

## Investigation of Per- and Polyfluoroalkyl Substances (PFAS) in the Keweenaw Peninsula region of Michigan: Surface Sampling Update September 2021

EGLE Water Resources Division (WRD), Surface Water Assessment Section (SWAS) conducted surface water sampling in the Keweenaw Peninsula region in July 2021 to determine if PFAS contamination exists in the Tobacco, Portage Lake, Sturgeon, Misery, and Salmon Trout watersheds. These watersheds were selected for sampling as part of EGLE's [five-year rotating watershed monitoring strategy](#). Additional sampling was conducted in the Carp River watershed to determine if activities at the former Marquette County airport near Negaunee resulted in PFAS contaminated surface water. Finally, surface water samples were collected from the Chocolay and Escanaba River watersheds near the former KI Sawyer Air Force base. Surface water samples were collected in accordance with the Michigan Per- and Polyfluoroalkyl Substances (PFAS) Sampling Guidance document (MDEQ 2018) and tested for 29 different PFAS following the Michigan Surface Water PFAS Investigation 2019 QAPP (EGLE 2019).

Overall, 76 % of the samples (56 of 73) were non-detect for PFOS and 79% (58 of 73) were non-detect for PFOA. No surface water samples exceeded the Rule 57 Human Noncancer Value (HNV) for PFOA of 12,000 ppt. Concentrations ranged from non-detect to 54 ppt (Silver Lead Creek near KI Sawyer). Seven sampling locations exceeded the HNV for PFOS (which is 12 ppt).

1. Begunn Creek (BG-0010) west of Tamarack had a PFOS concentration of 15.9 ppt. See Figure 1.
2. Quincy Creek (QC-0010) near Calumet had a PFOS concentration of 30.4 ppt. See Inset 1.
3. The Little Carp River (LCR-0100) in Baraga township had a PFOS concentration of 36.5 ppt. PFOS was 42.3 ppt in a replicate sample collected at this location. See Inset 2.
4. Two unnamed tributaries in Negaunee had PFOS concentrations of 16.1 (UHL-0010) and 21.8 ppt (UCR-0010). Brook trout and white sucker were collected from the carp river downstream of the confluence with UCR-0010. Sample results aren't expected back until spring 2022. See Insets 3 and 3b.
5. Two of three samples collected from Silver Lead Creek near KI Sawyer had PFOS concentrations of 14.2 (SLC-0090) and 26.4 ppt (SLC-0050). A fish consumption advisory currently exists for [Silver Lead Creek brook trout](#). Additional brook trout were collected from the creek in 2021 and results are expected back during the 2021 winter. See Inset 4.

Status Update By:

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Table 1. Surface water PFOS and PFOA concentrations (in ppt) in surface water samples in and near the Keweenaw Peninsula region of Michigan in July 2021. PFOS data is compared to the Rule 57 Human Noncancer Value (HNV) of 12 ppt and PFOA data is compared to the HNV of 12,000 ppt. HNV exceedances are bolded and italicized.

