

Investigation of Per- and Polyfluoroalkyl Substances (PFAS) in Michigan's Saginaw River watershed: Surface Sampling Update October 2021

EGLE Water Resources Division (WRD), Surface Water Assessment Section (SWAS) conducted surface water sampling in the [Saginaw River watershed](#) in 2019 to determine if PFAS contamination exists in the watershed. This watershed was selected for sampling in 2019 as part of EGLE's [five-year rotating watershed monitoring strategy](#). Very high river discharge conditions at the time of the 2019 sample collection may have resulted in low PFAS concentrations due to dilution. Two days prior to sampling in 2019, the watershed received significant rainfall. The discharge at the USGS Stream Gage for the Saginaw River at Holland Ave in Saginaw (USGS 04157005) was approximately 15,000 cubic feet per second (cfs) at the time of sampling, which is above the 26-year median discharge of approximately 2,500 cfs for this date and location. Due to the potential dilution, EGLE WRD repeated the Saginaw River portion of this sampling in 2021 during lower flow (~2,000 cfs at this USGS station at the time of sampling). Additional samples were collected from the Dutch Creek watershed, a tributary to the Saginaw River, in March 2021 to determine if former AFFF activities at the [MBS International Airport](#) in Freeland resulted in elevated surface water PFAS concentrations. These investigations were initially planned for 2020; however, postponed to 2021 due to COVID-19 impacts to the 2020 field season. Surface water samples were collected in accordance with the Michigan Per- and Polyfluoroalkyl Substances (PFAS) Sampling Guidance document (MDEQ 2018) and tested for 28 different PFAS following the Michigan Surface Water PFAS Investigation 2019 QAPP (EGLE 2019).

None of the 26 surface water samples exceeded the Rule 57 Human Noncancer Value (HNV) for PFOA (12,000 ppt) with concentrations ranging from non-detect to 16.7 ppt. Overall, PFOS concentrations in the Saginaw River samples collected in 2021 were similar to those observed in 2019 (less than 3 ppt) and were below the HNV for PFOS (12 ppt). The highest PFOS concentration in the Saginaw River was 2.9 ppt in a sample collected in a backwater area of the river at Middleground Island (MGI-0010). Two samples collected from two branches of Squaconning Creek downstream of the MBS International airport exceeded the HNV for PFOS with concentrations of 37.3 and 45.7 ppt. A sample collected from the Columbia Drain at Hotchkiss Ave (CM-0010) had a PFOS concentration just below the HNV at 11.6 ppt.

Fish were collected from the Saginaw River at three locations (Saginaw, Essexville, and Bay City) and from Squaconning Creek downstream of the SQ-0010 sampling location (accessed via Ziegler Rd) for contaminant analyses. The fish results are expected back in 2022.

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Table 1. Surface water PFOS and PFOA concentrations (in ppt) in surface water samples in the Saginaw River watershed of Michigan between March and August, 2021. As these water bodies are non-drinking water sources, results are compared to the Rule 57 Human Noncancer Value (HNV) of 12,000 ppt of 12 ppt for PFOS and 12,000 ppt for PFOA. Samples exceeding the HNV for PFOS are bolded and italicized.

Sample ID	Waterbody	Description	Latitude	Longitude	Collection Date	PFOS (ppt)	PFOS Flag	PFOA (ppt)	PFOA Flag
MGI-0010	Saginaw River	Middleground Island	43.57550	-83.90308	8/26/2021	2.91	J, Q	1.63	J
SG-0025	Saginaw River	d/s Smith Park	43.61857	-83.84422	8/26/2021	0.993	K	1.74	J
SG-0030	Saginaw River	3rd St Dock	43.61300	-83.85400	8/26/2021	1.38	J, Q	1.43	J
SG-0039	Saginaw River	d/s Retention Basin # 5	43.61218	-83.86827	8/26/2021	1.7	J, Q	1.69	J
SG-0043	Saginaw River	d/s Retention Basin # 1	43.60914	-83.88755	8/26/2021	1.06	K	1.32	J
SG-0044	Saginaw River	d/s Retention Basin # 4	43.59874	-83.89169	8/26/2021	1.54	J, Q	1.42	J
SG-0052	Saginaw River	Riverwalk Bridge	43.58400	-83.90000	8/26/2021	1.67	J	1.8	J
SG-0053	Saginaw River	Bigelow Park (east side)	43.58400	-83.89900	8/26/2021	1.56	J, Q	1.64	J
SG-0054	Saginaw River	d/s Retention Basin # 2	43.58154	-83.89811	8/26/2021	1.47	J, Q	1.33	J
SG-0055	Saginaw River	Middleground Trail	43.57500	-83.90700	8/26/2021	1.76	J, Q	1.77	J
SG-0056	Saginaw River	d/s Retention Basin # 3	43.57195	-83.90249	8/26/2021	2.73	J, Q	1.84	J
SG-0057	Saginaw River	u/s Retention Basin # 3	43.56620	-83.90396	8/26/2021	1.72	J, Q	1.25	J
SG-0060	Saginaw River	Near Stone Island Rd	43.55500	-83.90700	8/26/2021	1.03	K	1.39	J, Q
UTB-0010	Trib to Tittabawassee River	Oakdale Dr	43.51755	-84.10910	3/30/2021	1.01	K	1.01	K
KD-0010	Klauss Drain	Delta Rd	43.55240	-83.99310	3/30/2021	10.00		2.37	J
SQ-0020	Squaconning Creek	Four Mile Rd	43.56024	-83.97380	3/30/2021	7.39	Q	1.79	J
CM-0010	Columbia Drain	E. Hotchkiss Rd	43.56620	-83.92430	3/30/2021	11.60		3.41	J
NS-0010	N. Branch Squaconning Creek	8 mile Rd	43.55300	-84.05040	3/30/2021	<i>45.70</i>		16.70	
DC-0010	Dutch Creek	S. Euclid Rd	43.55700	-83.91600	3/30/2021	3.44	J	1.43	J
DC-0020	Dutch Creek	Westside Saginaw Rd	43.56478	-83.94100	3/30/2021	1.01	K	1.01	K
SQ-0010	Squaconning Creek	Westside Saginaw Rd	43.55563	-83.95120	3/30/2021	5.99		1.26	J
WS-0010	W. Branch Squaconning Creek	8 Mile Rd	43.52433	-84.05080	3/30/2021	<i>37.30</i>		5.74	
KF-0010	Kochville and Frankenlust Drain	Delta Rd	43.55190	-83.96330	3/30/2021	1.01	K	1.01	K
BS-0010	Branch 3 Squaconning Creek	Hackett Rd	43.55911	-84.07020	3/30/2021	1.01	K	1.01	K
SH-0010	Schmitt Drain	8 mile Rd	43.53808	-84.05050	3/30/2021	10.00		2.37	K
SQ-0030	Squaconning Creek	E. Hotchkiss Rd	43.56640	-83.99210	3/30/2021	7.39	Q	1.79	J

