Memorandum

To:	Shawna Warshawski, Yukon Government Assessment and Abandoned Mines
From:	Lyndsay Doetzel, EDI Environmental Dynamics Inc.
Date:	December 15, 2022
Project No:	20Y0150
Re:	Addendum to 2019 Two Year Summary Report

Introduction

Yukon Government Assessment and Abandoned Mines (YG AAM) requested that EDI prepare an addendum to Clinton Creek Surface Water Quality and Hydrology Investigations; Two Year Data Summary (EDI 2020). The original report covered data from September 2017 to October 2019; this current addendum extends the analysis to data collected until October 2022.

Meteorology

Precipitation (as rainfall) in summer 2018, 2020 and 2022 was higher than the climate normals[1], while precipitation levels in summer 2019 and 2021 were closer to the climate normal, although August 2021 had elevated precipitation (60 mm total precipitation compared to August climate normal of43.1 mm; Figure 1). Snowpack was comparable to climate normals in 2017/2018, elevated in 2018/2019, 2019/2020 and 2021/2022, and lower than normal in 2020/2021 (Figure 2).

Air temperatures at Clinton Creek during winter 2017/2018 were comparable to climate normals for the region. Air temperatures were warmer than normal over winters 2018/2019 and 2020/2021, while winters 2019/2020 and 2021/2022 were colder than or equal to normals. Summers of 2019, 2021 and 2022 had air temperatures that were normal, or slightly above climate normals, while early summer 2020 was cooler than normal, before returning to normal at the end of the season (Figure 3).

Hydrology

Data collected between 2017 – 2022 from the hydrometric monitoring station at the outlet of Hudgen Lake (E1(H)) had the highest recorded water levels and flow rates (discharge) in May 2020, likely from a rain on

[1] Canadian Climate Normals for the 1981 to 2010 climate period are available for the Dawson City weather station (airport location, Dawson A, Station ID 2100402) and published by Government of Canada. This station, located approximately 90 km south of the Clinton Creek Station at an elevation of 370 m above sea level, is used for comparison purposes.

snow event, followed by the lowest recorded measurements in 2021. Water levels and flow rates in 2022 were similar to conditions recorded in 2018 and 2019 (Figure 13 and Figure 14). Currently, the rating curve for EH(1), developed based on flows collected between 2017 and 2019, is considered provisional with the upper range of the rating curve poorly developed and should not be extrapolated to higher flows (i.e., > 8 m^3/s). However, two additional high flow measurements during spring snowmelt have been captured since the rating curve was last updated in 2019, with 3.812 m^3/s on May 11, 2021, and 5.031 m^3/s on May 17, 2022. If the current stage-discharge relationship is updated, these higher flow measurements will help strengthen the relationship, increase the accuracy in estimated flow rates and help document changes in frequency/intensity over time. Heavy rainfall events occurred in 2018, 2020 and 2022, resulting in higher flow rates with no major rainfall events occurring in 2019 and 2021. The lowest recorded temperatures for the open water season were documented in 2020 with 2018–2019 and 2021–2022 being relatively consistent.

Review of data collected between 2017 – 2022 from the hydrometric station at Wolverine Creek (E3(H)) had higher recorded water levels in 2019 and 2020 during the open water seasons followed by the lowest recorded water levels in 2021. Water levels in 2022 were considered average and similar to 2018 with the exception of a suspect spike documented in October 2018, which was erroneous logger data influenced by ice (Figure 15). A wider range of discrete discharge measurements have been completed at E3(H), resulting in a more established rating curve relationship and increased accuracy in calculated flow rates; though this curve was also not updated with data from 2020 - 2022. Peak flow rates are relatively consistent between 2018 and 2022 resulting from spring snowmelt each year with similar rainfall events as described for E1(H). Again, the lowest recorded temperatures for the open water season were documented in 2020 with 2018-2019 and 2021-2022 being relatively consistent.

Surface Water Quality

All water quality figures from the 2019 Two Year Data Summary Report were updated through October 2022. In general, water quality across the site has been remarkably stable; the only possible change noted is a slight increase in concentrations of total aluminium at GWCC-5. Here we present a summary of potential parameters of concern, trends, and updated time series figures (Table 1 and Water Quality Attachment).

Aluminum, copper, iron, and selenium are all naturally occurring in the area and are present at concentrations that exceed the CCME guidelines for the protection of freshwater aquatic life (CCME Canadian Council of Ministers of the Environment 2020, CCME-AL) in most sampling locations, including at the reference locations. The median concentrations of these parameters from each site are presented to allow for comparisons (Table 2). In general, concentrations in exposure areas are not markedly higher than in reference areas.

Water quality time series figures include the CCME-AL guidelines (Figure 17 through Figure 99). Aluminium and copper have CCME-AL guidelines that vary based on pH and hardness, respectively. To simplify data display, the variable guidelines are shown at the 95th percentile of the guideline values.

Table 1. Parameters of concern and trends by watershed.

Watershed	Parameter of Potential Concern	Trending	Figure List
Reference Sites	dissolved oxygen (under ice only) fluoride aluminium copper iron selenium	All parameters stable	Figure 17 – Figure 27
Hudgeon Lake	dissolved oxygen fluoride aluminum arsenic (HL3-B only) iron selenium	All parameters stable	Figure 28 – Figure 40
Clinton Creek	fluoride aluminium copper iron selenium	All parameters stable	Figure 41 – Figure 51
Wolverine Creek	fluoride aluminium copper iron selenium	All parameters stable	Figure 52 – Figure 62
Snowshoe Lake	fluoride arsenic chromium (hexavalent) selenium	All parameters stable	Figure 64 – Figure 77
Groundwater Seeps	dissolved oxygen fluoride chromium (hexavalent) selenium	Slight increase in total and dissolved iron at GWCC-5	Figure 78 – Figure 88
Forty Mile River	fluoride aluminium copper iron	All parameters stable	Figure 89 – Figure 99

Table 2. Median concentrations of total aluminium, copper, iron and selenium from all reference and exposure and monitoring sites.

Site	Aluminium (median, mg/L)	Copper (median, mg/L)	Iron (median, mg/L)	Selenium (median, mg/L)
Reference Sites				
R1	0.0705	0.0019	0.540	0.0012
R2	0.0499	0.0013	0.364	0.0005
R4	0.1380	0.0078	0.490	0.0017
R7	0.8485	0.0061	2.050	0.0003
R8	0.3440	0.0042	0.877	0.0013
R9	0.0968	0.0043	1.060	0.0008
Hudgeon Lake				
HL-T	0.0255	0.00254	0.121	0.00124
HL-M	0.0720	0.00086	5.910	0.00123
HL-B	0.0989	0.00050	14.05	0.00088
Clinton Creek				
E1	0.0334	0.00271	0.142	0.00123
E1(H)	0.0339	0.00267	0.140	0.00120
E2	0.0128	0.00157	0.806	0.00158
E4	0.0126	0.00148	0.424	0.00114
E7	0.0152	0.00157	0.444	0.00093
Wolverine Creek				
R3	0.356	0.00272	1.023	0.000579
R11	0.871	0.00361	1.600	0.000772
E3	0.0777	0.00149	0.252	0.000872
Snowshoe Lake				
SL	0.023	0.00136	0.054	0.01245
Groundwater Seeps				
GWCC-1	0.006	0.00100	0.020	0.00566
GWCC-2	0.006	0.00114	0.020	0.00445
GWCC-3	0.004	0.00139	0.010	0.00212
GWCC-4	0.004	0.00146	0.012	0.00103
GWCC-5	0.003	0.00086	0.044	0.00468
Forty Mile River				
R6	0.103	0.00228	0.255	0.000247
E8	0.112	0.00252	0.290	0.000256

Blue text indicates value exceeds the CCME-AL guideline, or in the case of aluminium and copper, exceeds the 95th percentile of the guideline values as described in text.

References

CCME Canadian Council of Ministers of the Environment. 2020. Canadian Environmental Quality Guidelines. (https://www.ccme.ca/en/summary-table)

Addendum Attachments

Meteorology

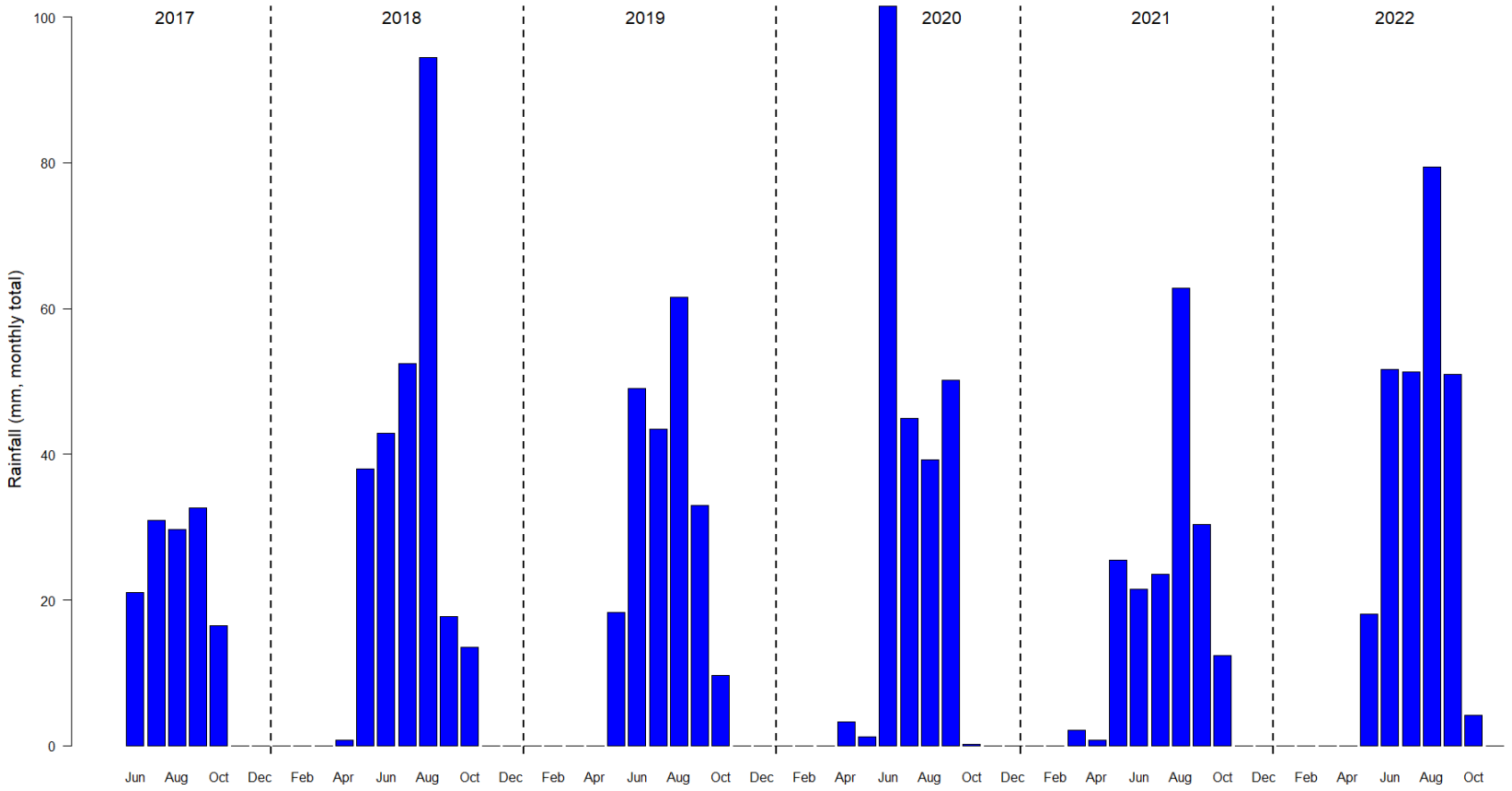


Figure 1. Monthly rainfall (mm) at the Clinton Creek Meteorological Station (July 1, 2017, to October 31, 2022).

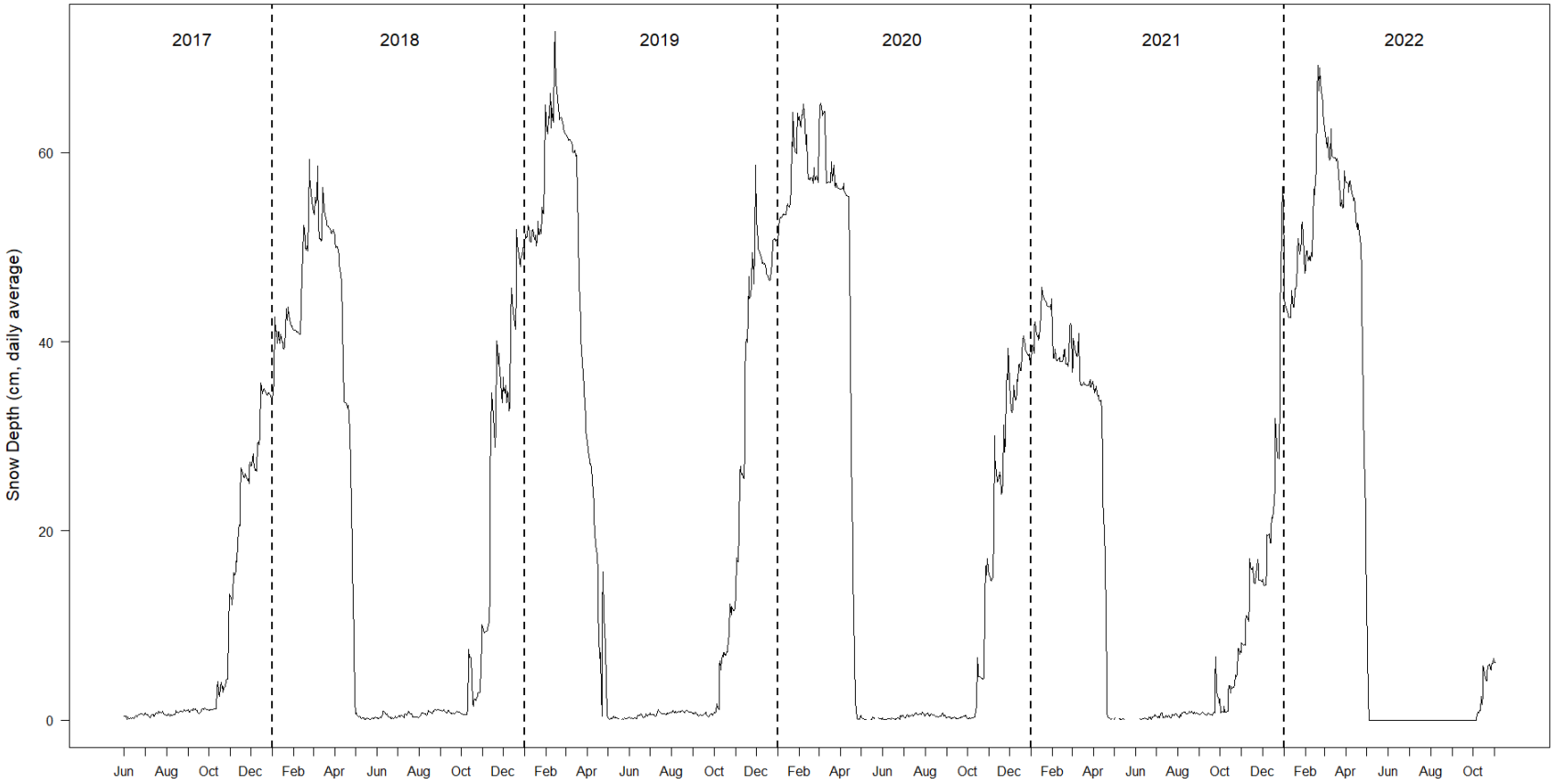


Figure 2. Snow depth (daily average of hourly sample, in cm) at the Clinton Creek Meteorological Station (July 1, 2017, to October 31, 2022).

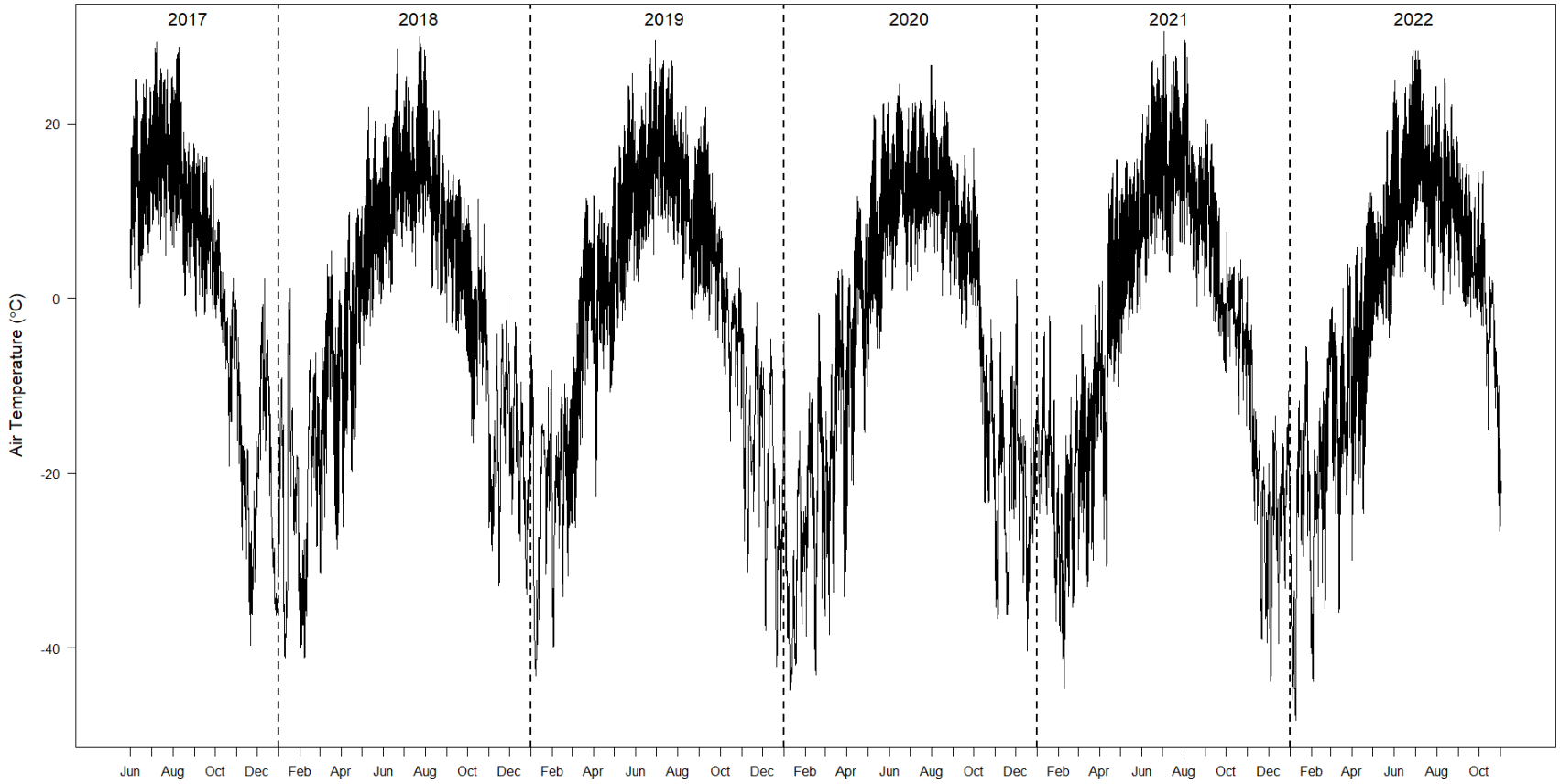


Figure 3. Air temperature (hourly average, °C) at the Clinton Creek Meteorological Station (July 1, 2017, to October 31, 2022).