Sample ID	Watershed	Water Body	Sample Description	Latitude	Longitude	Collection Date	PFOS (ppt)	PFOS Flag	PFOA (ppt)	PFOA Flag
BG-0010	Tobacco	Begunn Creek	M203	47.24837	-88.51867	7/10/2021	<b>15.9</b>		7.64	
CC-0010	Sturgeon	Cole Creek	County S-553	47.12854	-88.62425	7/10/2021	1.04	K	1.04	K
CMC-0010	Salmon Trout	Compeau Creek	Big Bay Rd	46.58634	-87.44171	7/9/2021	1.05	K	1.05	K
CRC-0100	Carp	Carp Creek	US-41	46.49905	-87.68333	7/9/2021	1.06	K	1.06	K
CRP-0050	Carp	Carp River	NP	46.49466	-87.47092	7/9/2021	1.02	K	11.8	
CRP-0100	Carp	Carp River	M35	46.50711	-87.53761	7/9/2021	1.08	K	1.08	K
CRP-0100 D	Carp	Carp River	M35	46.50711	-87.53761	7/9/2021	1.05	K	1.05	K
CRP-0150	Carp	Carp River	Heritage Dr	46.52487	-87.57538	7/9/2021	1.04	K	1.04	K
CRP-0200	Carp	Carp River	N Rd	46.53031	-87.60409	7/9/2021	1.08	K	1.08	K
DL-0010	Carp	Deer Lake	Public Boat Launch	46.53258	-87.69549	7/9/2021	1.07	K	1.07	K
DR-0010	Carp	Dead River	Hawley St	46.57227	-87.41008	7/9/2021	1.05	K	1.05	K
DR-0010 D	Carp	Dead River	Hawley St	46.57227	-87.41008	7/9/2021	1.04	K	1.04	K
FR-0010	Salmon Trout	Falls River	US-41	46.75198	-88.45257	7/9/2021	1.06	K	1.06	K
FR-0010 D	Salmon Trout	Falls River	US-41	46.75198	-88.45257	7/9/2021	1.04	K	1.04	K
FS-0100	Misery	Firesteel River	S. Firesteel Rd	46.86599	-89.19584	7/9/2021	1.05	K	1.05	K
FS-0150	Misery	Firesteel River	Ontonagon Greenland Rd	46.81087	-89.17987	7/9/2021	1.02	K	1.19	J, Q
GB-0010	Tobacco	Garden Brook	US-41	47.46689	-87.86659	7/10/2021	1.01	K	1.01	K
GNC-0010	Sturgeon	Gooseneck Creek	Forsman Rd	47.14869	-88.49594	7/10/2021	1.06	K	1.06	K
GNC-0100	Sturgeon	Gooseneck Creek	Airpark Blvd	47.17008	-88.49977	7/10/2021	1.11	J	2.43	J
GR-0010	Tobacco	Gratiot River	Gratiot River Park	47.34329	-88.45186	7/10/2021	1.05	K	1.05	K
HC-0010	Escanaba	Hammel Creek	M26	47.21466	-88.43583	7/10/2021	1.04	K	1.04	K
HC-0800	Escanaba	Halfway Creek	County S-553	46.28929	-87.41717	7/8/2021	0.993	K	0.993	K
HC-0850	Escanaba	Halfway Creek	Near Site 2	46.29491	-87.41035	7/8/2021	1.06	K	1.06	K
HC-0900	Escanaba	Halfway Creek	u/s Site 2	46.29808	-87.40164	7/8/2021	1.05	K	1.05	K
HC-0950	Escanaba	Halfway Creek	d/s Site 1	46.30516	-87.39513	7/8/2021	1.02	K	1.02	K
HC-1000	Portage Lake	Halfway Creek	Marshall Dr	46.30881	-87.39665	7/9/2021	1.07	K	1.07	K
HR-0010	Salmon Trout	Huron River	Huron Rd	46.90233	-88.07008	7/9/2021	1.09	K	1.09	K
HR-0010 R	Salmon Trout	Huron River	Huron Rd	46.90233	-88.07008	7/9/2021	1.06	K	1.06	K
HZ-0010	Salmon Trout	Hazel Creek	US-41	46.75884	-88.50046	7/9/2021	1.04	K	1.04	K
ID-0010	Salmon Trout	Iron Dog River	Dam Rd	46.81242	-87.67994	7/9/2021	1.1	K	1.1	K
KLC-0100	Sturgeon	Kelsey Creek	Nurmela Rd	46.55696	-88.57994	7/9/2021	1.08	K	1.08	K
KW-0005	Sturgeon	Keweenaw Waterway	Houghton Canal Launch	47.21676	-88.62115	7/10/2021	1.03	K	1.03	K
KW-0010	Sturgeon	Keweenaw Waterway	Michigan Tech	47.12180	-88.55029	7/10/2021	1.02	K	1.02	K
KW-0015	Sturgeon	Keweenaw Waterway	Dollar Bay	47.10890	-88.51202	7/10/2021	1.09	K	1.09	K
KW-0020	Sturgeon	Keweenaw Waterway	Pilgrim Point	47.10576	-88.51211	7/10/2021	1.03	K	1.03	K
LCR-0100	Salmon Trout	Little Carp River	M38	46.78363	-88.56469	7/9/2021	<b>36.5</b>		1.02	K
LCR-0100 D	Salmon Trout	Little Carp River	M38	46.78363	-88.56469	7/9/2021	<b>42.3</b>		1.02	K
LGR-0100	Tobacco	Little Gratiot River	Gay Lac La Belle Rd	47.37580	-88.03634	7/10/2021	1.05	K	1.05	K

