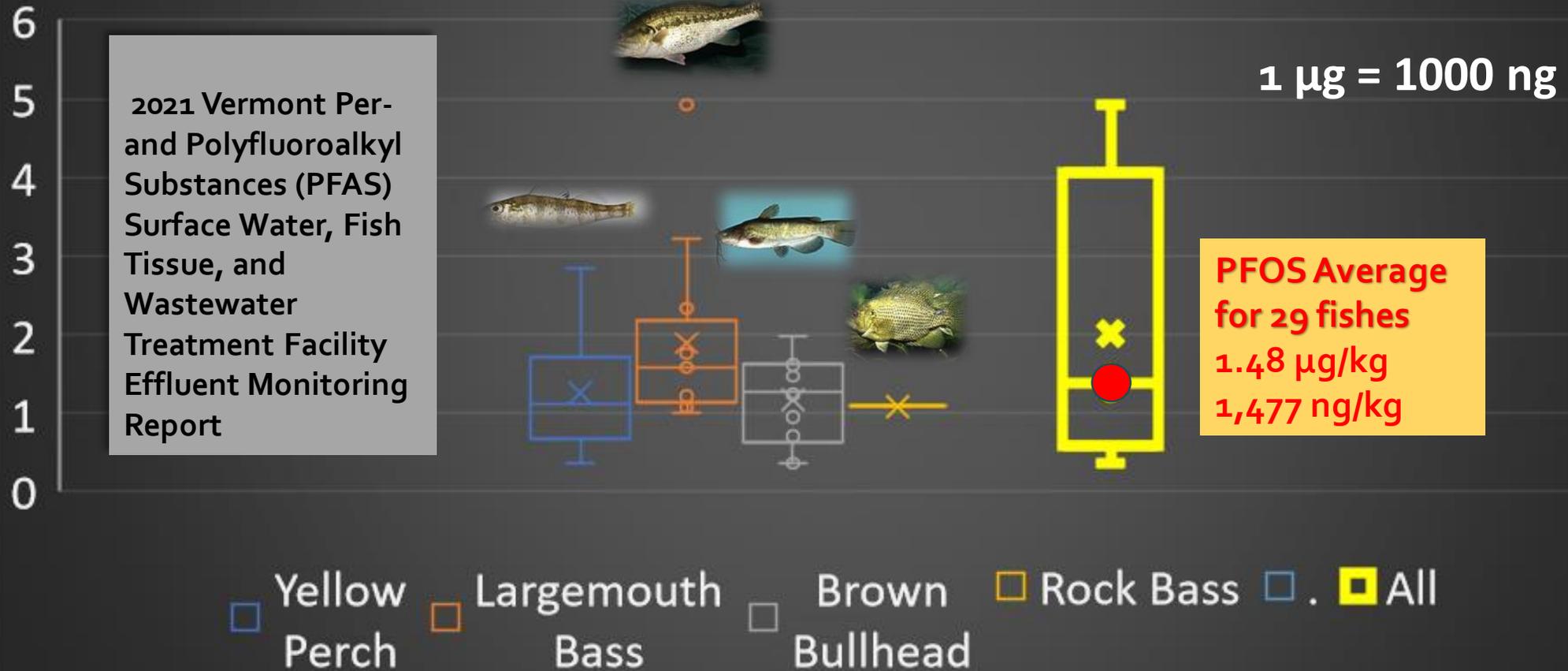
While collecting data back at the dock in Newport, Pete Emerson (left) holds up a brown bullhead with melanomas on the left, while a colleague holds up a healthy fish. Both were caught in Lake Memphremagog in May 2023.