Table 3. Mean monthly air temperatures at Clinton Creek Met Station (June 2017 to October 2022) and comparison with climate normals (1981-2010) at Dawson City Airport.

Monthly Average Air Temperature (°C)	Clinton Creek Site						*Dawson Airport 1981-2010 Climate Normals*
	2017	**2018**	**2019**	**2020**	**2021**	**2022**	
January	-	-21.6	-23.7	-30.9	-18.9	-26.0	***-26.0***
February	-	-22.9	-22.0	-22.5	-26.3	-20.8	***-21.5***
March	-	-10.7	-5.4	-14.7	-15.8	-11.8	***-12.1***
April	-	-3.6	0.0	-2.2	-4.0	-4.7	***-0.1***
May	-	7.7	10.2	8.8	6.9	6.1	***8.2***
June	14.5	13.2	15.2	12.9	15.2	14.8	***14.0***
July	17.3	16.4	17.1	13.8	16.6	15.4	***15.7***
August	13.6	11.1	10.3	12.9	12.1	12.3	***12.3***
September	7.1	4.6	6.9	6.2	4.1	5.6	***5.8***
October	-2.4	-3.8	-2.7	-7.3	-2.7	-4.3	***-4.7***
November	-22.2	-15.1	-14.3	-22.0	-20.1	-	***-18.1***
December	-18.5	-18.0	-21.9	-20.4	-24.1	-	***-22.9***
Year Average	-	**-3.5**	**-2.4**	**-5.4**	**-4.6**	-	***-4.1***

Table 4. Monthly total rainfall at Clinton Creek Met Station (June 2017 to October 2022) and comparison with climate normals (1981-2010) at Dawson City Airport.

Rainfall in mm Monthly Total	Clinton Creek Site						*Dawson Airport 1981-2010 Climate Normals*
	2017	2018	2019	2020	2021	2022	
January	-	0.0	0.0	0.0	0.0	0.0	0.1
February	-	0.0	0.0	0.0	0.0	0.0	0.0
March	-	0.0	0.0	0.0	2.2	0.0	0.3
April	-	0.8	0.0	3.3	0.8	0.0	2.6
May	-	38.0	18.3	1.3	25.5	18.1	28.4
June	21.1	42.9	49.0	101.5	21.5	51.7	38.2
July	30.9	52.5	43.5	44.9	23.5	51.3	49
August	29.7	94.4	61.5	39.3	62.8	79.4	43.1
September	32.7	17.8	33.0	50.2	30.4	51.0	29.7
October	16.5	13.5	9.7	**0.2**	12.4	4.2	9.4
November	0.0	0.0	0.0	0.0	0.0	-	0.1
December	0.0	0.0	0.0	0.0	0.0	-	0.4
Year Total	**-**	**259.9**	**215.0**	**240.7**	**179.1**	**-**	**201.3**

Table 5. Snow depth at month's end at Clinton Creek Met Station (June 2017 to October 2022) and comparison with climate normals (1981-2010) at Dawson City Airport.

Snow Depth in cm Month End	Clinton Creek Site						*Dawson Airport 1981-2010 Climate Normals*
	2017	2018	2019	2020	2021	2022	
January	-	41.3	63.7	63.5	44.5	47.3	49.0
February	-	54.2	62.1	56.9	41.8	63.3	52.0
March	-	51.5	30.0	56.2	35.8	57.1	45.0
April	-	2.0	0.5	0.5	NA *	18.3	3.0
May	-	0.0	0.0	0.0	0.0	0.0	0.0
June	0.0	0.0	0.0	0.0	0.0	0.0	0.0
July	0.0	0.0	0.0	0.0	0.0	0.0	0.0
August	0.0	0.0	0.0	0.0	0.0	0.0	0.0
September	1.1	0.8	0.7	0.3	1.8	0.0	1.0
October	13.3	10.0	11.7	15.9	7.1	6.5	14.0
November	27.3	36.3	58.7	37.8	14.6	-	29.0
December	34.0	49.5	50.7	37.8	54.6	-	42.0

* April 2021 snow label as unusable or poor data

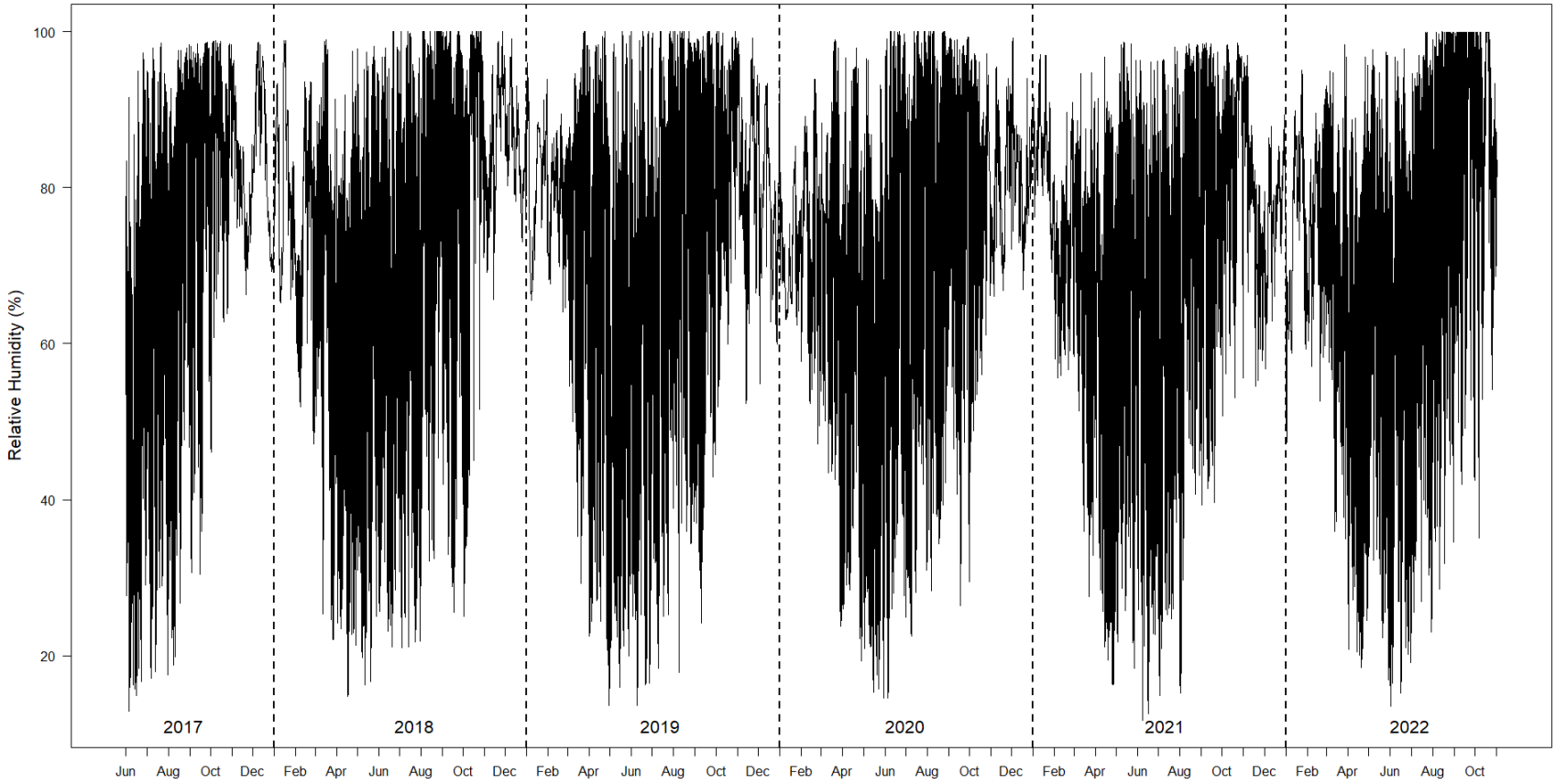


Figure 4. Relative humidity (hourly average, %) at the Clinton Creek Meteorological Station (July 1, 2017, to October 31, 2022).

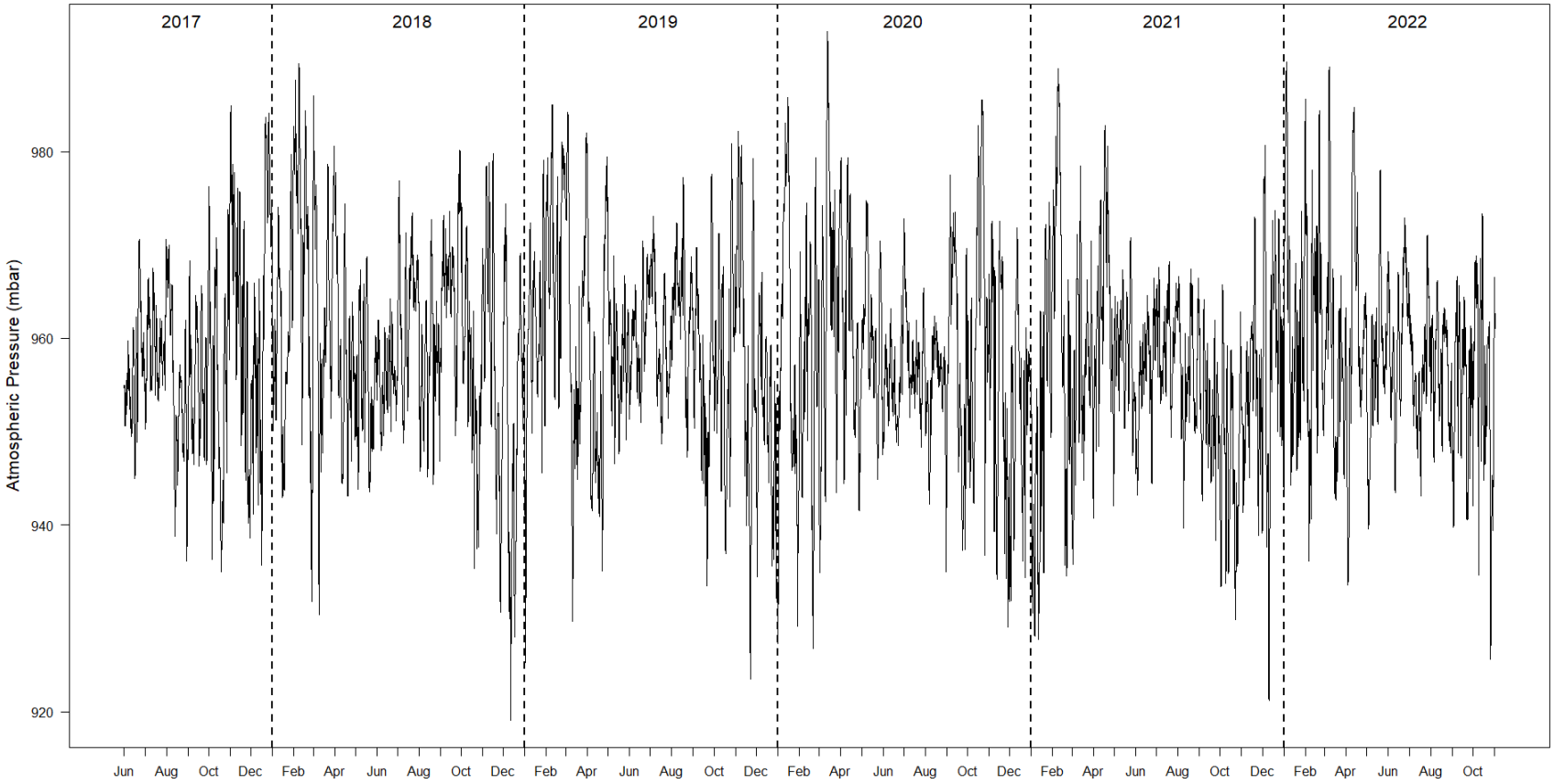


Figure 5. Atmospheric pressure (hourly sample, mbar) at the Clinton Creek Meteorological Station (July 1, 2017, to October 31, 2022).

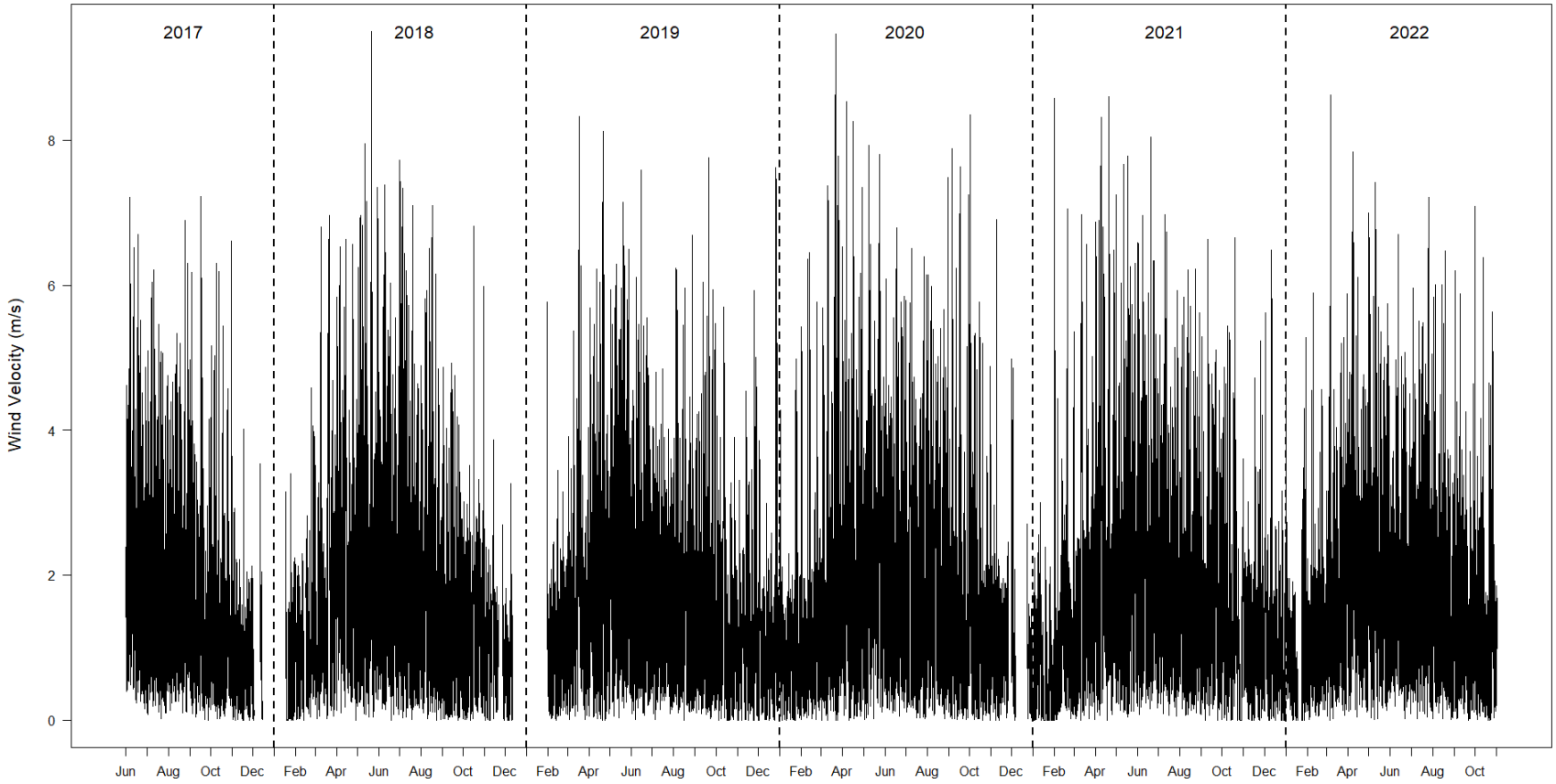


Figure 6. Wind velocity (hourly average, m/s) at the Clinton Creek Meteorological Station (July 1, 2017, to October 31, 2022).

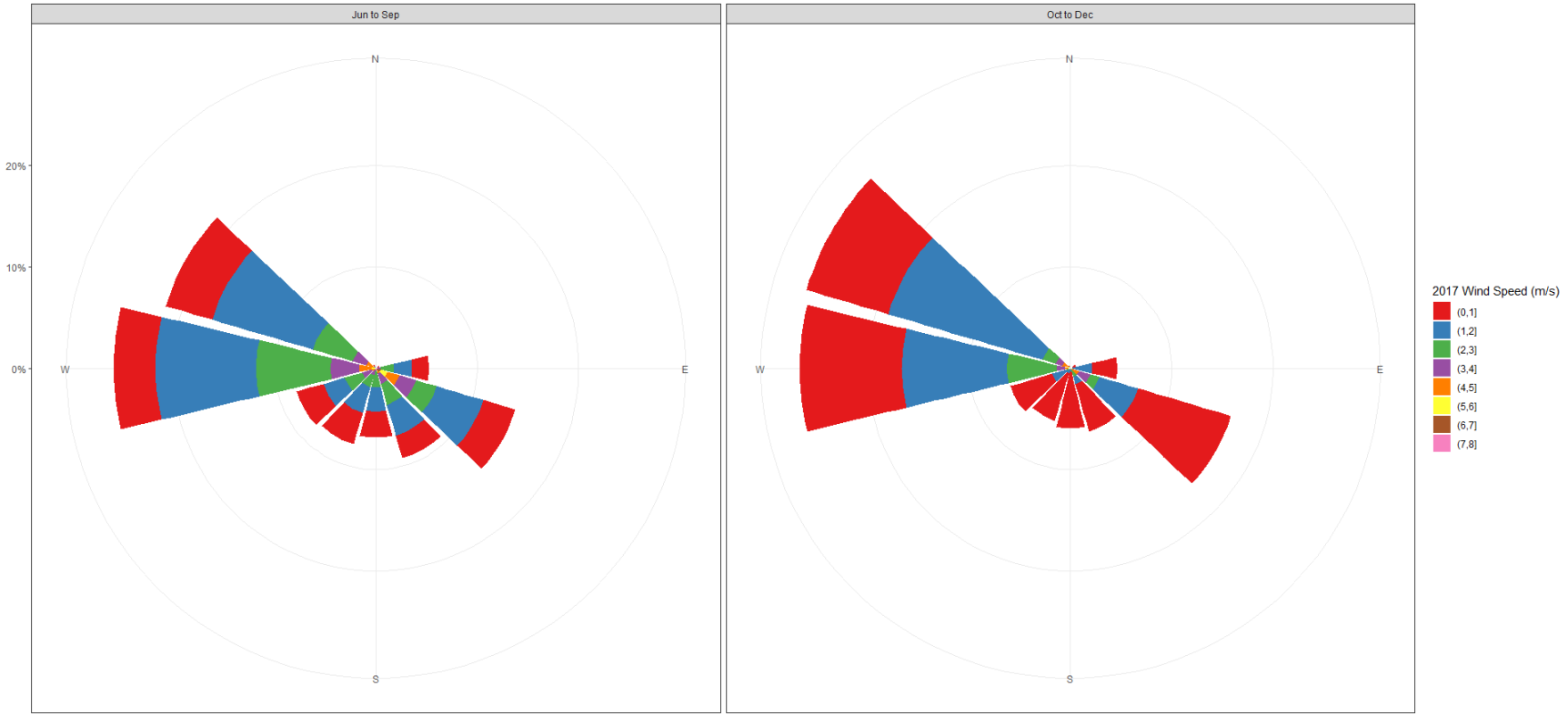


Figure 7. Seasonal wind roses (hourly average for wind velocity and direction) at the Clinton Creek Meteorological Station (July 1, 2017, to December 31, 2017).