LGR-0100 R	Tobacco	Little Gratiot River	Gay Lac La Belle Rd	47.37580	-88.03634	7/10/2021	1.04	K	1.04	K
LND-0010	Salmon Trout	Linden Creek	N Main St	46.75865	-88.45237	7/9/2021	1.08	K	1.08	K
MC-0010	Tobacco	Mendota Canal	End of Bete Gris Rd	47.37482	-87.96758	7/10/2021	1.02	K	1.02	K
MG-0010	Tobacco	Muggun Creek	Lakeshore Dr	47.25914	-88.55321	7/10/2021	8.38		3.92	J
MG-0010 R	Tobacco	Muggun Creek	Lakeshore Dr	47.25914	-88.55321	7/10/2021	11.1	Q	4.12	J
MR-0010	Misery	McGuire Creek	Impassable Rd	46.79179	-89.14155	7/9/2021	1	K	2.58	J
OB-0010	Carp	Orianna Brook	near E. Hampton St	46.53206	-87.39498	7/9/2021	3.5	J	4.18	J
ON-0010	Ontonagon	Ontonagon River	mouth	46.87294	-89.32128	7/9/2021	1.05	K	1.05	K
OR-0010	Sturgeon	Otter River	Mylylla Rd	46.92961	-88.55345	7/9/2021	1.04	K	1.04	K
OR-0100	Sturgeon	Otter River	Askel Rd	46.89422	-88.58944	7/9/2021	0.999	K	0.999	K
PK-0010	Sturgeon	Pike River	Old 41	47.01872	-88.52643	7/9/2021	1.01	K	1.01	K
PR-0010	Sturgeon	Pilgrim River	Superior Rd	47.06225	-88.59630	7/9/2021	1.03	K	1.03	K
PR-0020	Sturgeon	Pilgrim River	Onkalos Corner Rd	47.05075	-88.61821	7/10/2021	1.01	K	1.01	K
QC-0010	Portage Lake	Quincy Creek	M26	47.14749	-88.45929	7/10/2021	<b>30.4</b>		3.81	J
SCL-0100	Portage Lake	Scales Creek	Valley Rd	47.26703	-88.36995	7/10/2021	1.14	K	1.14	K
SDC-0100	Sturgeon	Sidnay Creek	M28	46.50576	-88.74168	7/9/2021	1.09	K	1.09	K
SLC-0050	Chocolay	Silver Lead Creek	d/s SAFB	46.34292	-87.36400	7/8/2021	<b>26.4</b>		53.9	
SLC-0090	Chocolay	Silver Lead Creek	at SAFB / Voodoo Ave	46.33450	-87.37250	7/8/2021	<b>14.2</b>		32.1	
SLC-1000	Chocolay	Silver Lead Creek	Base Lake Rd	46.32940	-87.38140	7/8/2021	6.32		6.27	
SLG-0010	Portage Lake	Slaughterhouse Creek	Amygdaloid Rd	47.25941	-88.43710	7/10/2021	1.07	K	2.02	J
STP-0010	Chocolay	Stump Lake	ATV Trail	46.31862	-87.39016	7/8/2021	5.71	Q	1.12	K
STR-0010	Sturgeon	Sturgeon River	US 41	47.01768	-88.50597	7/9/2021	1.01	K	1.01	K
TB-0010	Tobacco	Tobacco River	Gay Lac La Belle Rd	47.23125	-88.14864	7/10/2021	1.03	K	1.03	K
TB-0010 D	Tobacco	Tobacco River	Gay Lac La Belle Rd	47.23125	-88.14864	7/10/2021	1.07	K	1.07	K
TL-0010	Portage Lake	Torch Lake	Hubbel Park	47.17126	-88.42791	7/10/2021	1.15	J	1.08	K
TL-0020	Portage Lake	Torch Lake	Lake Linden Launch	47.18661	-88.40901	7/10/2021	1.1	K	1.1	K
TRP-0100	Portage Lake	Trap Rock River	near Traprock Valley Rd	47.21190	-88.38540	7/10/2021	0.986	K	0.986	K
UCR-0010	Carp	Unnamed Trib to Carp River	Airport Drive	46.52998	-87.57862	7/9/2021	<b>21.8</b>		1.03	K
UHC-0010	Tobacco	Unnamed Trib to Hills Creek	Wright St	47.29869	-88.40014	7/10/2021	1.02	K	1.02	K
UHL-0010	Carp	Unnamed Trib to Horseshoe Lake	US-41	46.53147	-87.54252	7/9/2021	<b>16.1</b>		6.07	
UKL-0010	Sturgeon	Unnamed Trib to Kelsey Creek	W. Plains Rd	46.55809	-88.57436	7/10/2021	1.04	K	1.04	K
UOL-0010	Sturgeon	Unnamed Trib to Otter Lake	Askel Rd	46.89273	-88.58833	7/9/2021	1.08	K	1.08	K
UPR-0010	Sturgeon	Unnamed Trib to Pilgrim River	Onkalos Corner Rd	47.06183	-88.62993	7/10/2021	0.986	K	1.03	J
WHB-0010	Carp	Whetstone Brook	S Lakeshore Blvd	46.53680	-87.39423	7/9/2021	2.5	J, Q	1.06	K

Sample ID Codes:

D = Duplicate

R = Replicate

#### PFAS Laboratory Codes

K: Result is below detection limit; therefore, the method detection limit is displayed

J: Result is above detection limit, below the reporting limit

Q: The ion transition ratio is outside of the acceptance criteria.