An excerpt from a Vermont Public article from September 13, 2023:

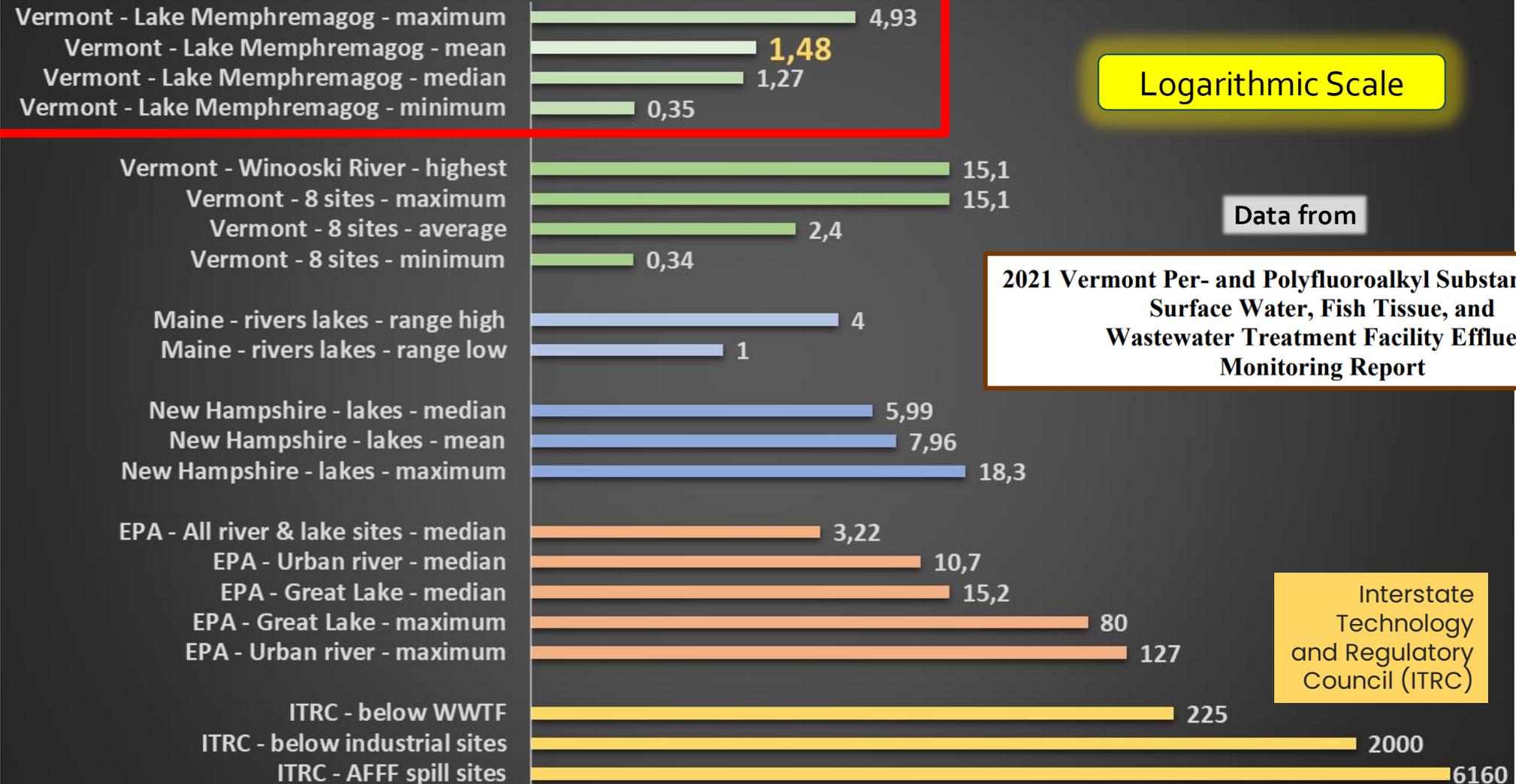
« Pete Emerson, the state fisheries biologist for Vermont's Northeast Kingdom, and others have found that between **35% and 45%** of the mature brown bullhead in this lake have **melanoma, a skin cancer**. It's super rare in fish, especially bottom feeders like these. In fact, this rate of cancer has never been documented in fish anywhere else.»