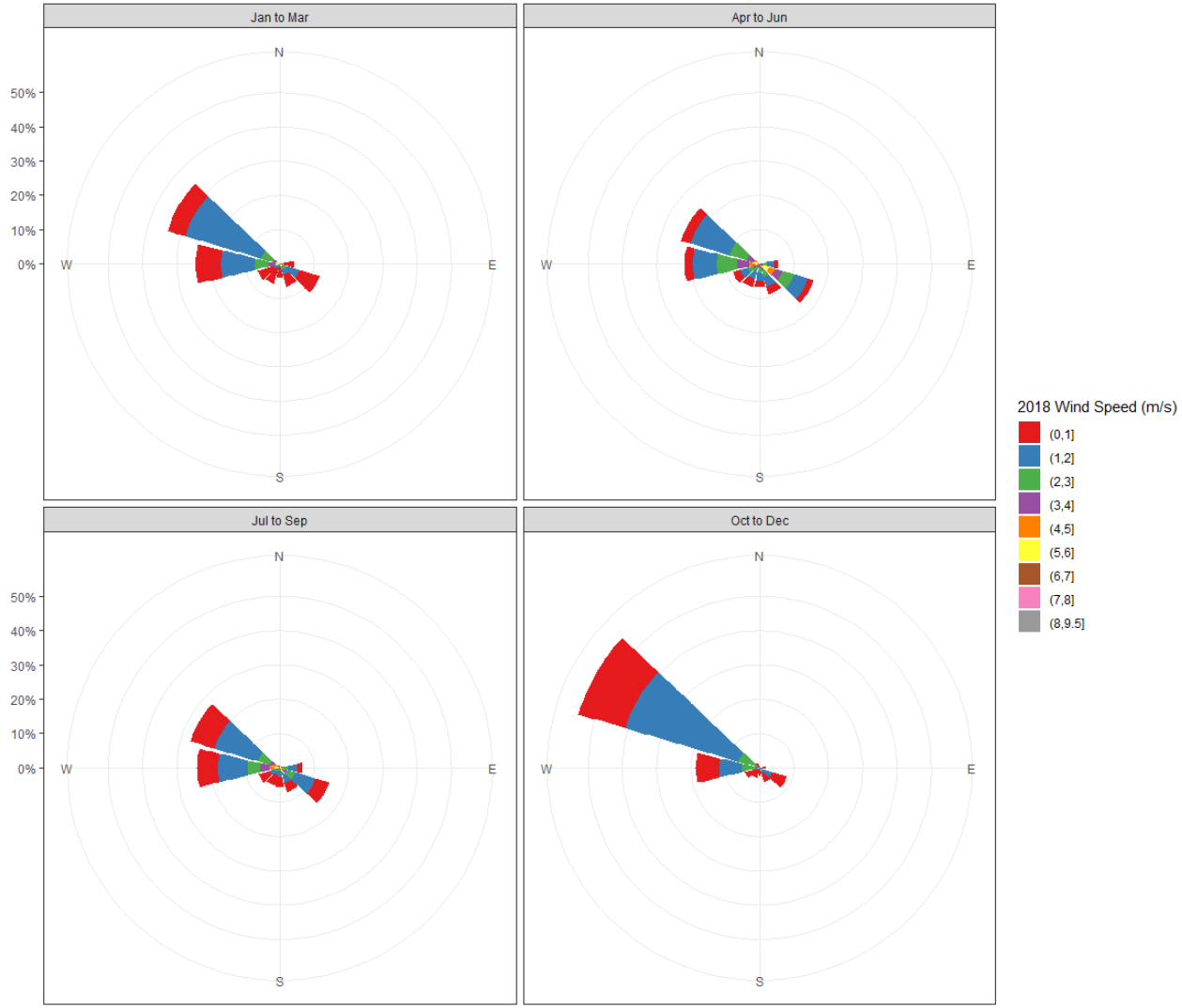


Figure 8. Seasonal wind roses (hourly average for wind velocity and direction) at the Clinton Creek Meteorological Station (January 1, 2018, to December 31, 2018).

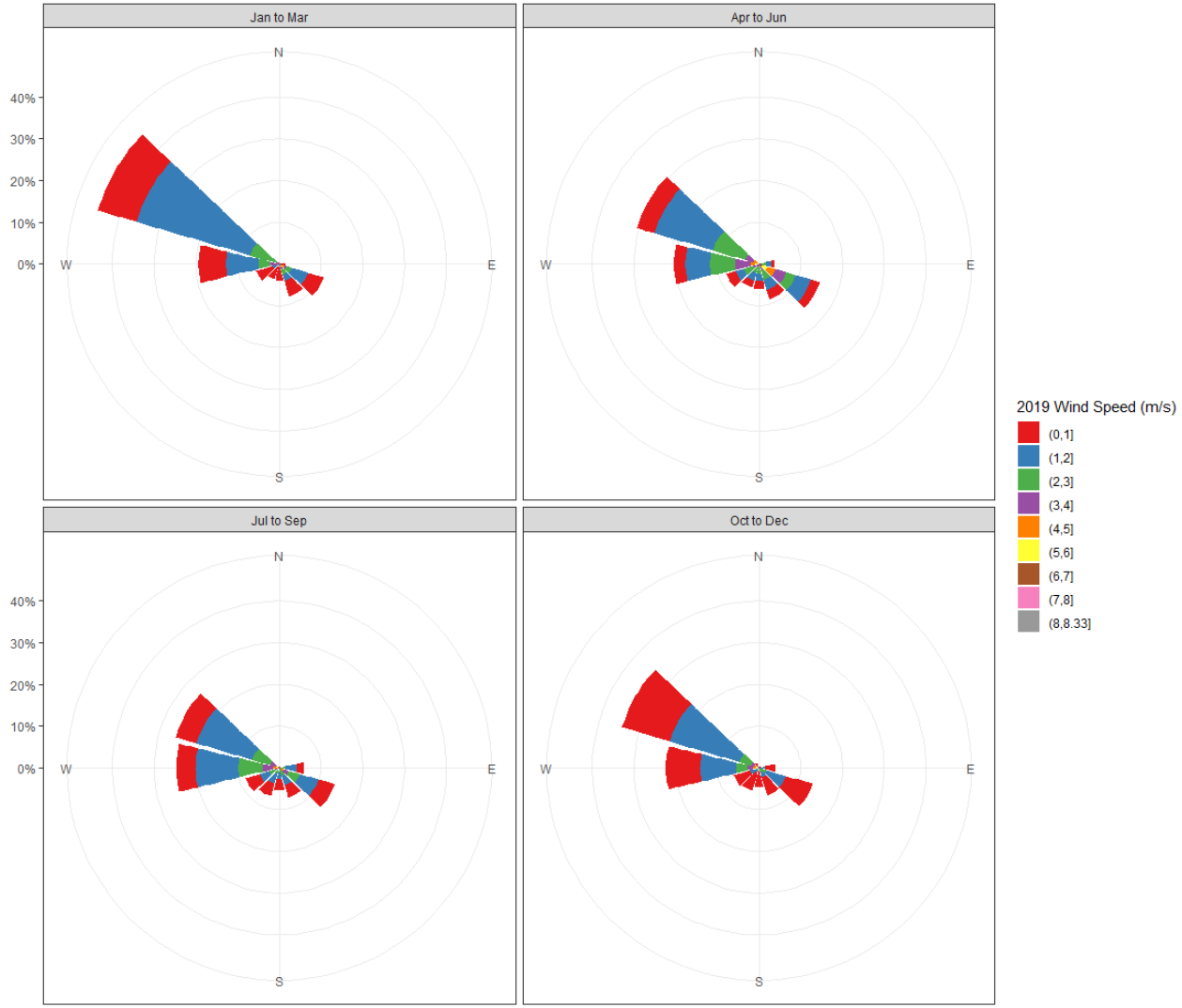


Figure 9. Seasonal wind roses (hourly average for wind velocity and direction) at the Clinton Creek Meteorological Station (January 1, 2019, to December 31, 2019).

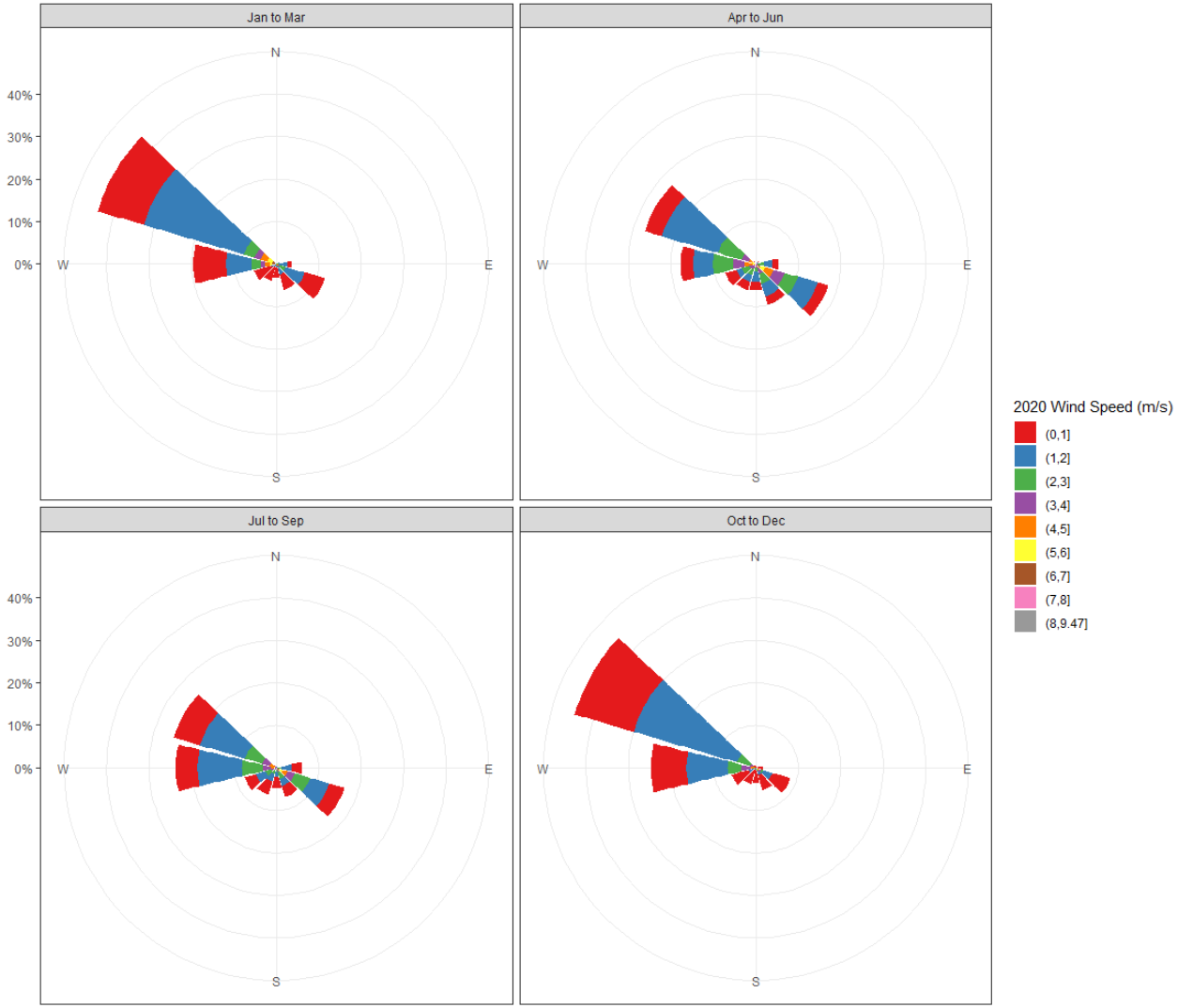


Figure 10. Seasonal wind roses (hourly average for wind velocity and direction) at the Clinton Creek Meteorological Station (January 1, 2020, to December 31, 2020).

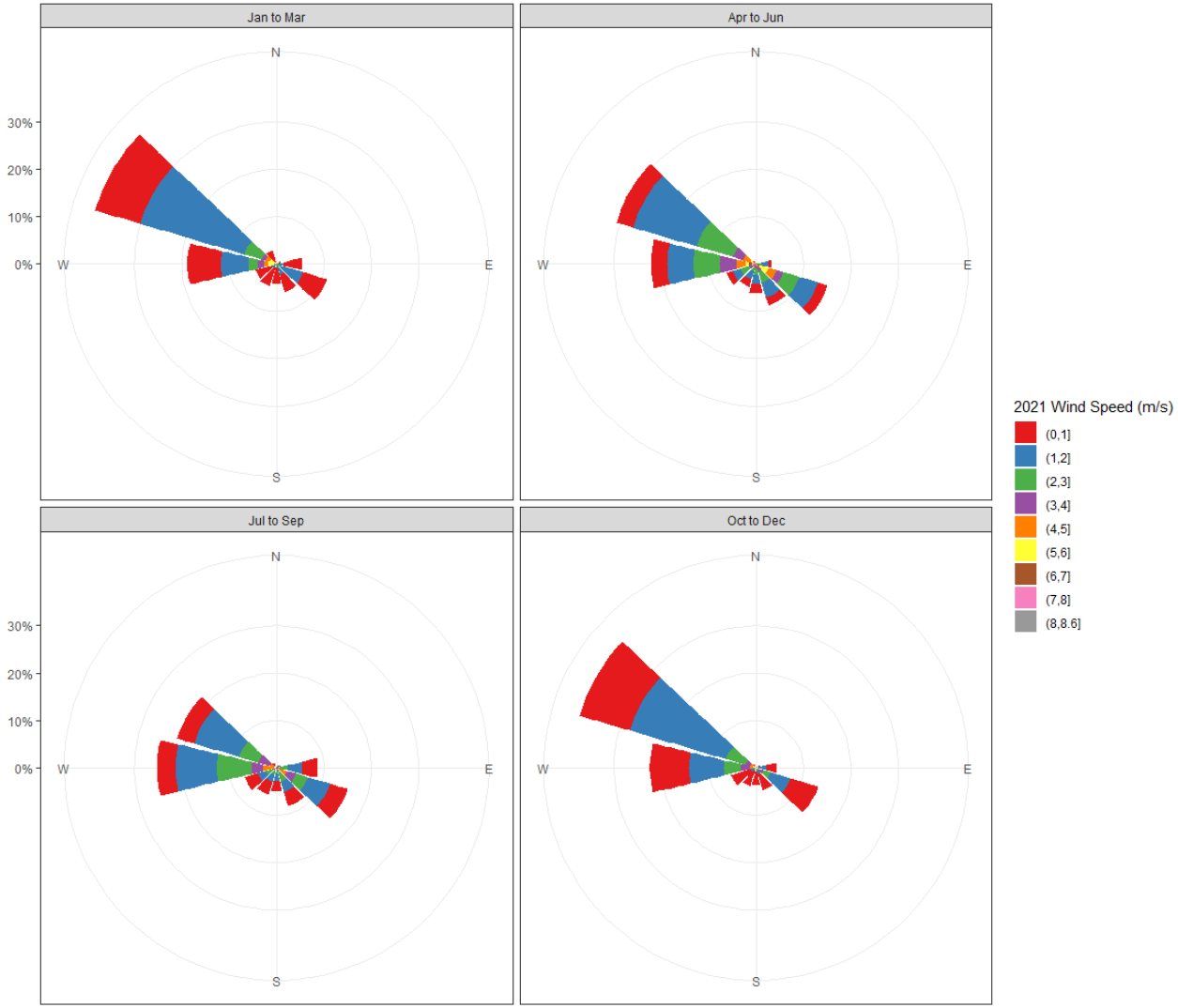


Figure 11. Seasonal wind roses (hourly average for wind velocity and direction) at the Clinton Creek Meteorological Station (January 1, 2021, to December 31, 2021).

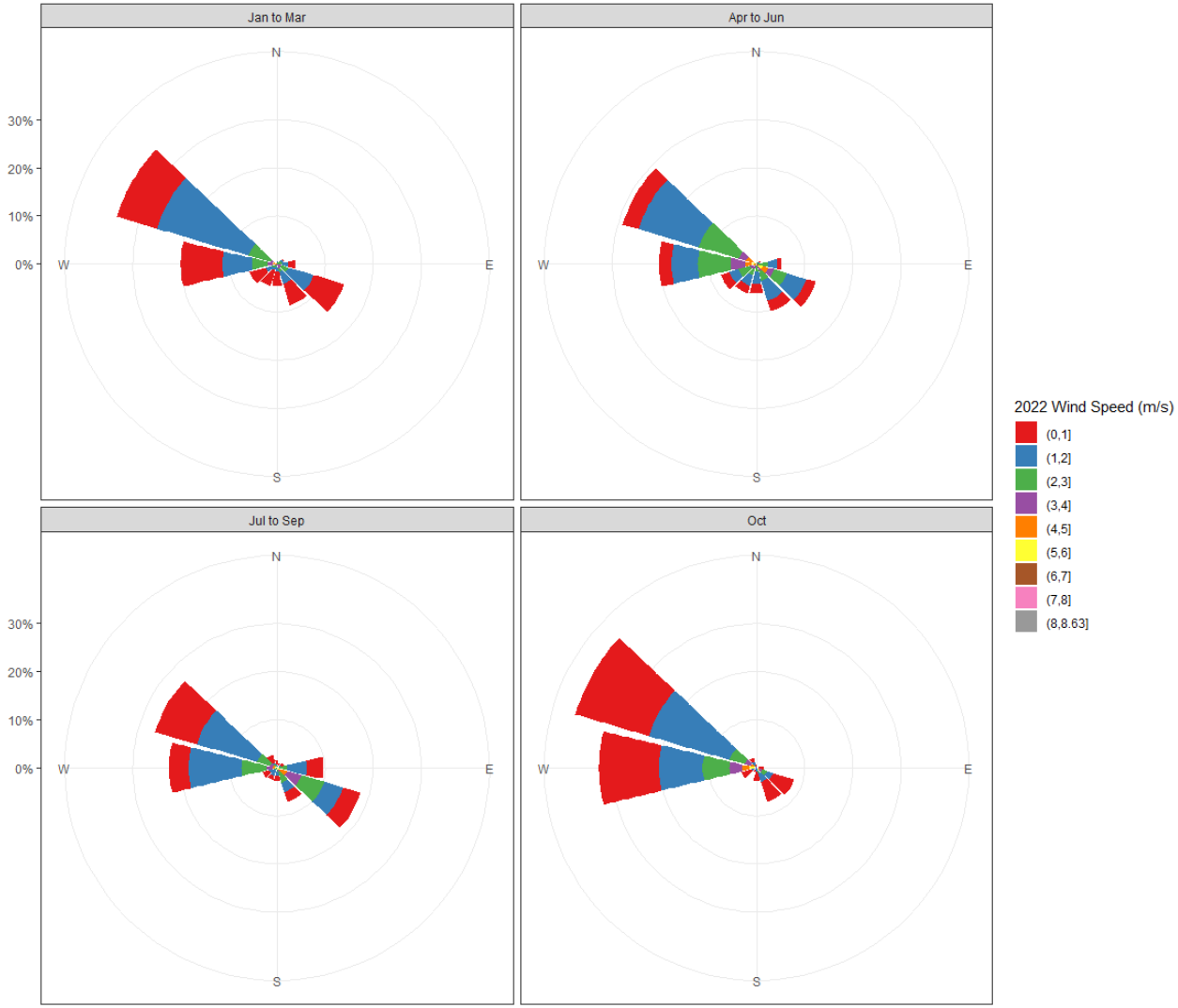


Figure 12. Seasonal wind roses (hourly average for wind velocity and direction) at the Clinton Creek Meteorological Station (January 1, 2022, to October 31, 2022).