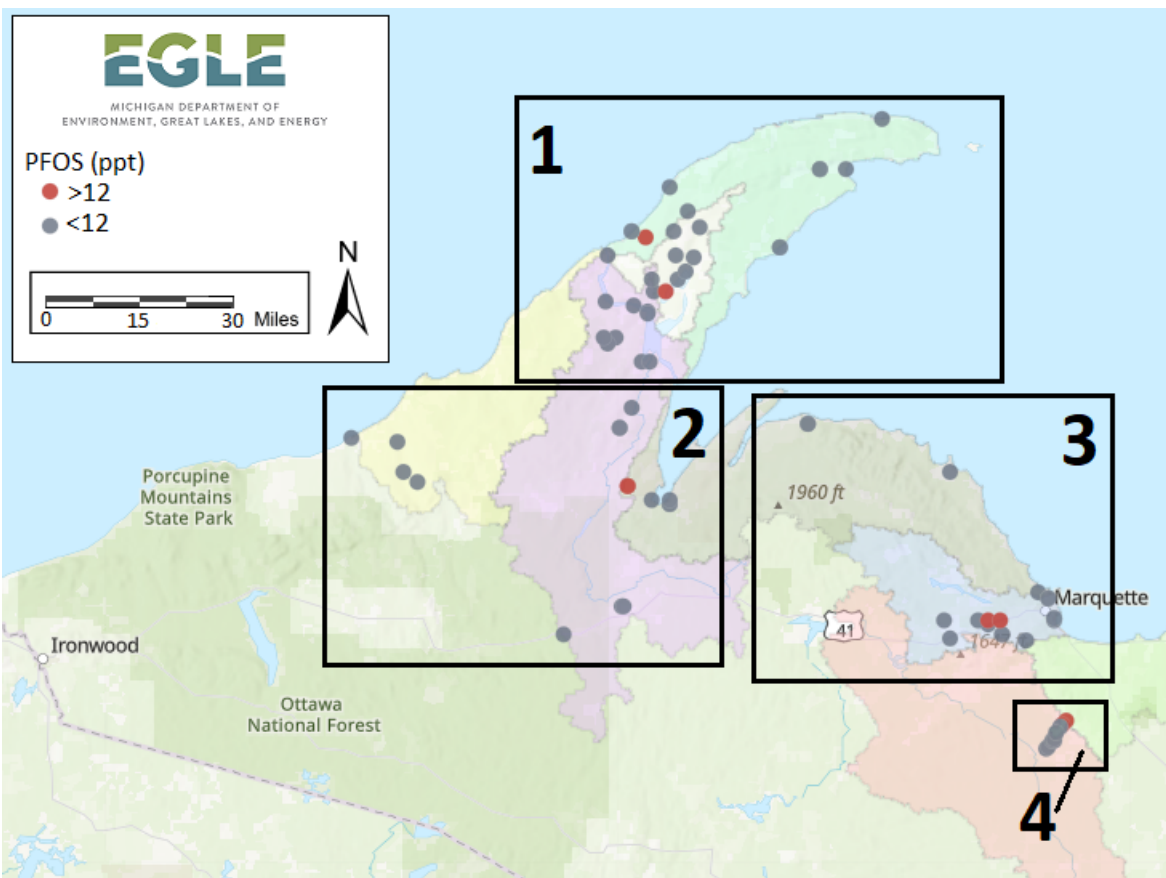
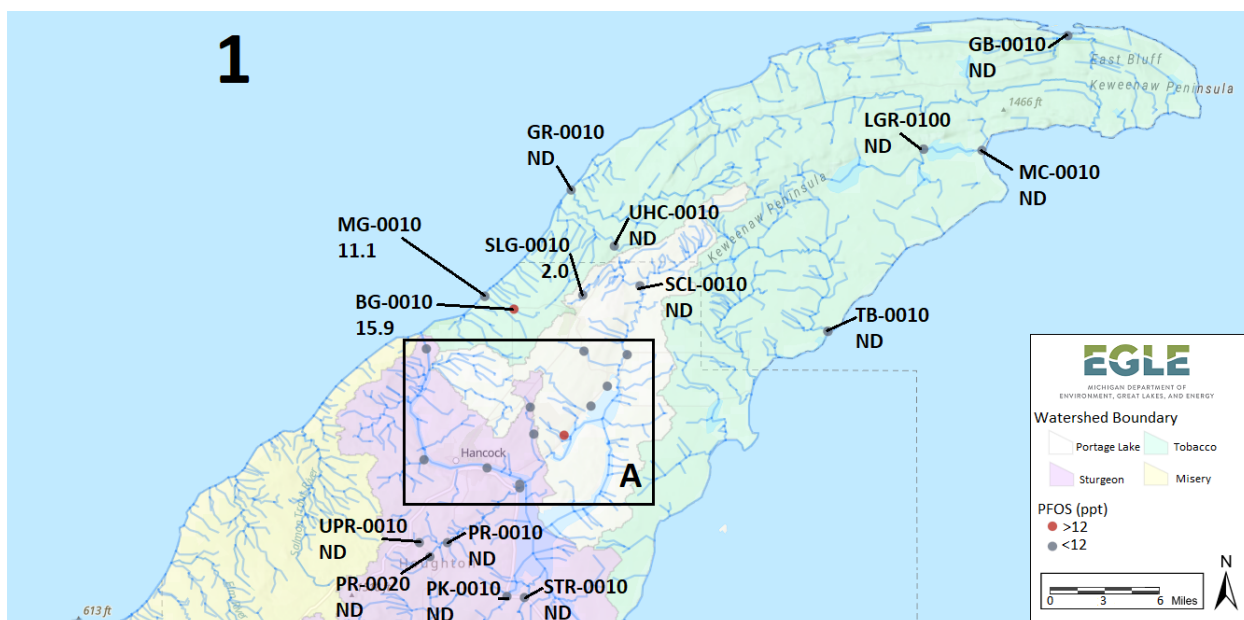