[Scientists hope genetics could tell them why these catfish in Lake Memphremagog have a rare cancer | Vermont Public](#)

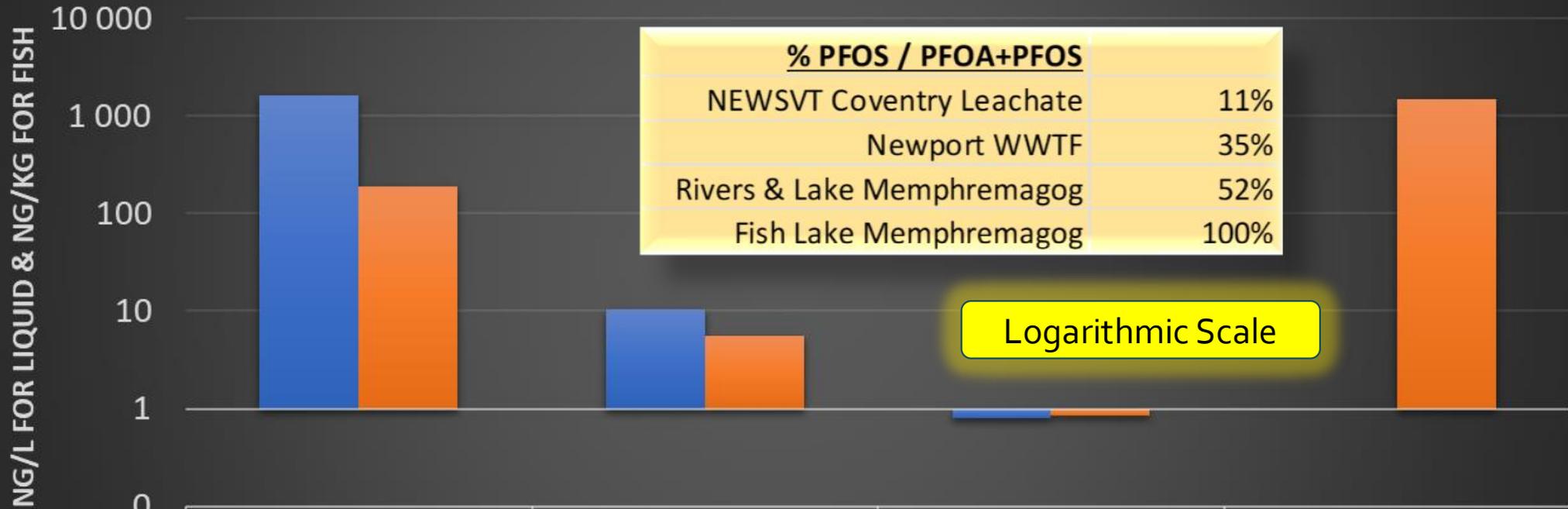
VERMONT LAKE MEMPHREMAGOG WATERSHED 2021 - PFOS in fish tissue ($\mu\text{g}/\text{kg}$)



PFOS in fish tissue in various states and locations ($\mu\text{g}/\text{kg}$)