Hydrology

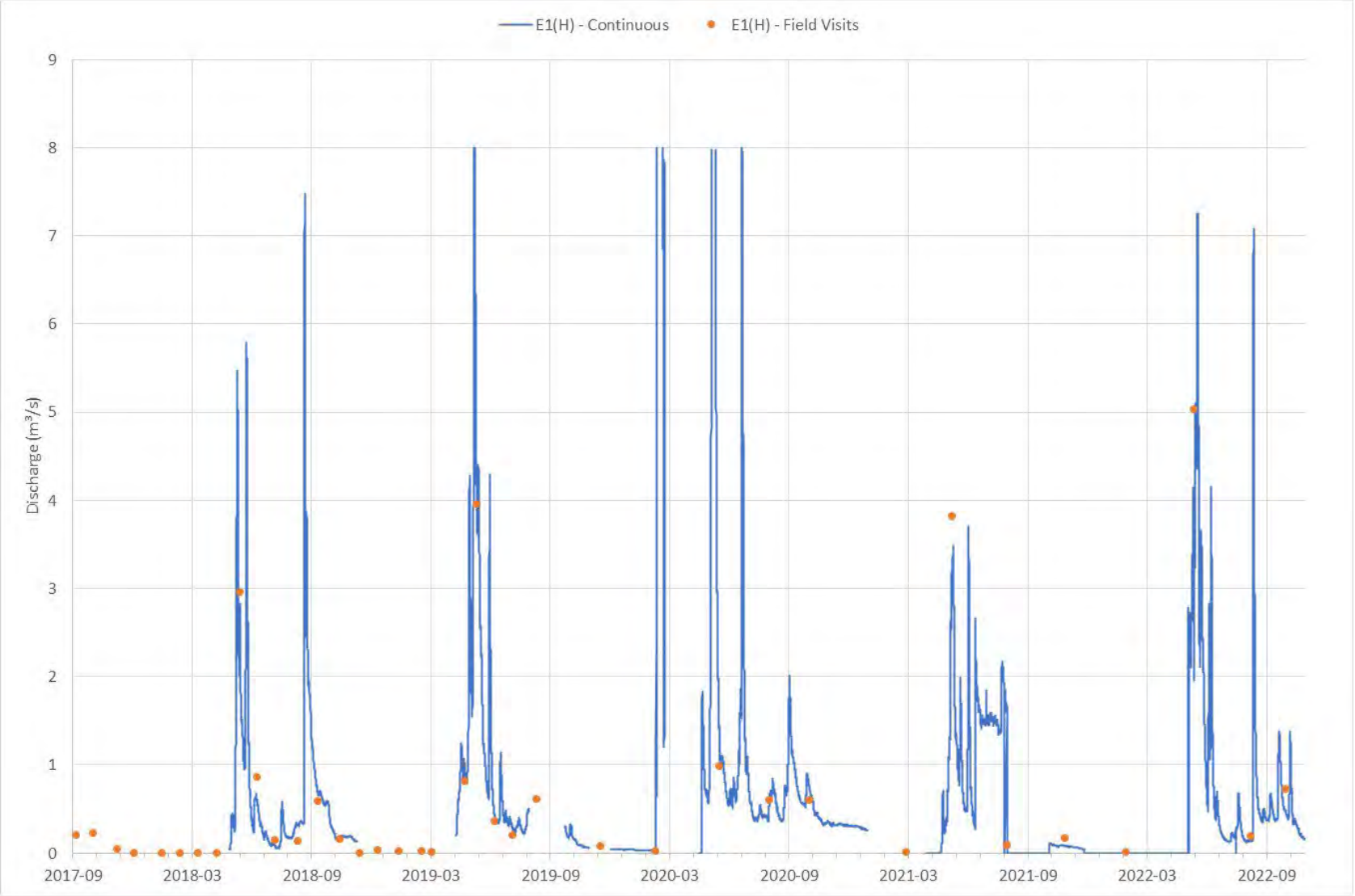


Figure 13. Hydrograph for Clinton Creek at the outlet of Hudgeon Lake (E1(H)) with provisional continuous discharge (September 1, 2017, to October 4, 2022).

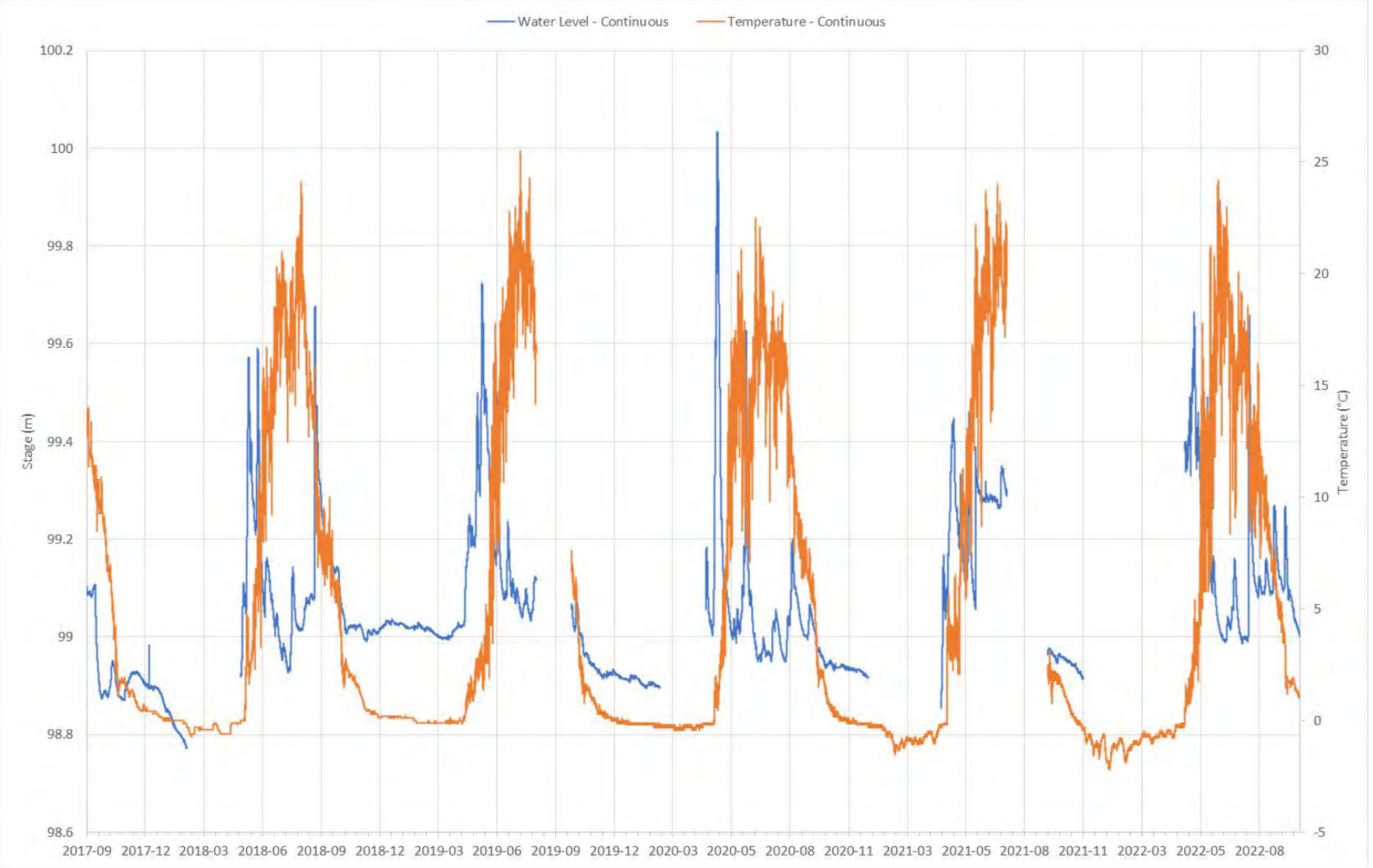


Figure 14. Water level and temperature in the outlet of Hudgeon Lake (Clinton Creek station E1(H)) (September 1, 2017, to October 4, 2022).

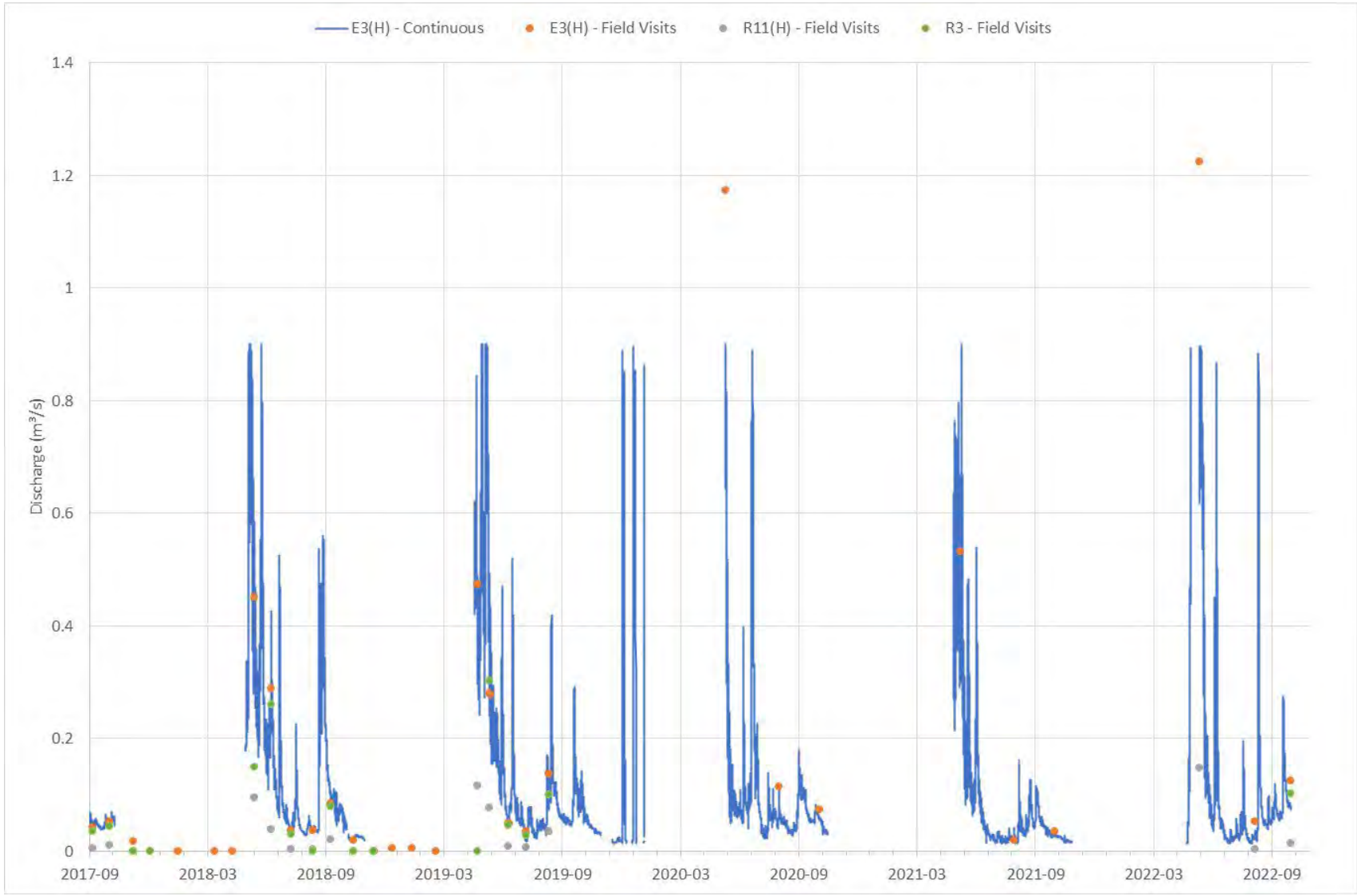


Figure 15. Hydrograph for Wolverine Creek basin (stations E3(H), R11(H) and R3) with provisional continuous discharge at E3(H) (September 1, 2017, to October 4, 2022).

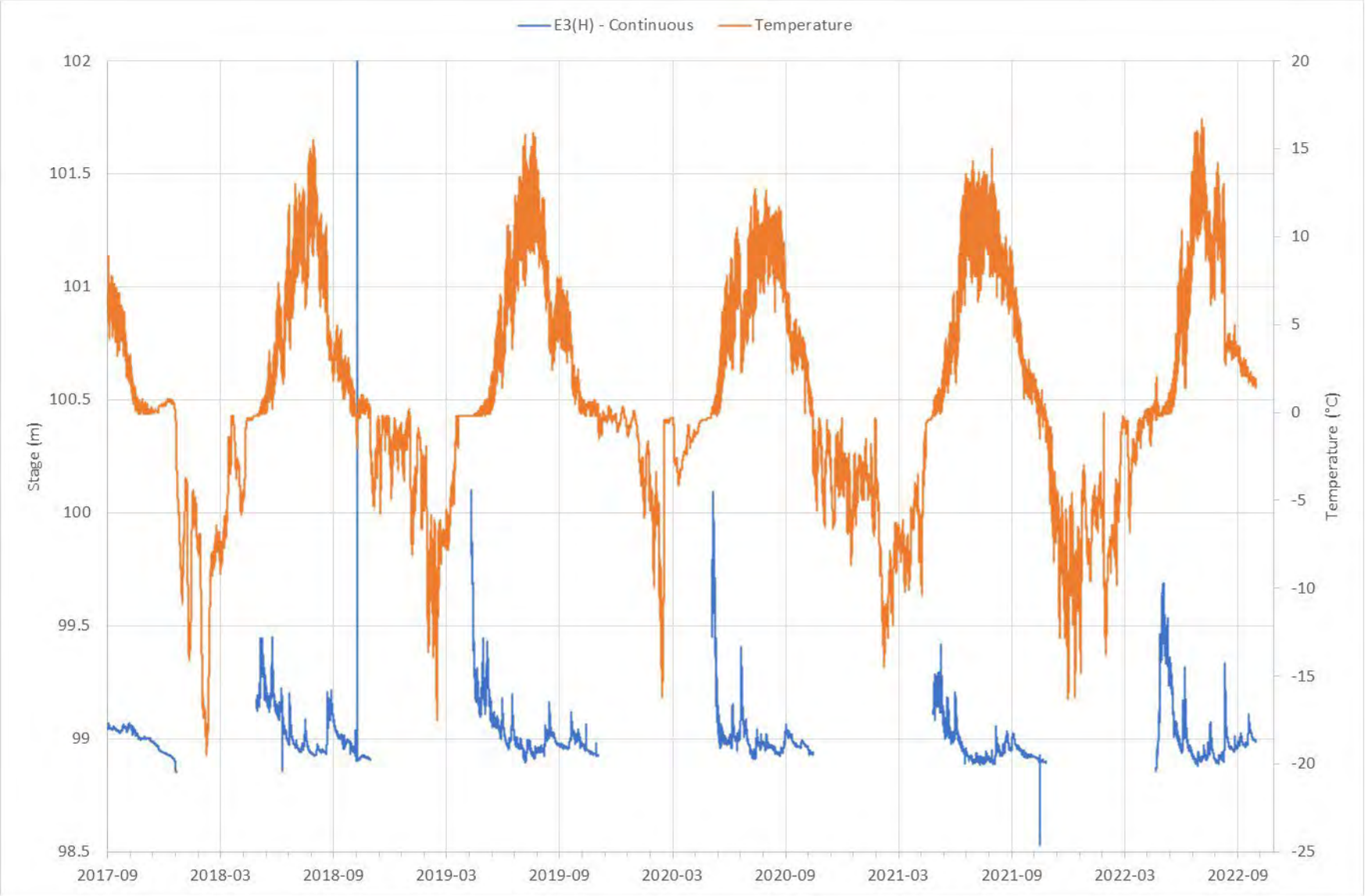


Figure 16. Water level and temperature in Wolverine Creek (station E3(H)) (September 1, 2017, to October 4,2022).

Water Quality

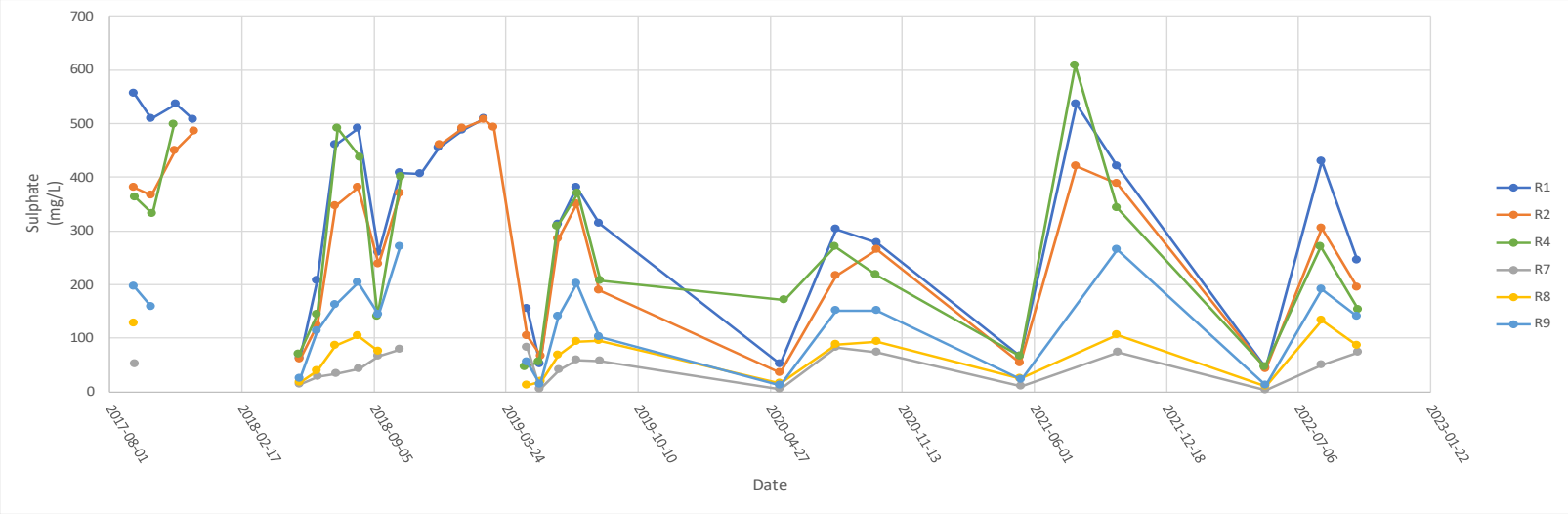


Figure 17. Sulphate concentrations at reference sites R1, R2, R4, R7, R8, and R9 between September 2017 and October 2022.