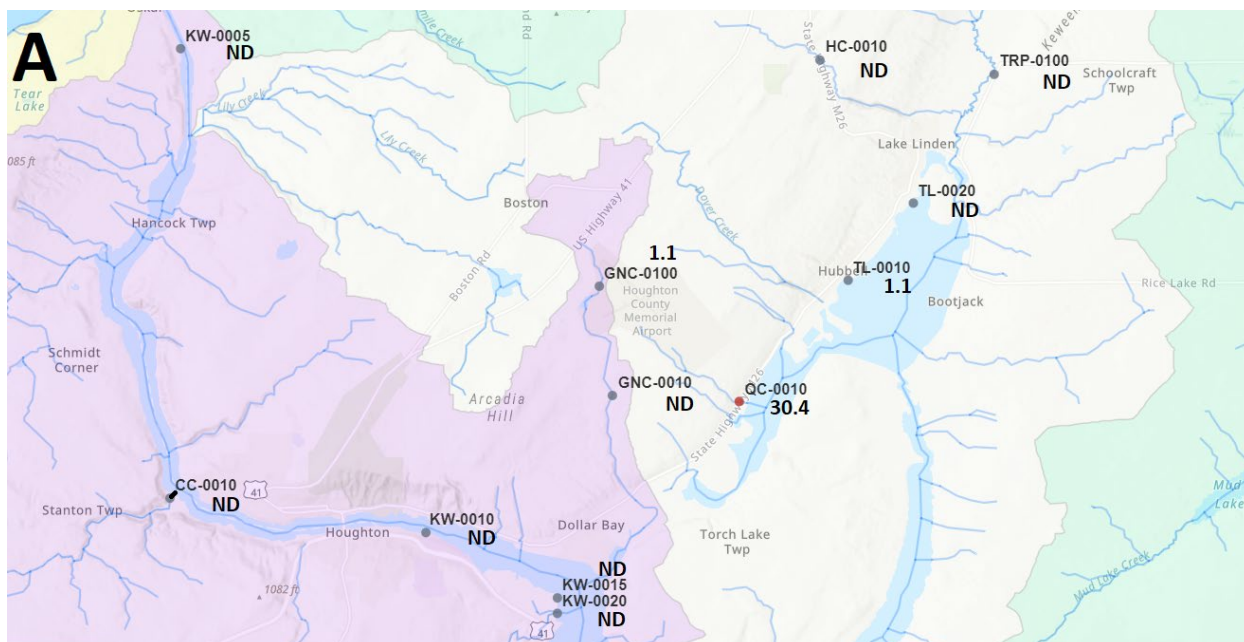