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.

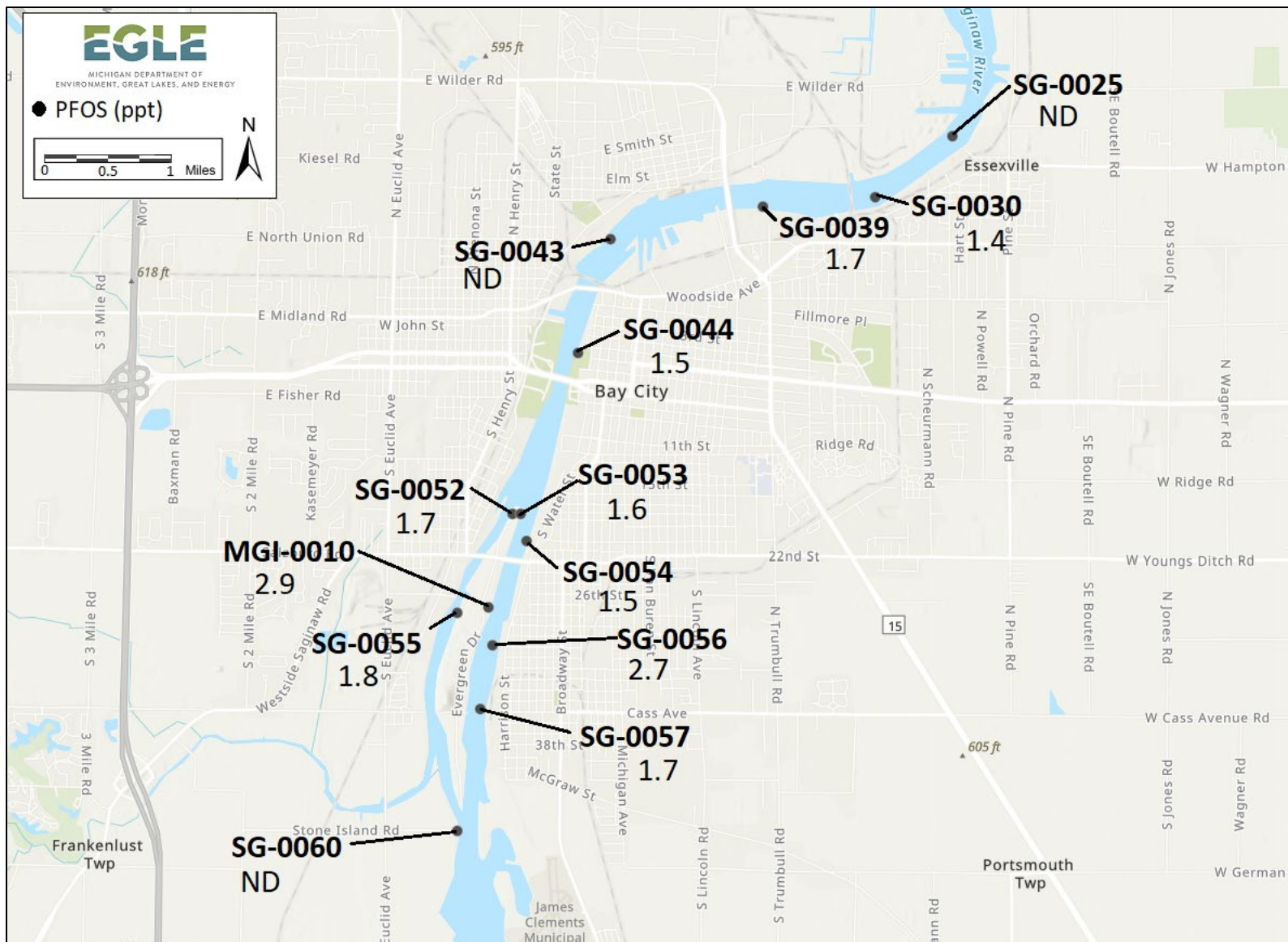


Figure 1. Surface water PFAS sampling locations in the Saginaw River collected in August 2021. PFOS concentrations are depicted in parts per trillion (ppt). ND indicates PFOS was non-detect in the sample.