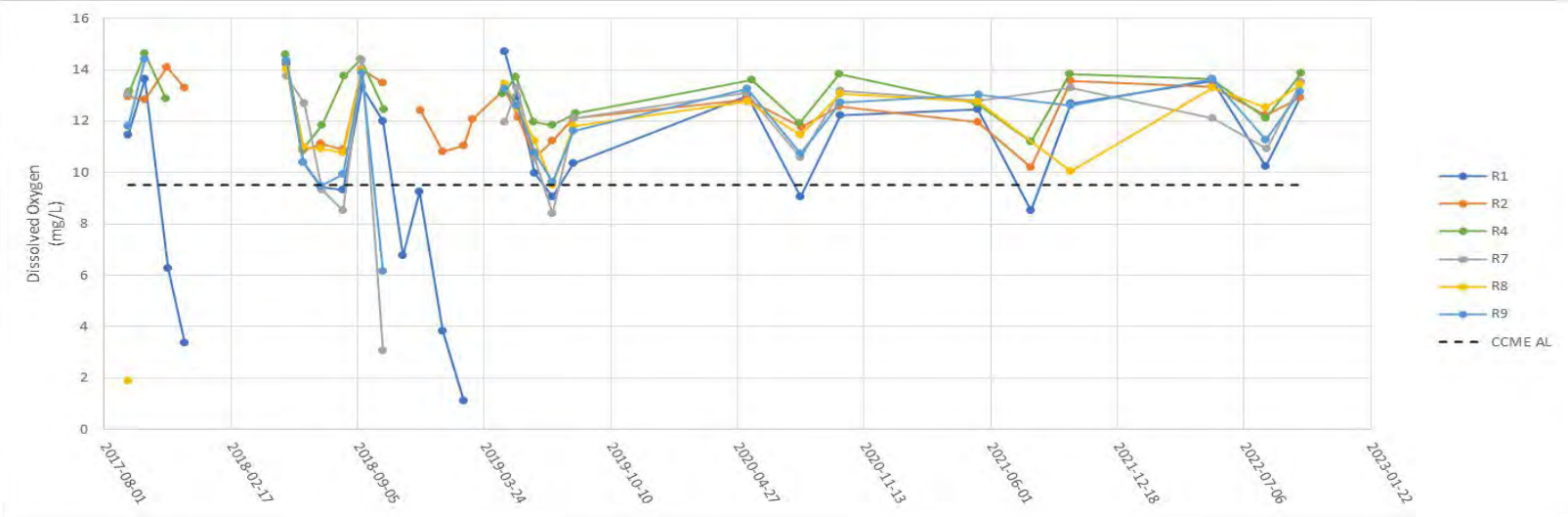


Figure 18. Dissolved oxygen concentrations at reference sites R1, R2, R4, R7, R8, and R9 between September 2017 and October 2022.

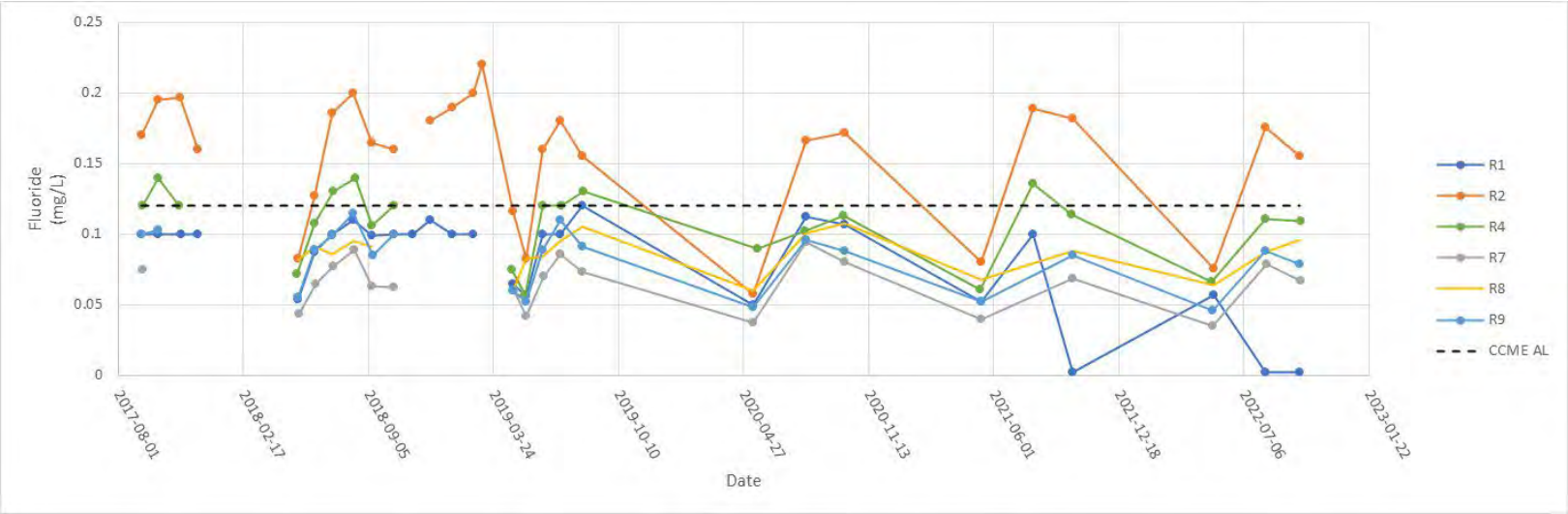


Figure 19. Fluoride concentrations at reference sites R1, R2, R4, R7, R8, and R9 between September 2017 and October 2022.

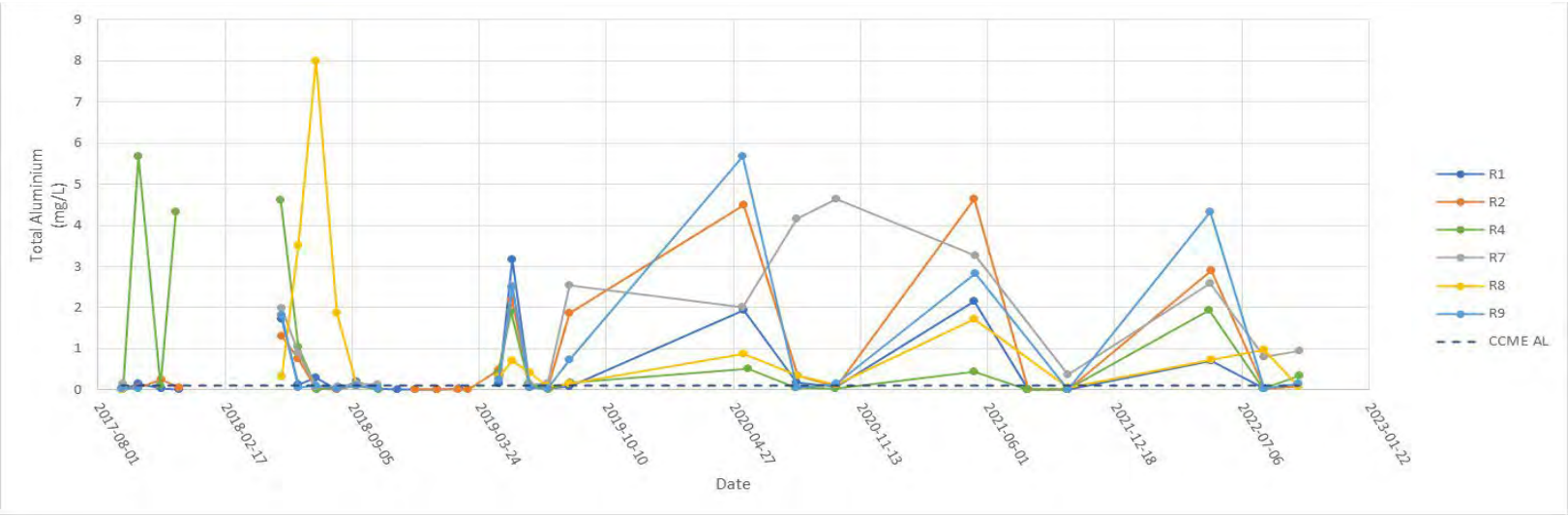


Figure 20. Total aluminium concentrations at reference sites R1, R2, R4, R7, R8, and R9 between September 2017 and October 2022.

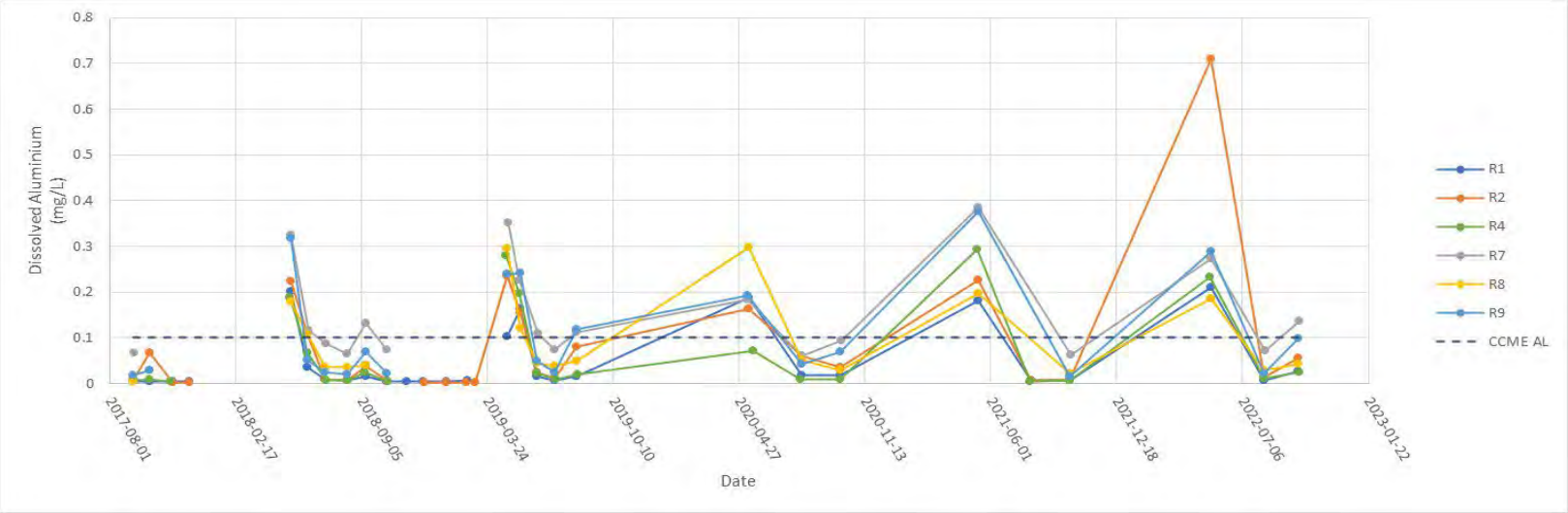


Figure 21. Dissolved aluminium concentrations at reference sites R1, R2, R4, R7, R8, and R9 between September 2017 and October 2022.

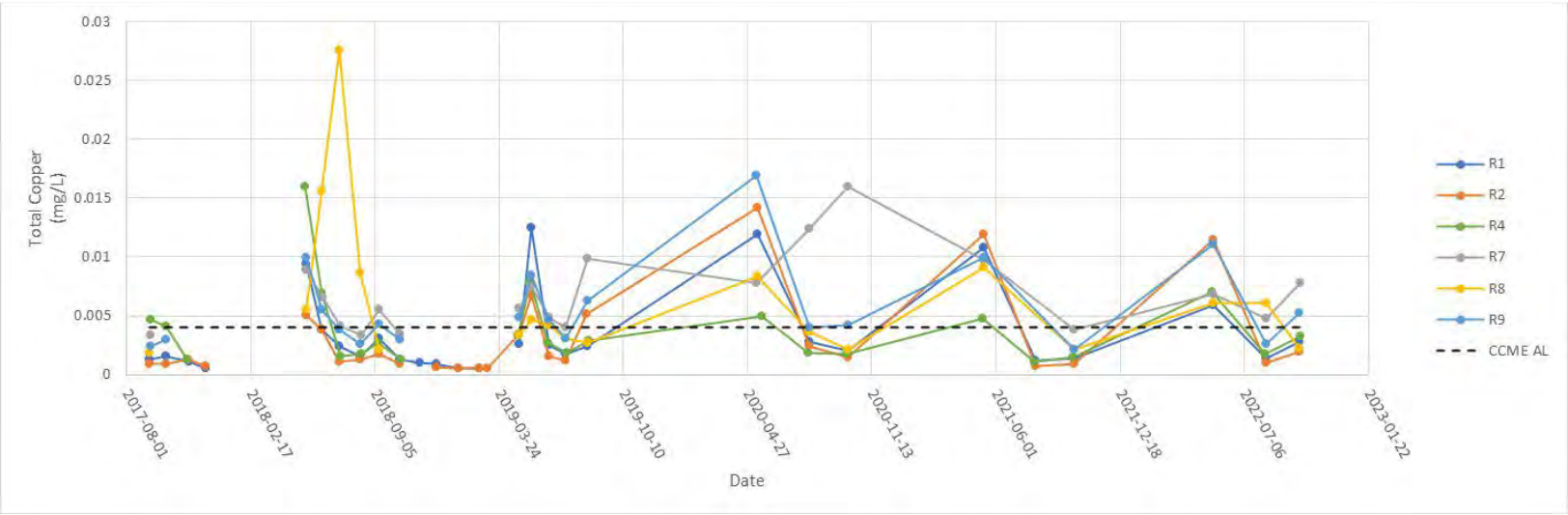


Figure 22. Total copper concentrations at reference sites R1, R2, R4, R7, R8, and R9 between September 2017 and October 2022.

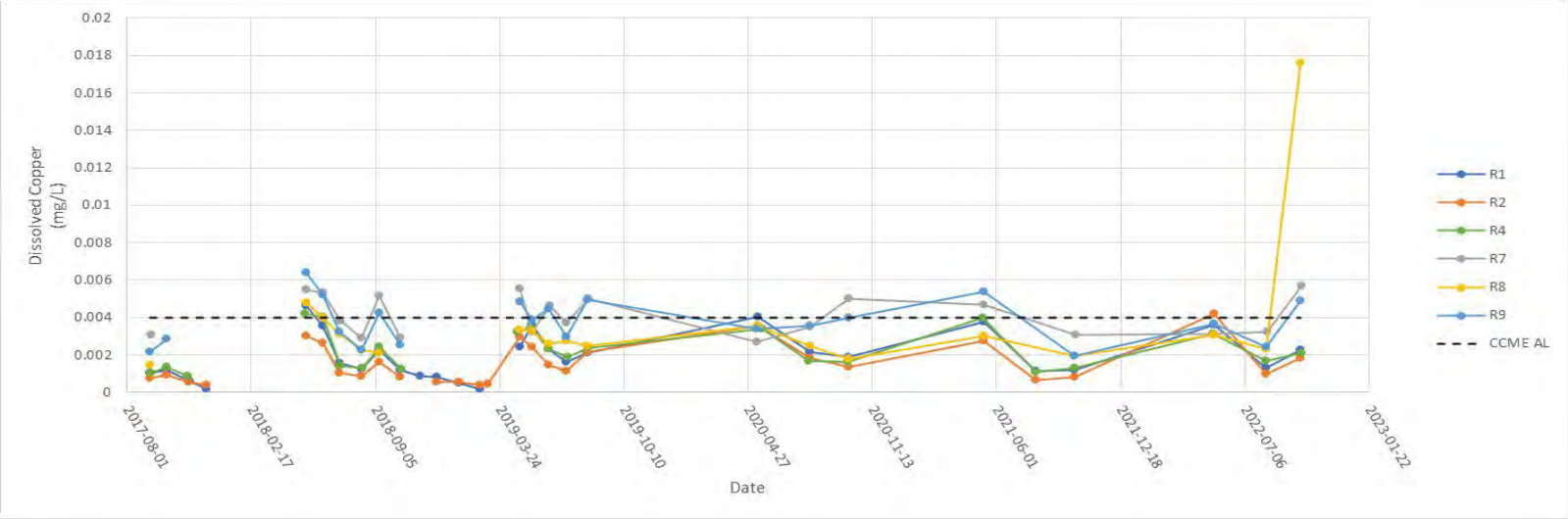


Figure 23. Dissolved copper concentrations at reference sites R1, R2, R4, R7, R8, and R9 between September 2017 and October 2022.

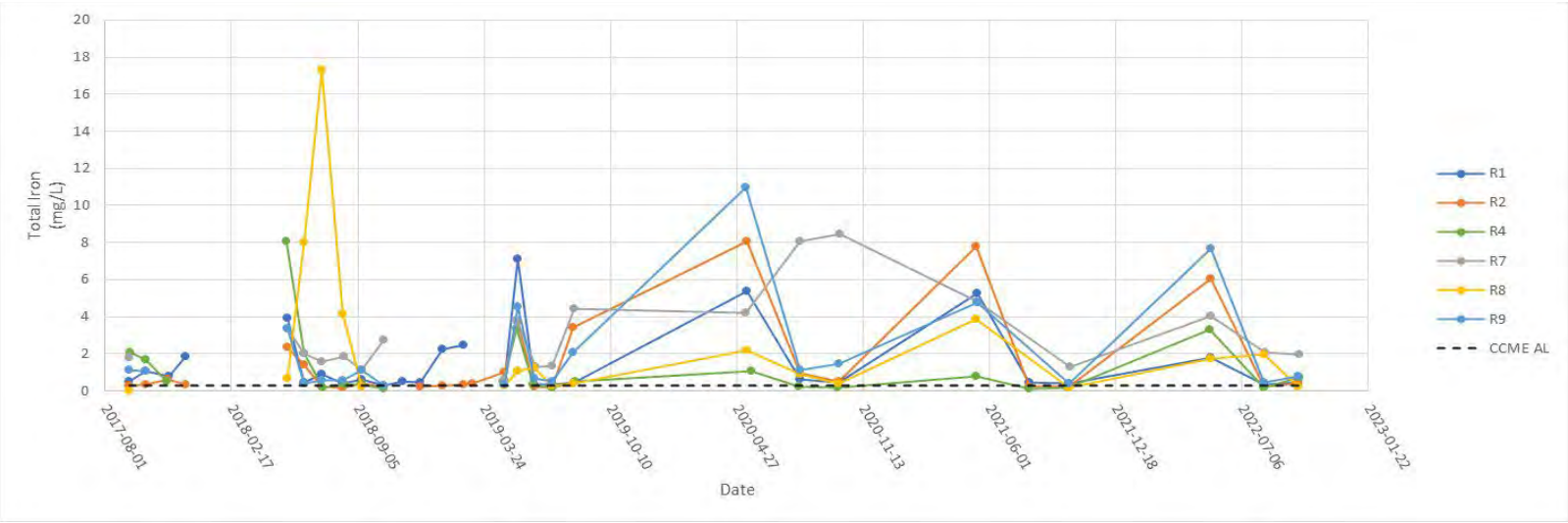


Figure 24. Total iron concentrations at reference sites R1, R2, R4, R7, R8, and R9 between September 2017 and October 2022.