Figure 1. Surface water sampling locations in samples collected in and near the Keweenaw Peninsula Region of Michigan in July 2021.

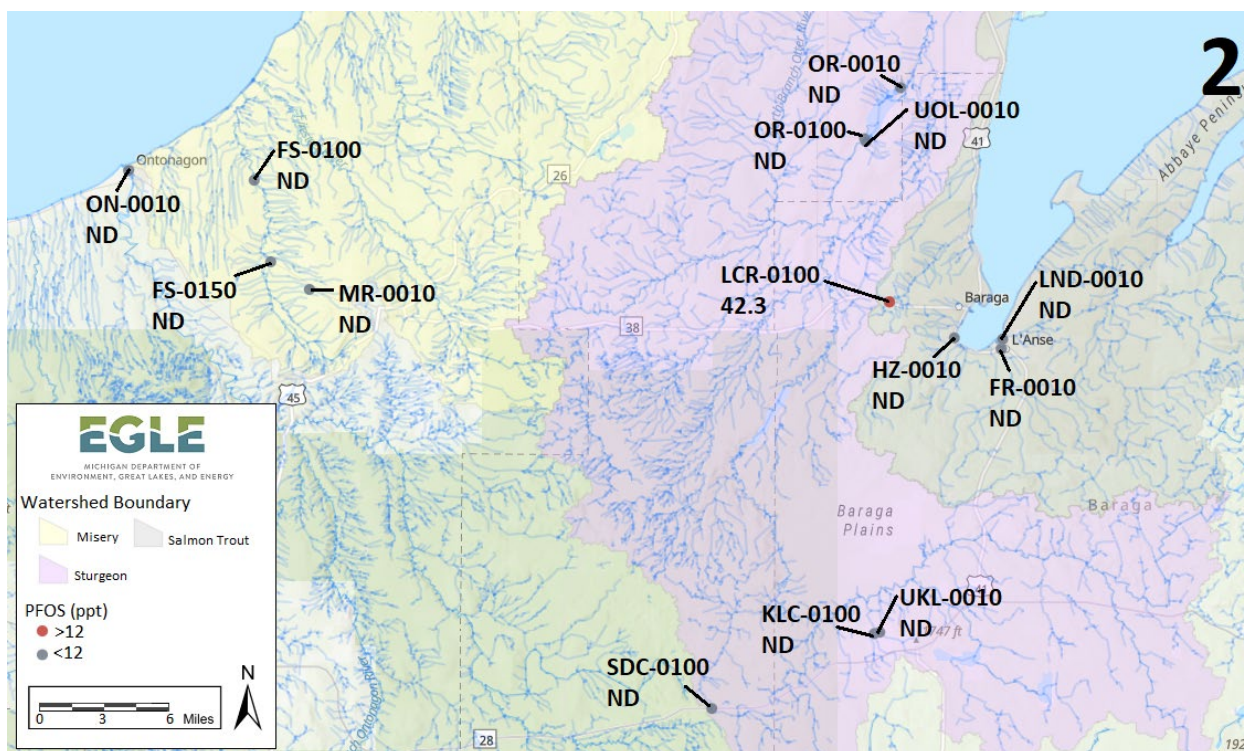


Inset 2. Surface water sampling locations in samples collected in and near the Keweenaw Peninsula Region of Michigan in July 2021. PFOS concentrations are depicted in parts per trillion (ppt). ND = non-detect.