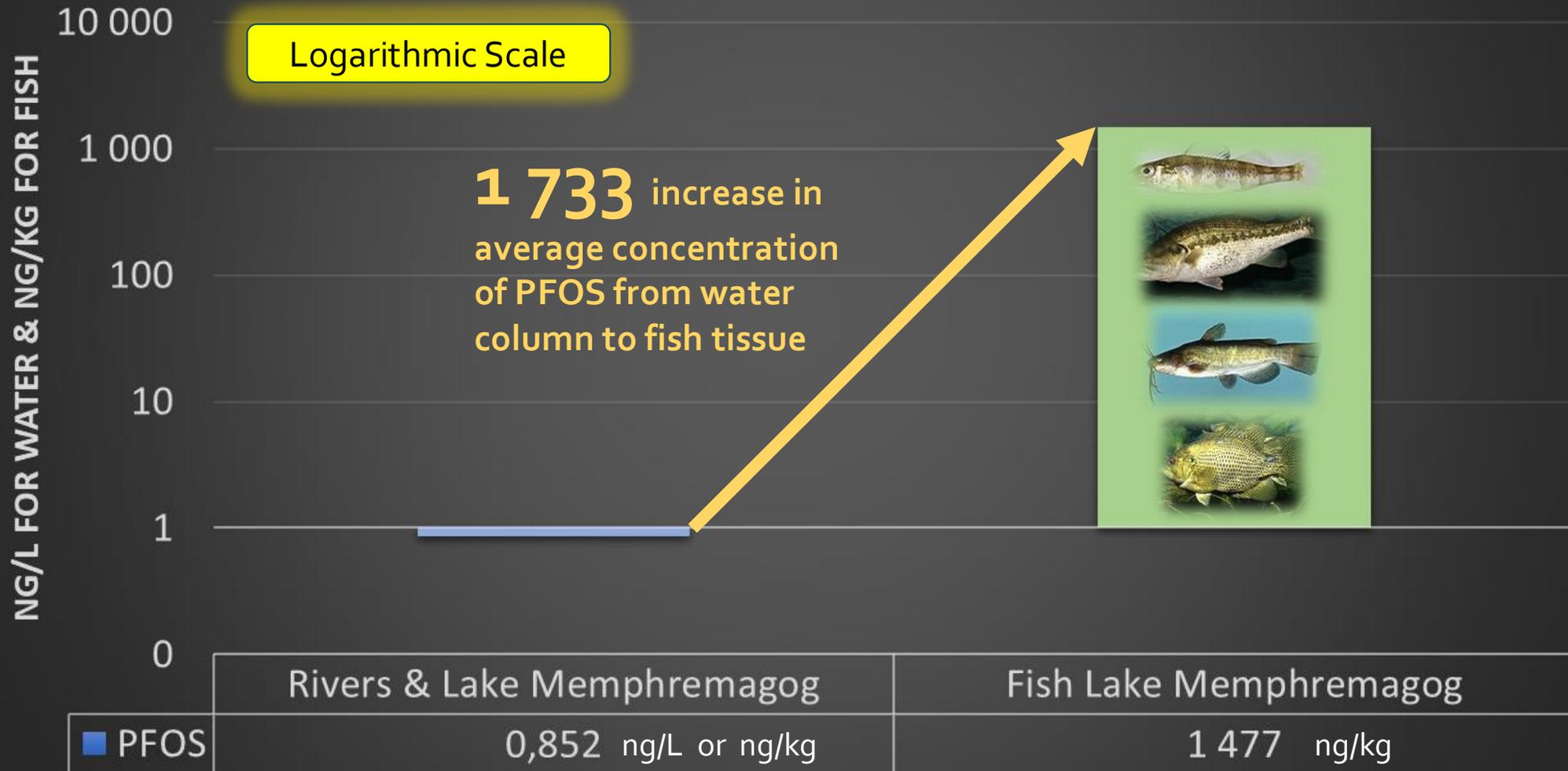
PFOA & PFOS in NEWSVT Coventry Leachate, Newport WWTF, Rivers & Lake Memphremagog and Fish of Lake Memphremagog (ng/L for liquid & ng/kg for fish)



% PFOS / PFOA+PFOS	
NEWSVT Coventry Leachate	11%
Newport WWTF	35%
Rivers & Lake Memphremagog	52%
Fish Lake Memphremagog	100%

	NEWSVT Coventry Leachate	Newport WWTF	Rivers & Lake Memphremagog	Fish Lake Memphremagog
■ PFOA	1617	10,48	0,793	Not Detected
■ PFOS	192	5,57	0,852	1 477

PFOS concentration in Rivers & Lake Memphremagog and Fish of Lake Memphremagog (ng/L for water & ng/kg for fish)