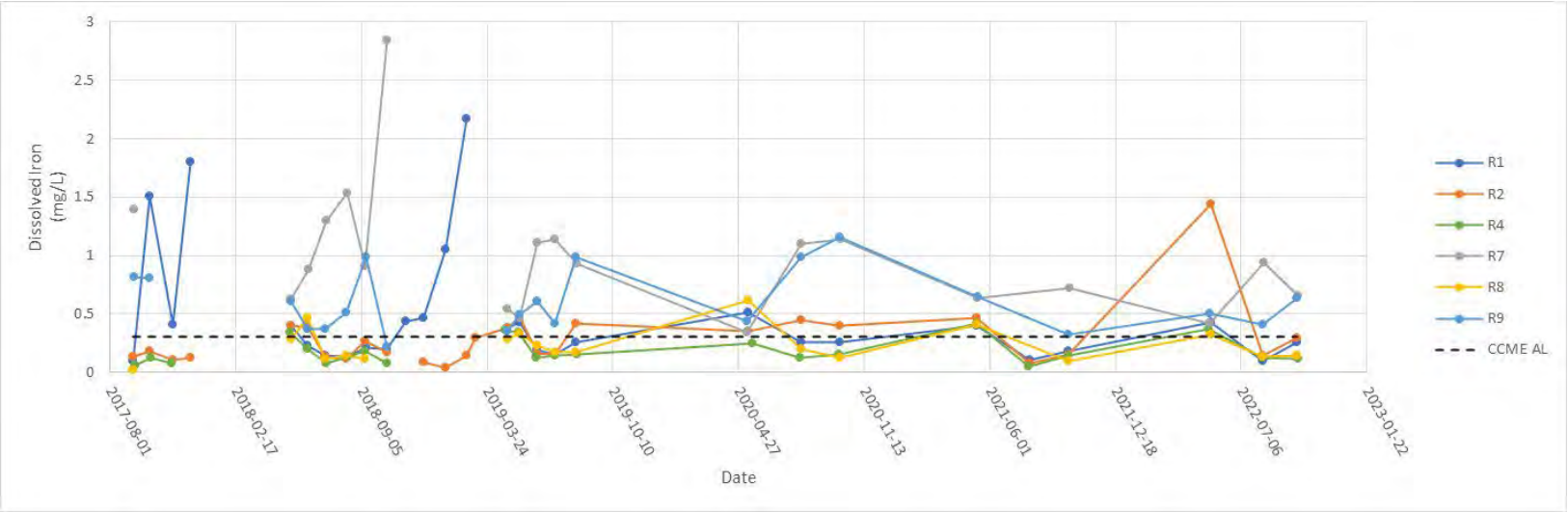


Figure 25. Dissolved iron concentrations at reference sites R1, R2, R4, R7, R8, and R9 between September 2017 and October 2022.

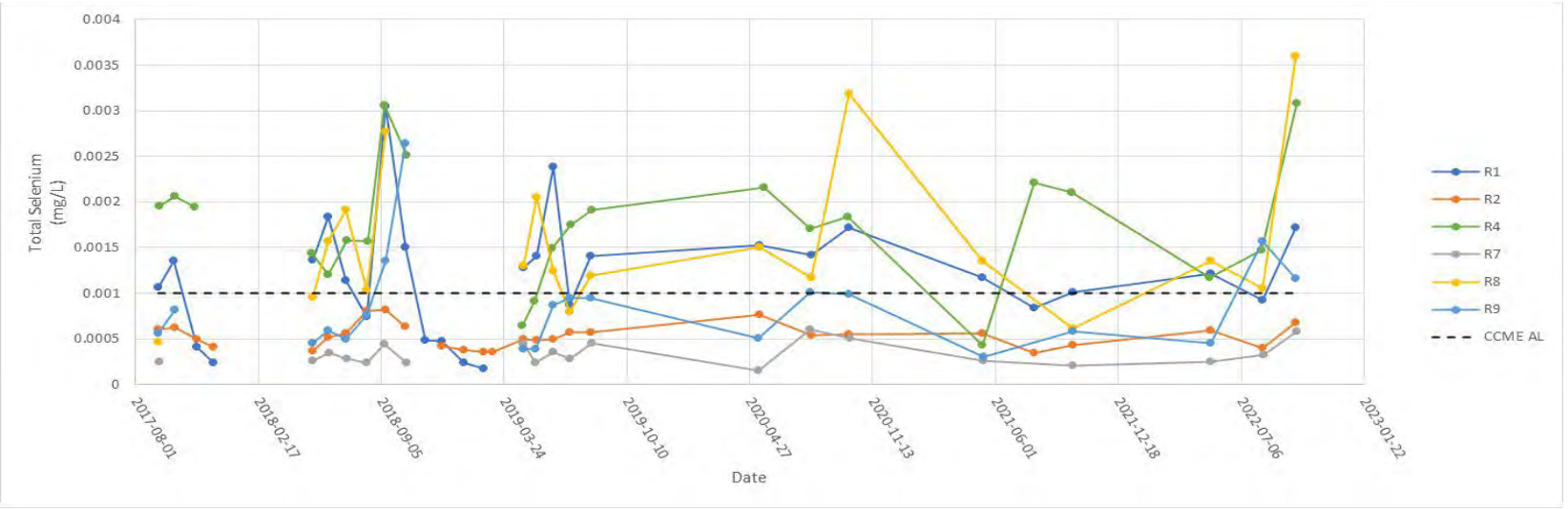


Figure 26. Total selenium concentrations at reference sites R1, R2, R4, R7, R8, and R9 between September 2017 and October 2022.

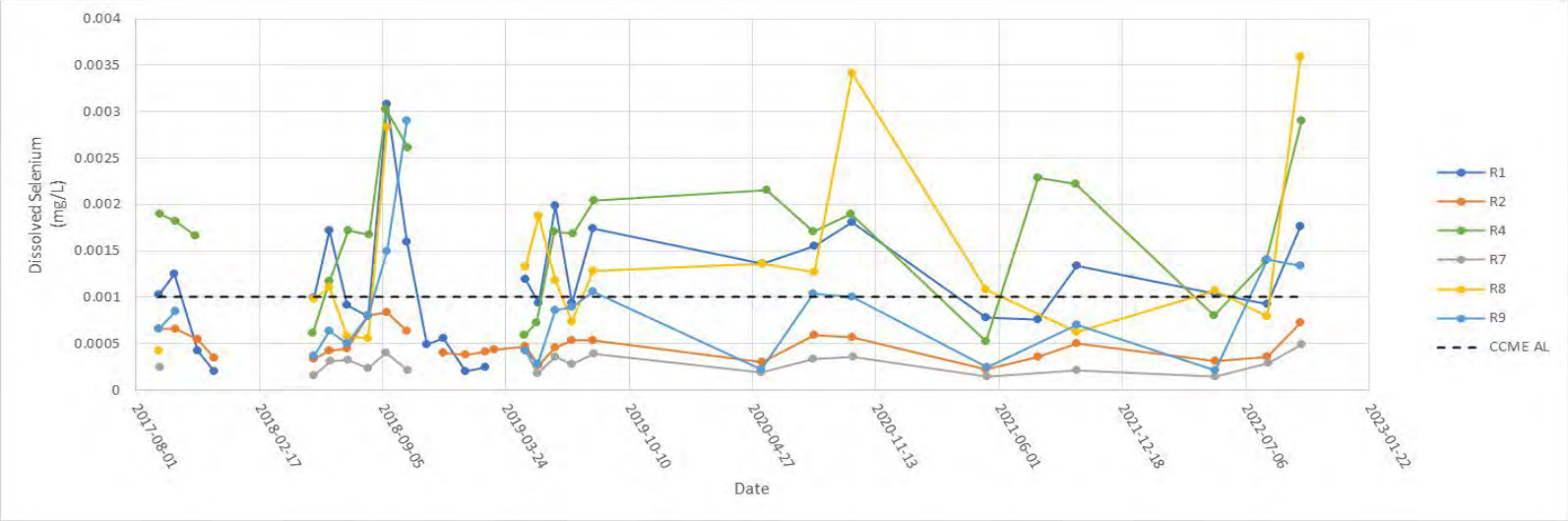


Figure 27. Dissolved selenium concentrations at reference sites R1, R2, R4, R7, R8, and R9 between September 2017 and October 2022.

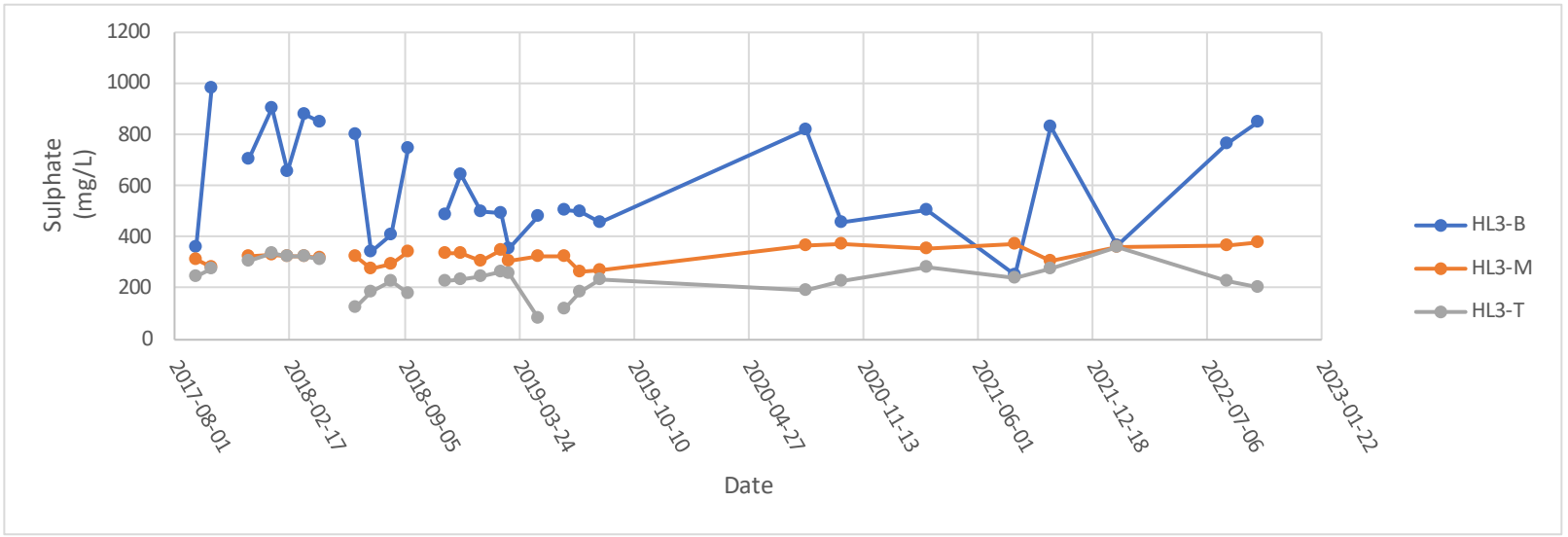


Figure 28. Sulphate concentrations at Hudgeon Lake sites HL3-B, HL3-M, and HL3-T between September 2017 and October 2022.

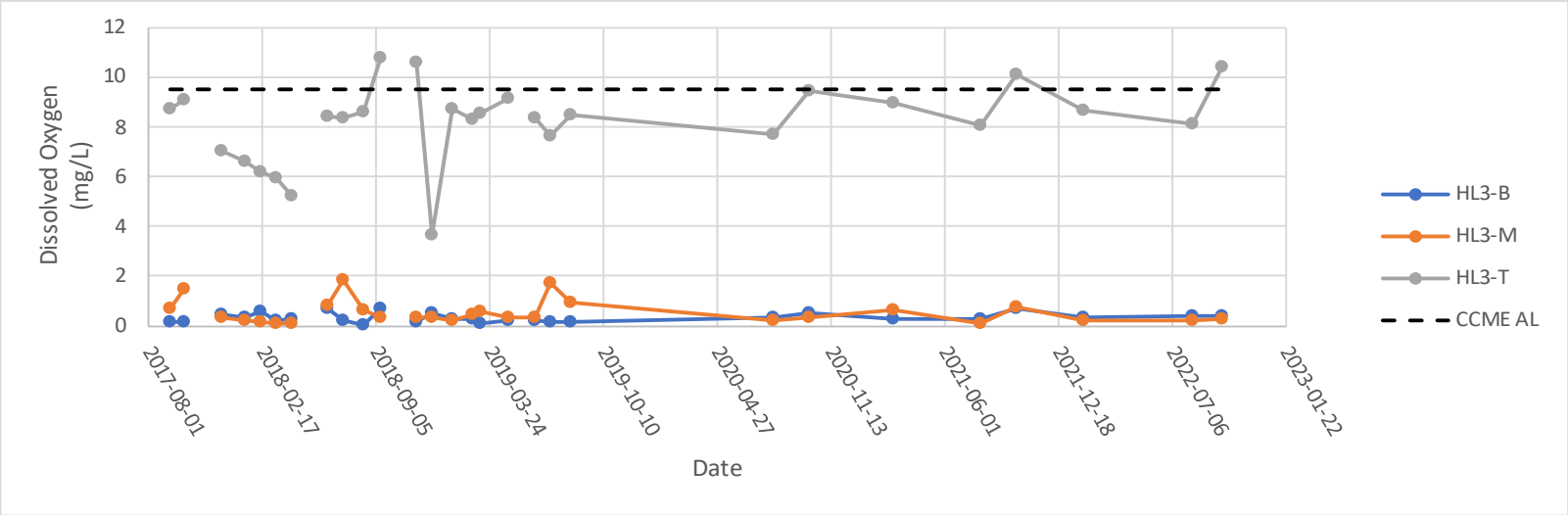


Figure 29. Dissolved oxygen concentrations at Hudgeon Lake sites HL3-B, HL3-M, and HL3-T between September 2017 and October 2022

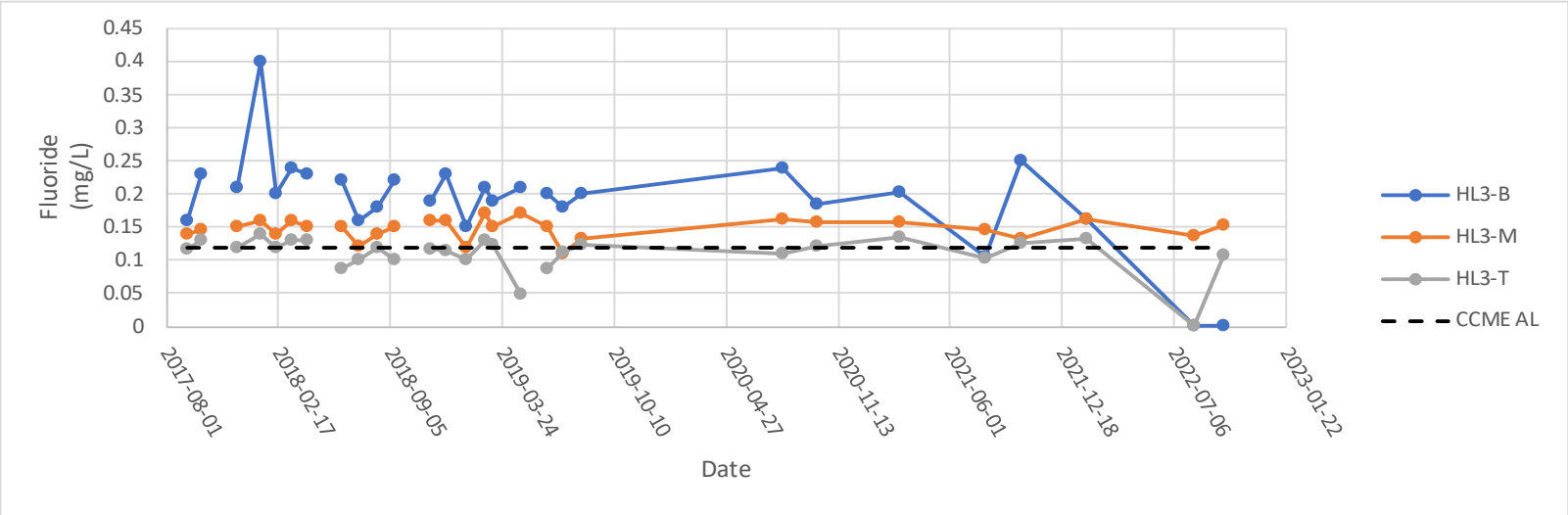


Figure 30. Fluoride concentrations at Hudgeon Lake sites HL3-B, HL3-M, and HL3-T between September 2017 and October 2022.

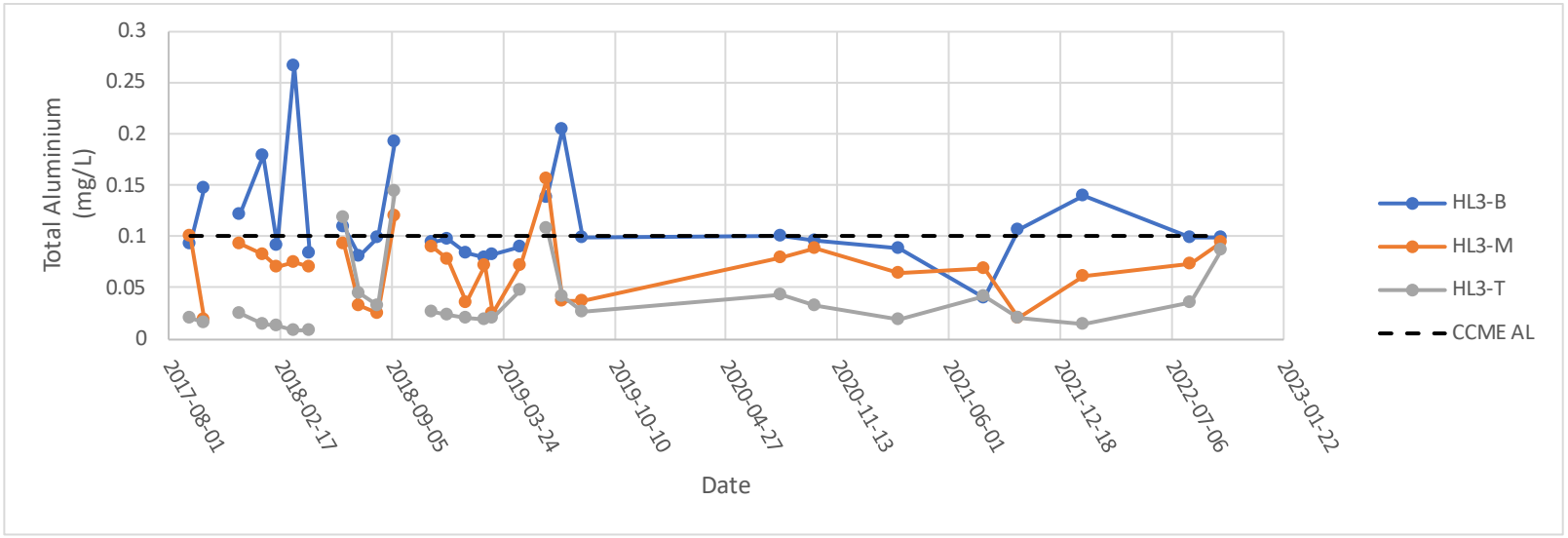


Figure 31. Total aluminium concentrations Hudgeon Lake sites HL3-B, HL3-M, and HL3-T between September 2017 and October 2022.