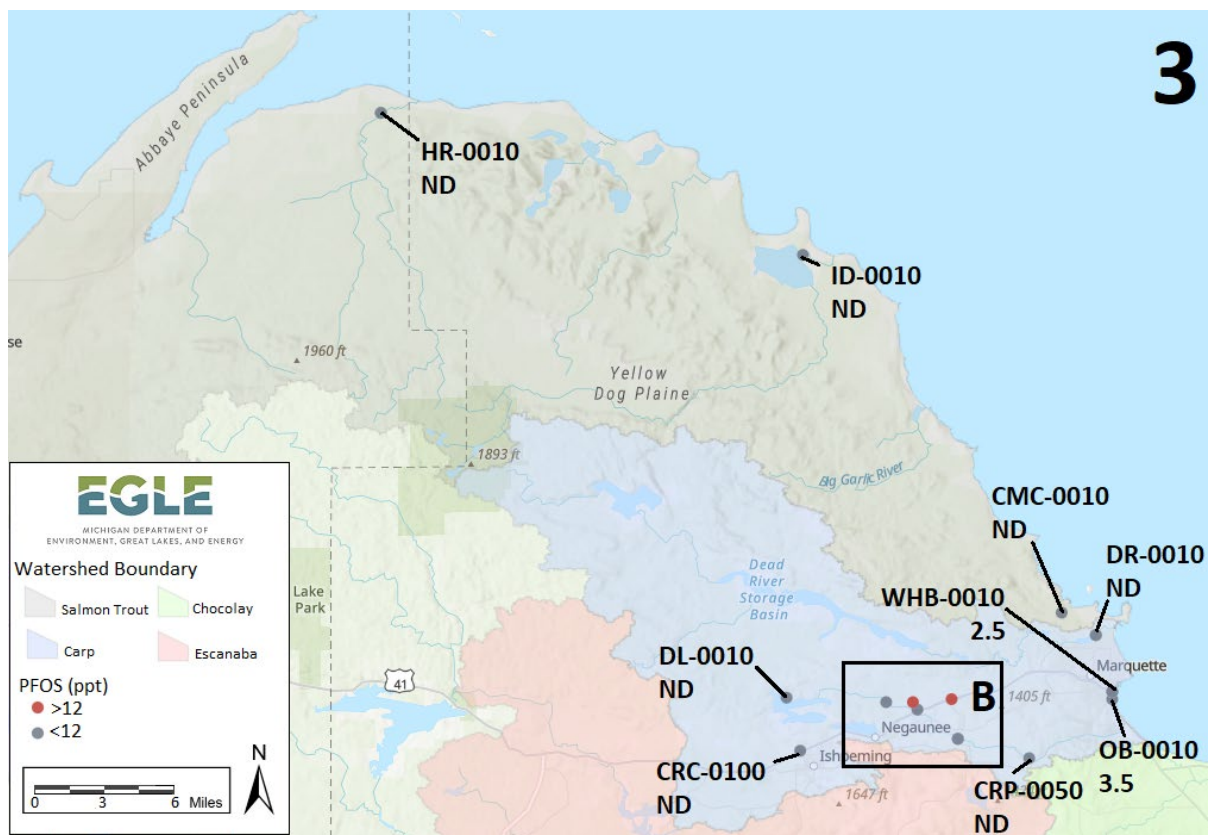




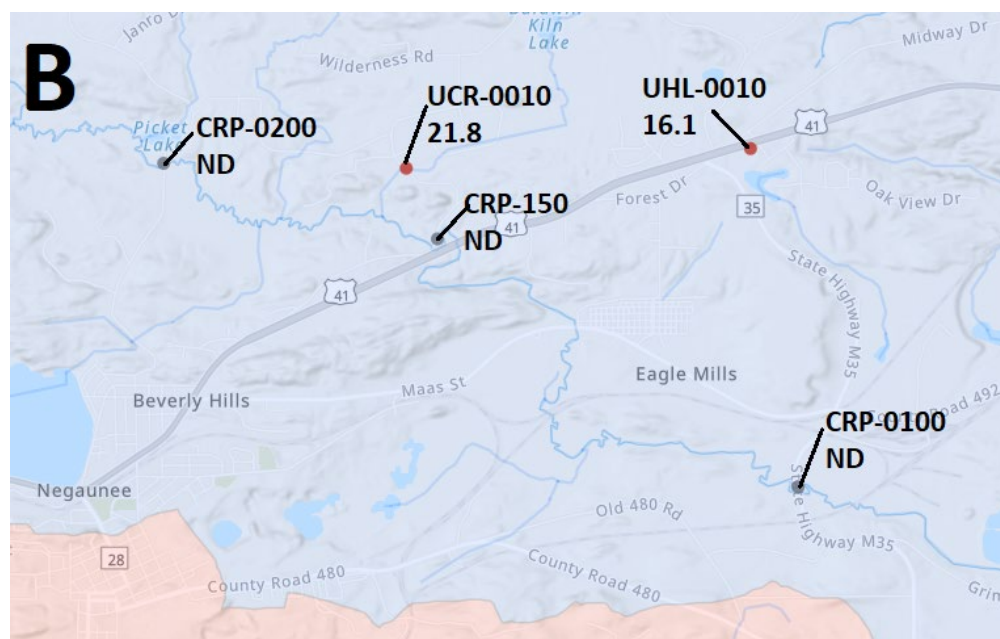
Inset 3a. Surface water sampling locations in samples collected in and near the Houghton County Airport in July 2021. PFOS concentrations are depicted in parts per trillion (ppt). ND = non-detect.