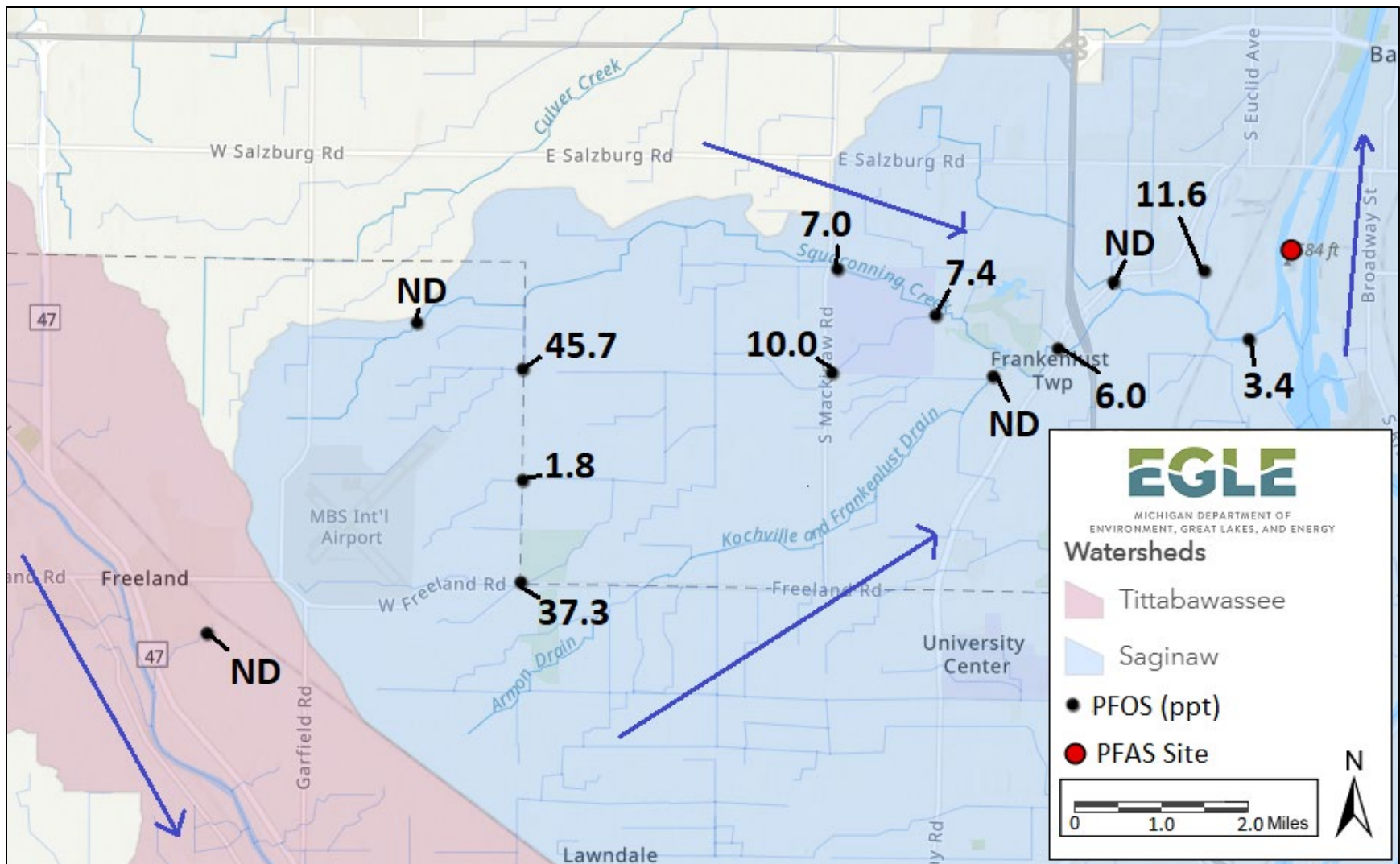


Figure 2. Surface water PFAS sampling locations in the Dutch Creek watershed, a tributary to the Saginaw River, in March 2021. PFOS concentrations are depicted in parts per trillion (ppt). ND indicates PFOS was non-detect in the sample. The blue arrows indicate general surface water flow direction.