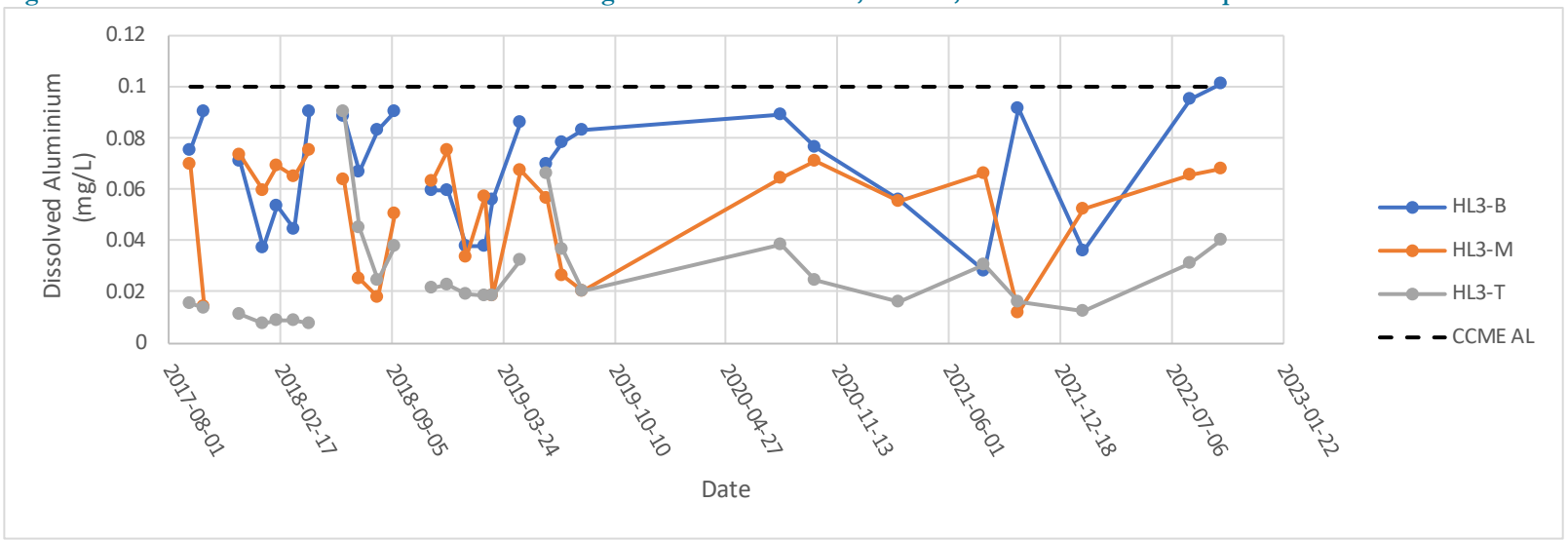


Figure 32. Dissolved aluminium concentrations at Hudgeon Lake sites HL3-B, HL3-M, and HL3-T between September 2017 and October 2022.

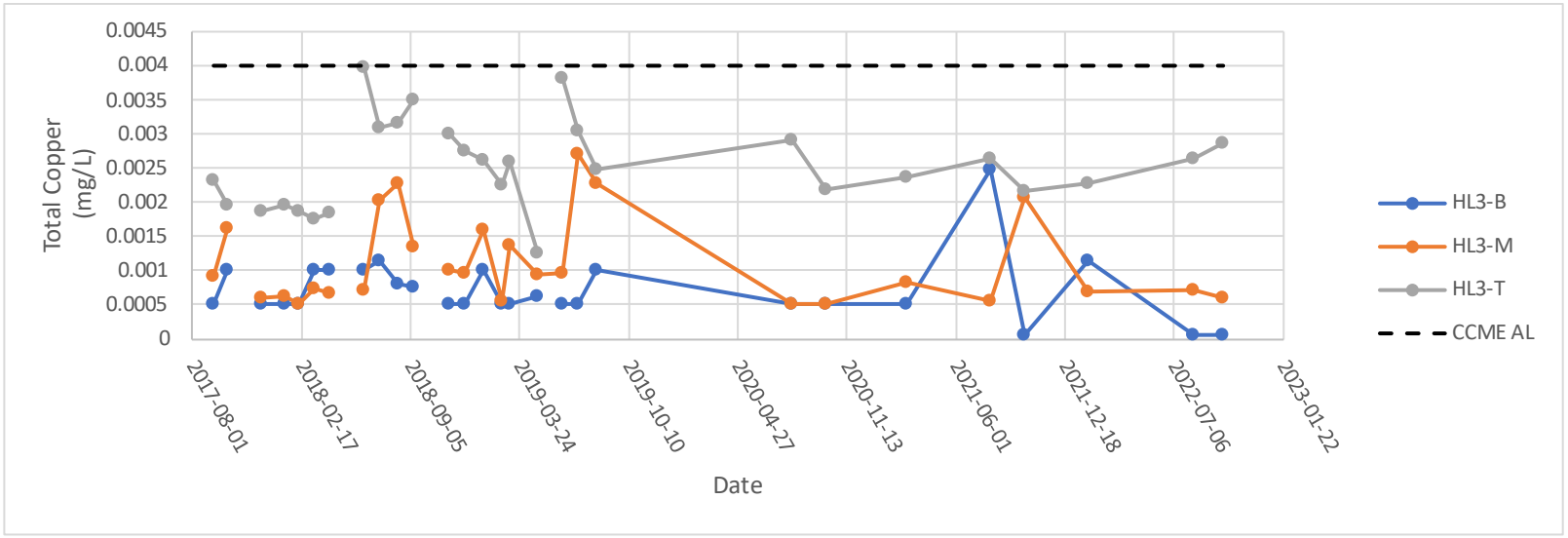


Figure 33. Total copper concentrations at Hudgeon Lake sites HL3-B, HL3-M, and HL3-T between September 2017 and October 2022.

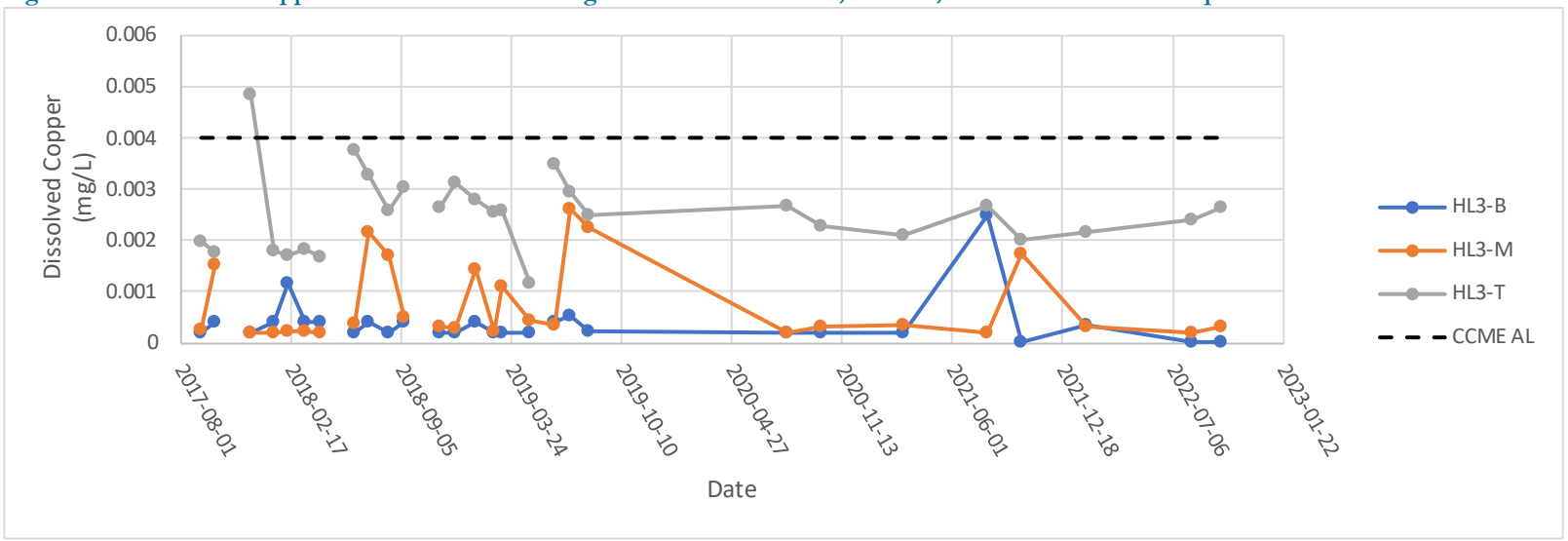


Figure 34. Dissolved copper concentrations at Hudgeon Lake sites HL3-B, HL3-M, and HL3-T between September 2017 and October 2022.

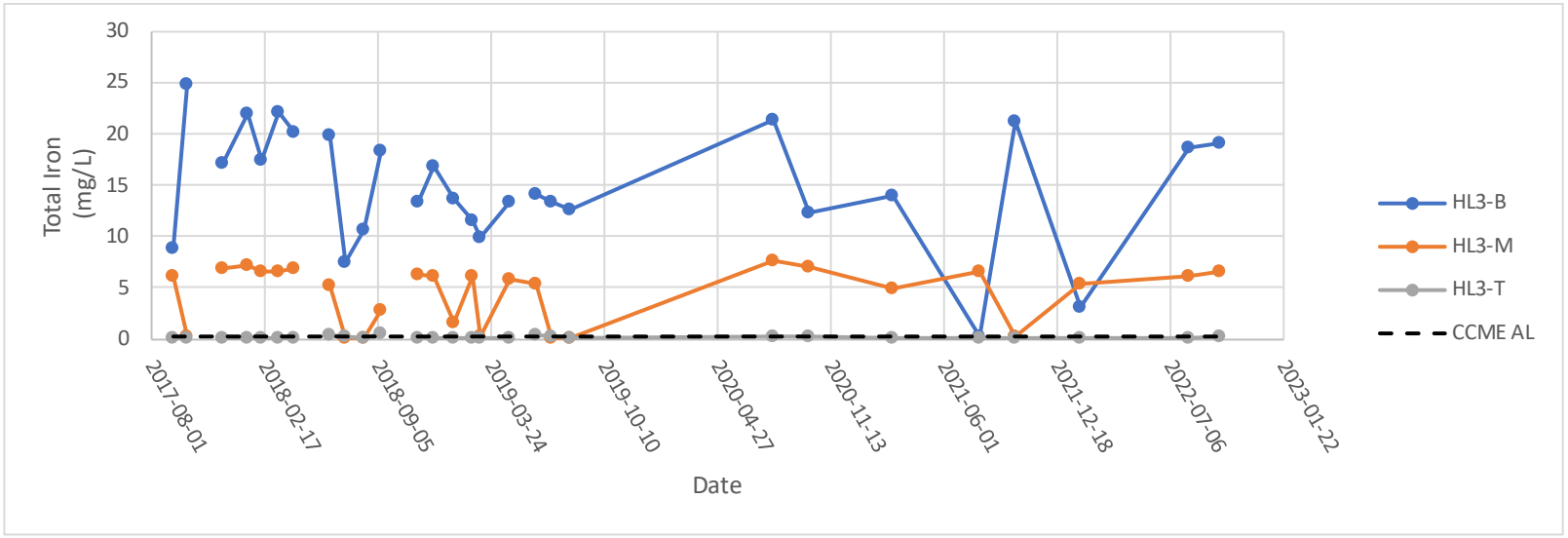


Figure 35. Total iron concentrations at Hudgeon Lake sites HL3-B, HL3-M, and HL3-T between September 2017 and October 2022.

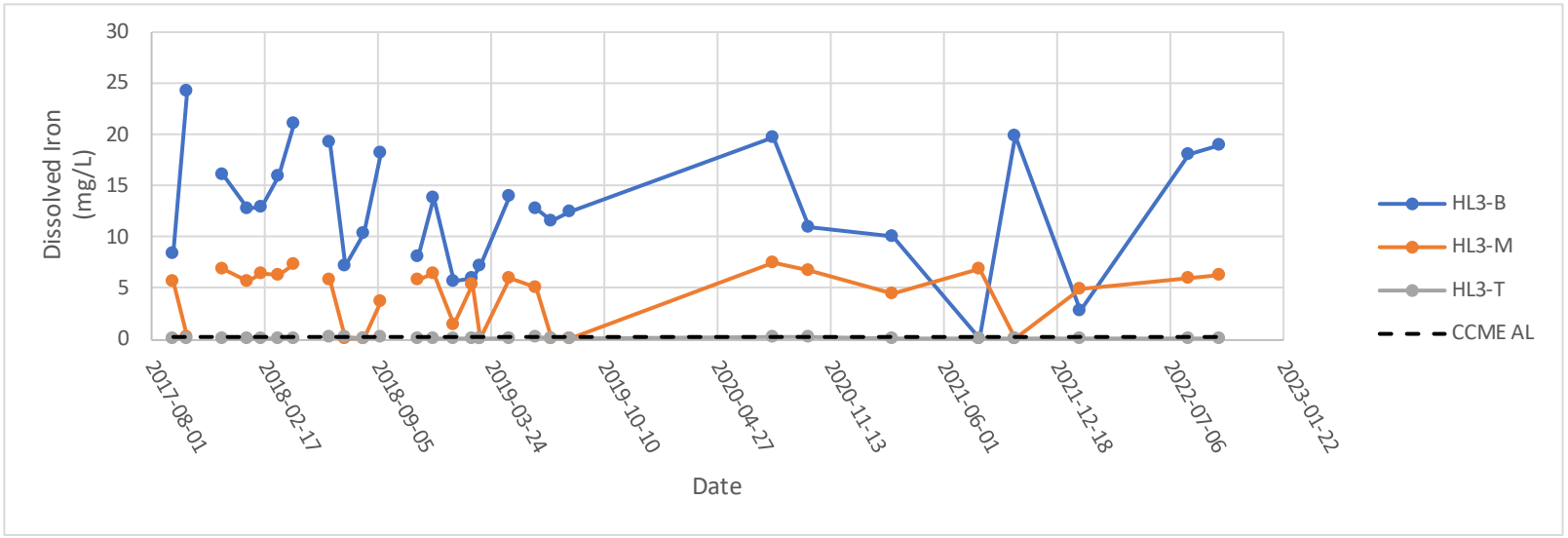


Figure 36. Dissolved iron concentrations at Hudgeon Lake sites HL3-B, HL3-M, and HL3-T between September 2017 and October 2022.

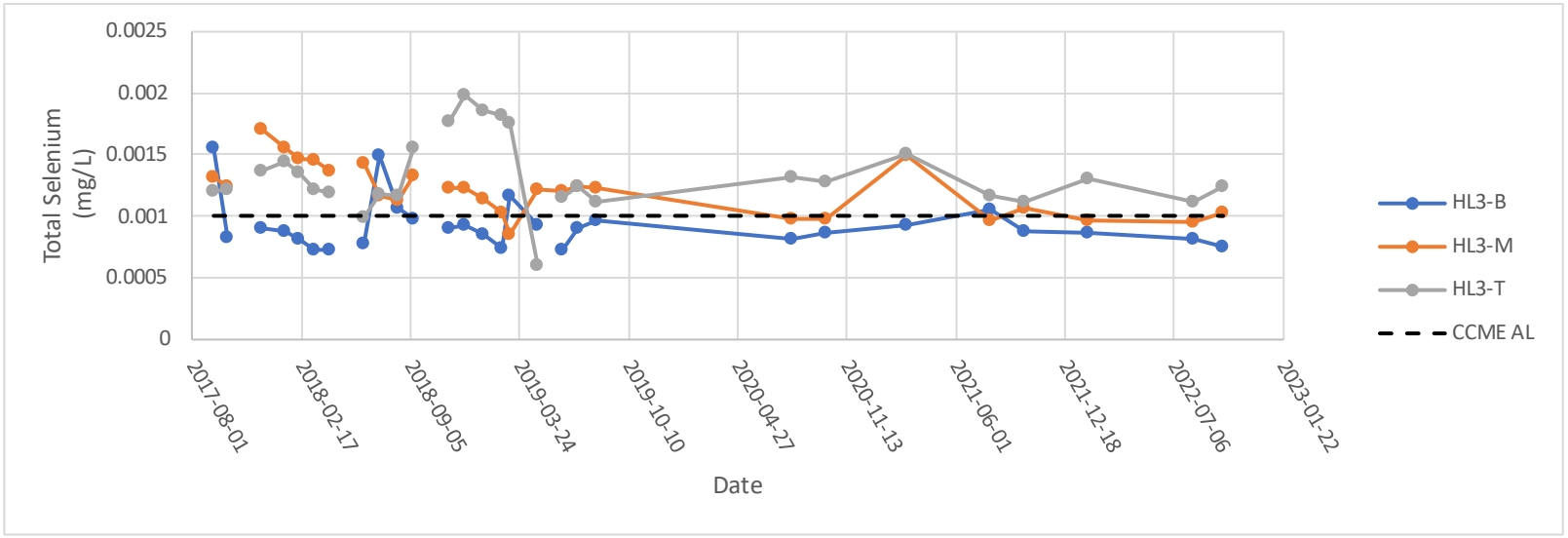


Figure 37. Total selenium concentrations at Hudgeon Lake sites HL3-B, HL3-M, and HL3-T between September 2017 and October 2022.

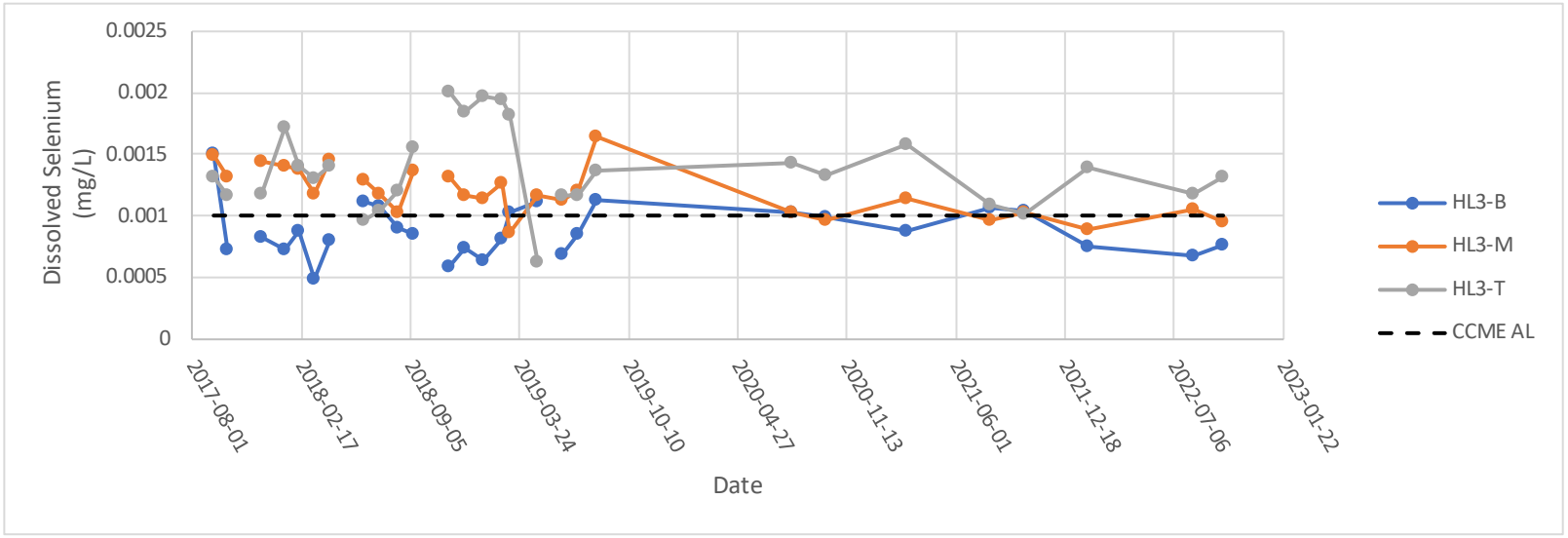


Figure 38. Dissolved selenium concentrations at Hudgeon Lake sites HL3-B, HL3-M, and HL3-T between September 2017 and October 2022.