Inset 2. Surface water sampling locations in samples collected in and near the Keweenaw Peninsula Region of Michigan in July 2021. PFOS concentrations are depicted in parts per trillion (ppt). ND = non-detect.

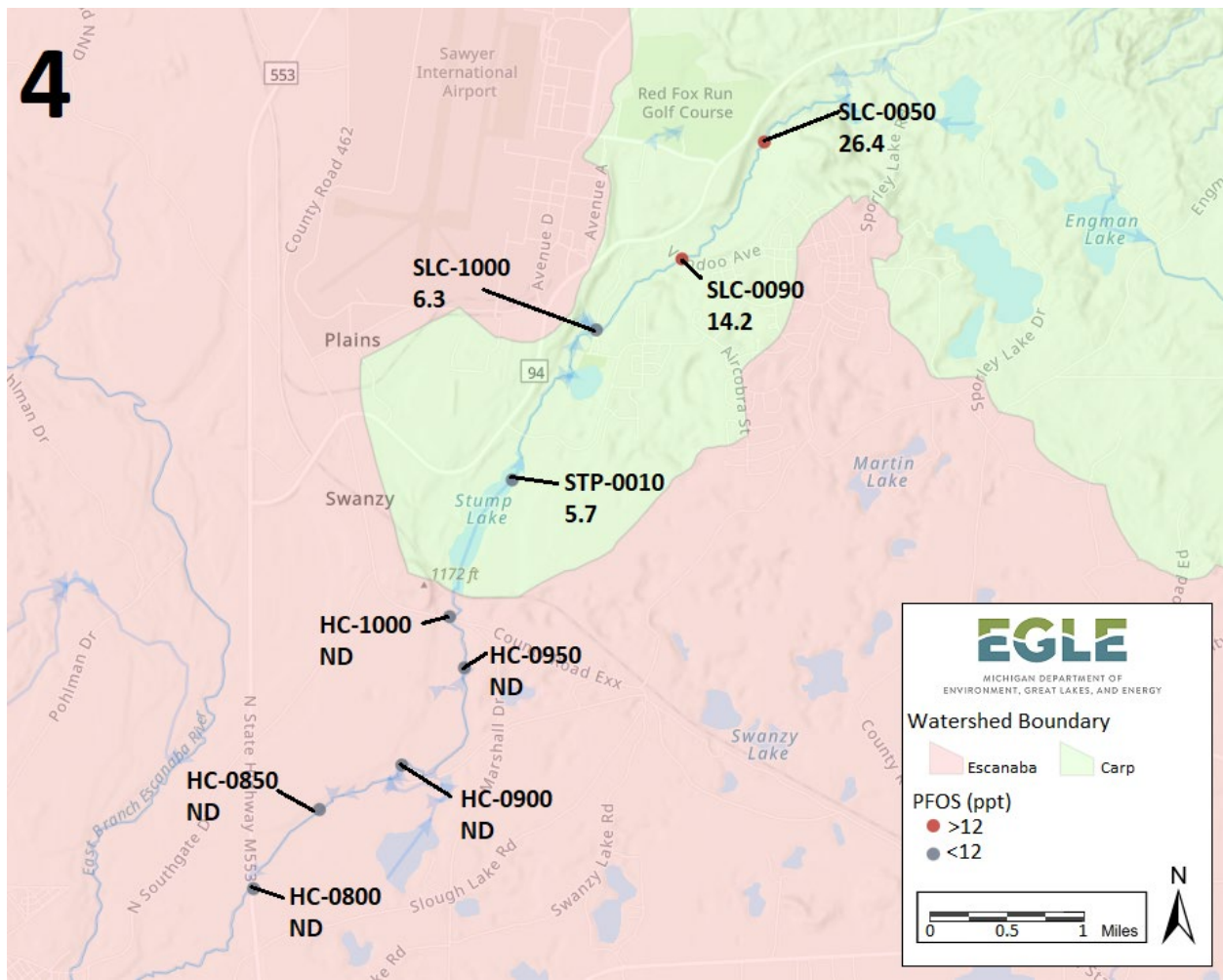


Inset 3. Surface water sampling locations in samples collected in and near the Keweenaw Peninsula Region of Michigan in July 2021. PFOS concentrations are depicted in parts per trillion (ppt). ND = non-detect.



Inset 3b. Surface water sampling locations in samples collected near the former Marquette County airport in July 2021. PFOS concentrations are depicted in parts per trillion (ppt). ND = non-detect.





Inset 4. Surface water sampling locations in samples collected near the former KI Sawyer Air Force Base in July 2021. PFOS concentrations are depicted in parts per trillion (ppt). ND = non-detect.