PFOA & PFOS

Fish

Compared to

Vermont Regulations

PFAS Vermont Rules & Regulations

Vermont Rules or Regulations PFAS	Vermont Groundwater Protection Rule & Strategy	Vermont Water Supply Rule	Vermont Hazardous Waste Management Regulations	Vermont Surface Water Quality	VT Health Warnings Fish Consumption
Adopted	July 6, 2019	March 17, 2020	February 1, 2022	Expected for 2024	Expected for ?
Description	Action Level	Maximum Contaminant Level (MCL)	Classified as hazardous wastes	Will it be based on EPA 842-D-22-005 April 2022 ?	
Value	20 ng/L	20 ng/L	>= 20 ng/L		
PFAS considered	Sum of five PFAS in groundwater <ul style="list-style-type: none"> • PFOA • PFOS • PFHxS • PFHpA • PFNA 	Sum of five PFAS in drinking water <ul style="list-style-type: none"> • PFOA • PFOS • PFHxS • PFHpA • PFNA 	Sum of two PFAS in liquid wastes <ul style="list-style-type: none"> • PFOA • PFOS 	Fact Sheet: Draft 2022 Aquatic Life Ambient Water Quality Criteria for Perfluorooctanoic acid (PFOA) and Perfluorooctane Sulfonic Acid (PFOS)	
Description		Preventive Action Level		Next page	
Value		2 ng/L for sum of five PFAS			

Table 1. Draft Recommended Freshwater Aquatic Life Water Quality Criteria for PFOA and PFOS

Criteria Component	Acute Water Column (CMC) ¹	Chronic Water Column (CCC) ²	Invertebrate Whole-Body	Fish Whole-Body	Fish Muscle
PFOA Magnitude	49 mg/L	0.094 mg/L	1.11 mg/kg ww	6.10 mg/kg ww	0.125 mg/kg ww
PFOS Magnitude	3.0 mg/L	0.0084 mg/L	0.937 mg/kg ww	6.75 mg/kg ww	2.91 mg/kg ww
Duration	1-hour average	4-day average	Instantaneous ³		
Frequency	Not to be exceeded more than once in three years, on average	Not to be exceeded more than once in three years, on average	Not to be exceeded more than once in ten years, on average		

¹ Criterion Maximum Concentration.

² Criterion Continuous Concentration.

³ Tissue data provide instantaneous point measurements that reflect integrative accumulation of PFOA or PFOS over time and space in aquatic life population(s) at a given site.



Hazardous Waste Management Regulations

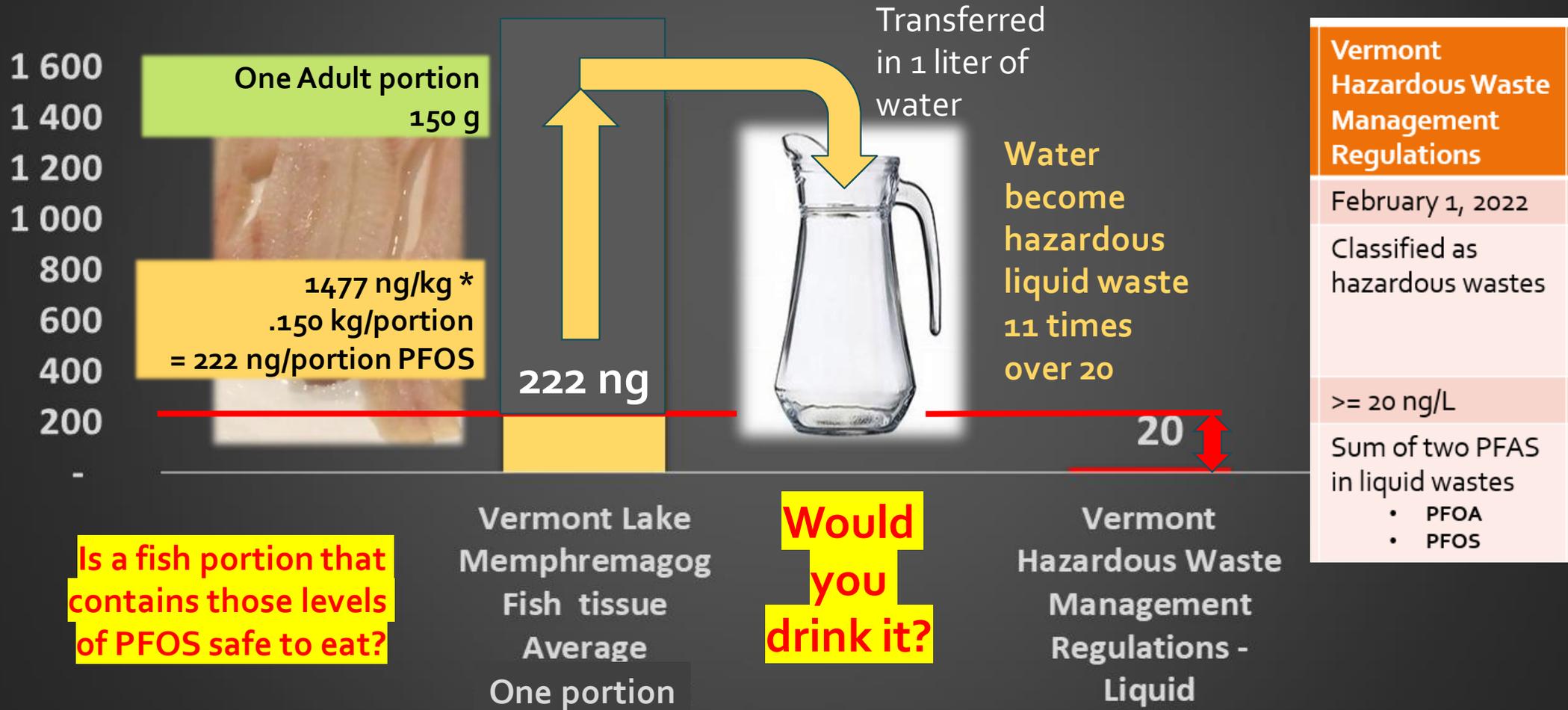


VERMONT HAZARDOUS WASTE MANAGEMENT REGULATIONS

Hazardous Waste Code	Vermont Listed Hazardous Waste	Hazard
VT21	Liquid wastes containing perfluorooctanoic acid (PFOA) in concentrations equal to or greater than 20 parts per trillion (ppt). For PFOA and PFOS, the standard of 20 ppt applies to the sum of the two substances (e.g. if the PFOA concentration is 15 ppt and the PFOS concentration is 6 ppt then there is an exceedance of the standard).	(T)
VT22	Liquid wastes containing perfluorooctanesulfonic acid (PFOS) in concentrations equal to or greater than 20 parts per trillion (ppt). For PFOA and PFOS, the standard of 20 ppt applies to the sum of the two substances (e.g. if the PFOA concentration is 15 ppt and the PFOS concentration is 6 ppt then there is an exceedance of the standard).	(T)

(T) : Toxic

PFOS+PFOA in 2021 Vermont Lake Memphremagog Fish Sampling compared to Vermont Hazardous Waste Management Regulations (ng/kg for fish tissue & ng/L for liquid waste)



Vermont Environmental Justice Bill

No. 154
2022 (S.148) Page 6 of 20

No. 154. An act relating to
environmental justice in Vermont.

(3) “Environmental justice” means all individuals are afforded equitable access to and distribution of environmental benefits; equitable distribution of environmental burdens; and fair and equitable treatment and meaningful participation in decision-making processes, including the development, implementation, and enforcement of environmental laws, regulations, and policies. Environmental justice recognizes the particular needs of individuals

OVERDOSE of leachate at Newport WWTF due to inputs of solid waste from outside the Lake Memphremagog basin contribute to **MORE PFAS** into Lake Memphremagog and **EXTRA PFOS** fish tissue contamination.

Does that constitute a NOT

« equitable distribution of environmental BURDENS »?

MCI objectives are simple
and clear: to have Newport
WWTF removed

«forever»

from the NEWSVT
Coventry list of leachate
destination even after
treatment and have the
leachate final destination
out of Lake
Memphremagog basin

«forever»

What is the state of Vermont's
position on MCI's request to
completely ban the disposal of
raw, pretreated or treated
leachate from the NEWSVT
Coventry site to the Newport
WWTF or elsewhere in the Lake
Memphremagog basin?



Lac Memphrémagog Lake Memphremagog

Un environnement
partagé à préserver
pour toujours

A shared environment
to preserve forever

Photo MCI Gisèle Benoit

MERCI ! THANK YOU !