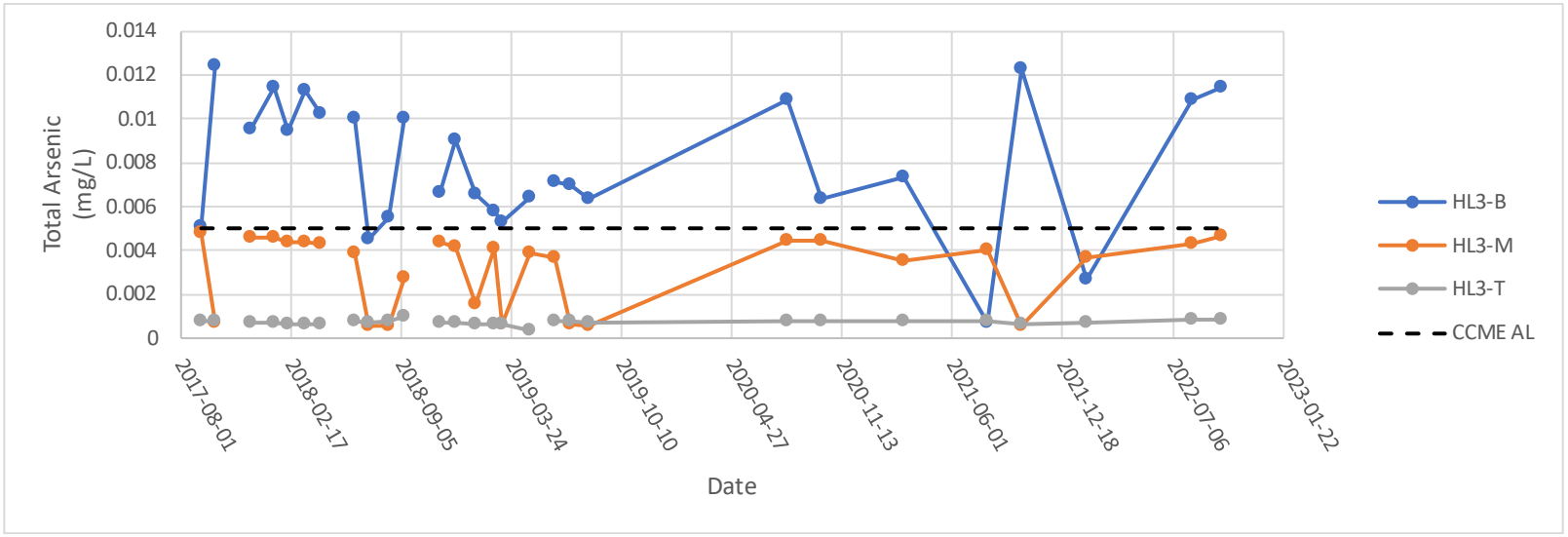


Figure 39. Total arsenic concentrations at Hudgeon Lake sites HL3-B, HL3-M, and HL3-T between September 2017 and October 2022.

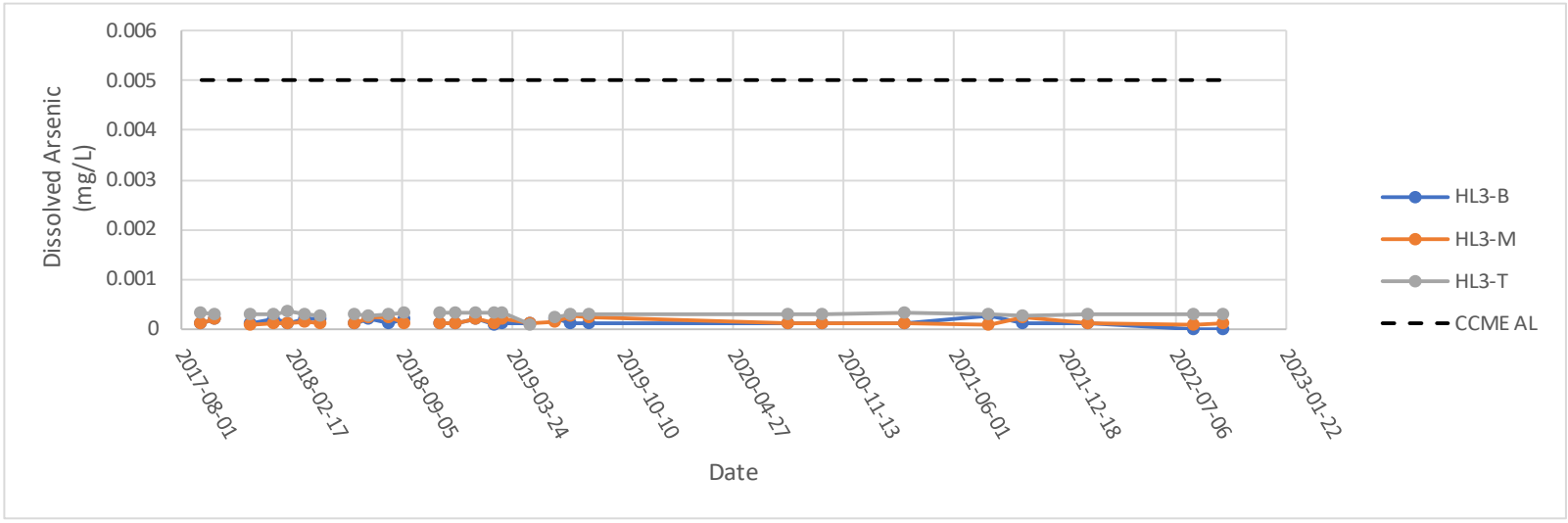


Figure 40. Dissolved arsenic concentrations at Hudgeon Lake sites HL3-B, HL3-M, and HL3-T between September 2017 and October 2022.

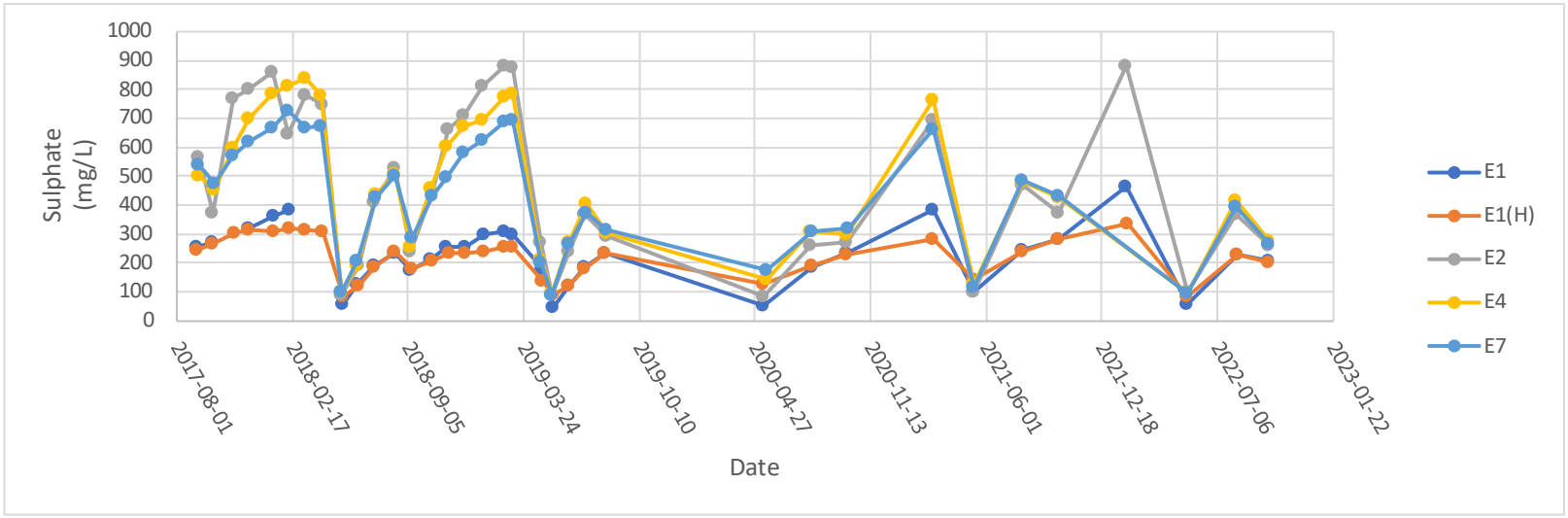


Figure 41. Sulphate concentrations at Clinton Creek sites E1, E1(H), E2, E4, and E7 between September 2017 and October 2022.

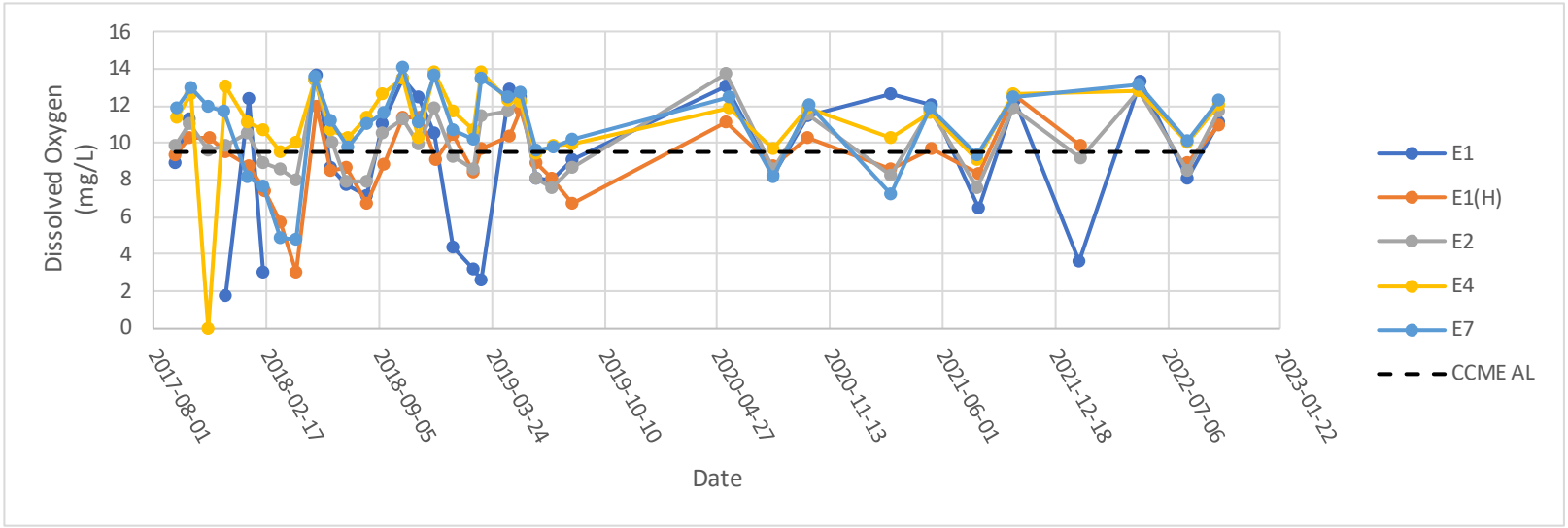


Figure 42. Dissolved oxygen concentrations at Clinton Creek sites E1, E1(H), E2, E4, and E7 between September 2017 and October 2022.

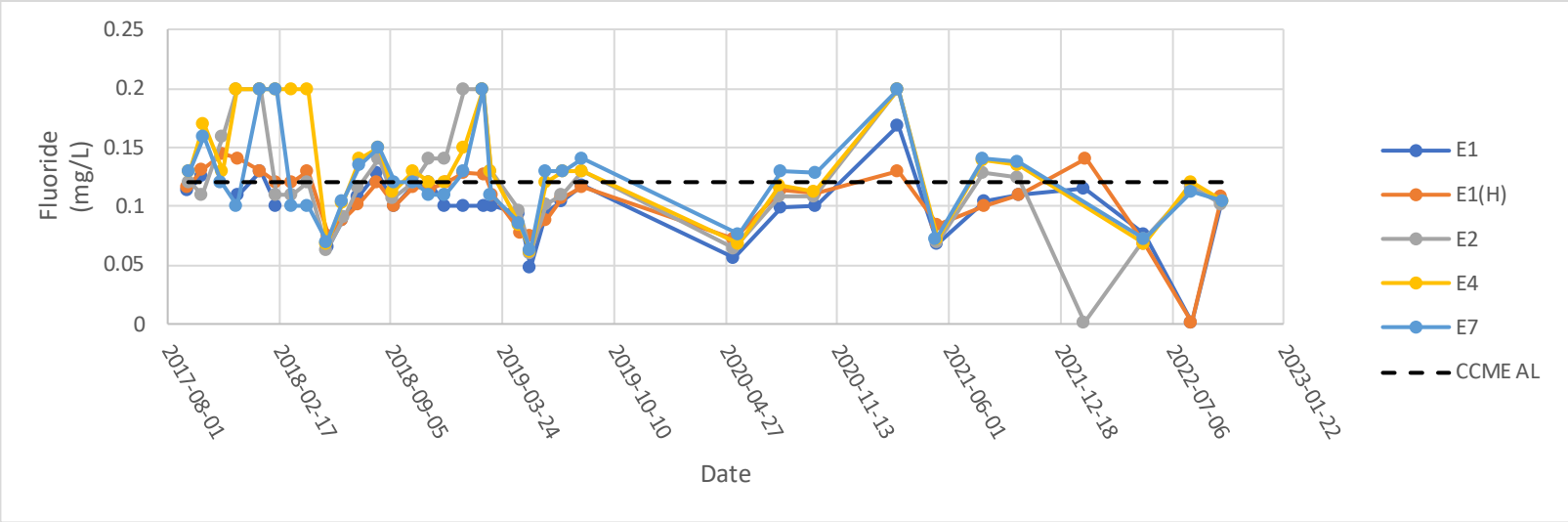


Figure 43. Fluoride concentrations at Clinton Creek sites E1, E1(H), E2, E4, and E7 between September 2017 and October 2022.

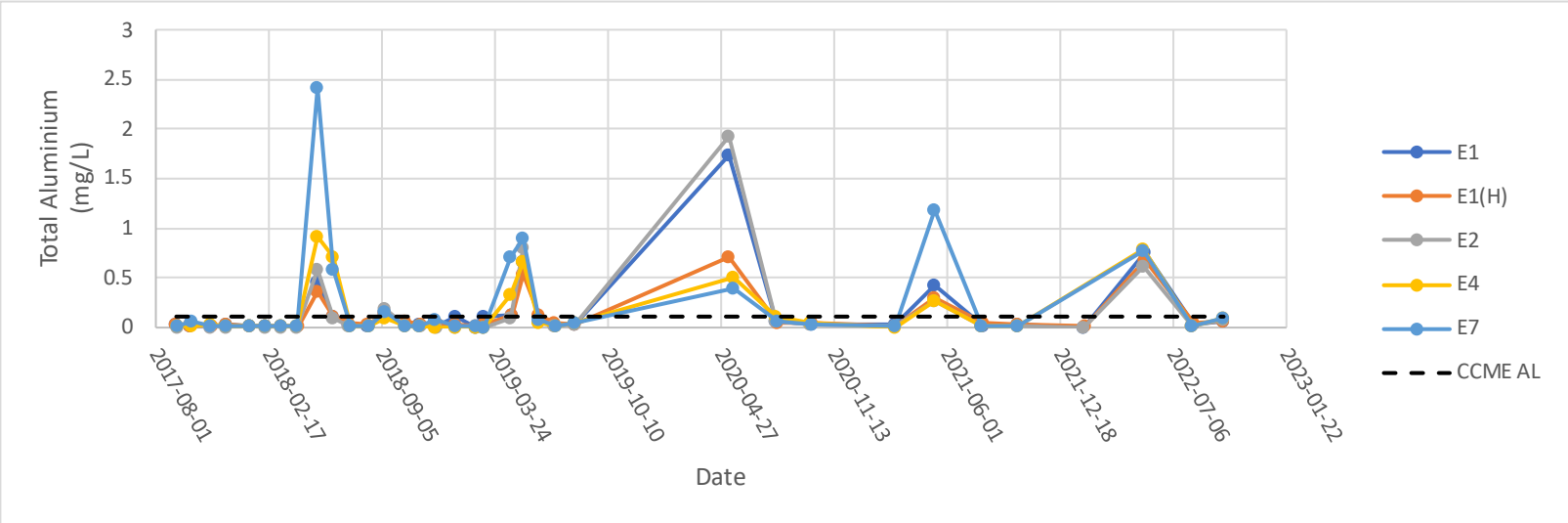


Figure 44. Total aluminium concentrations at Clinton Creek sites E1, E1(H), E2, E4, and E7 between September 2017 and October 2022.

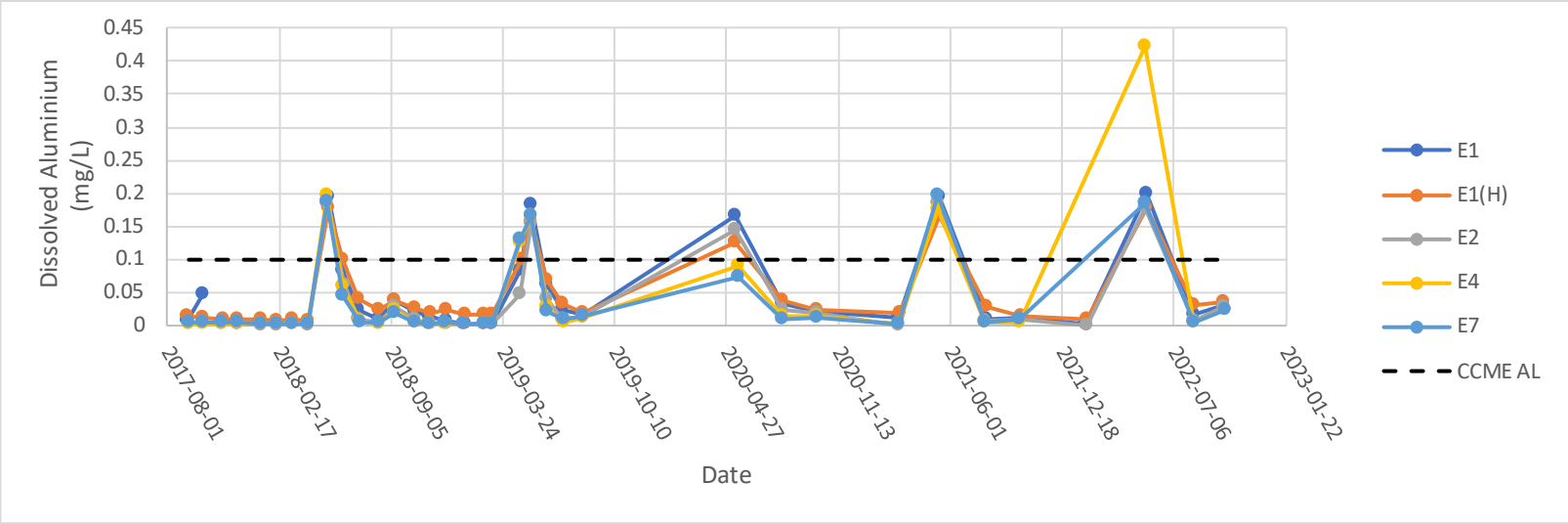


Figure 45. Dissolved aluminium concentrations at Clinton Creek sites E1, E1(H), E2, E4, and E7 between September 2017 and October 2022.

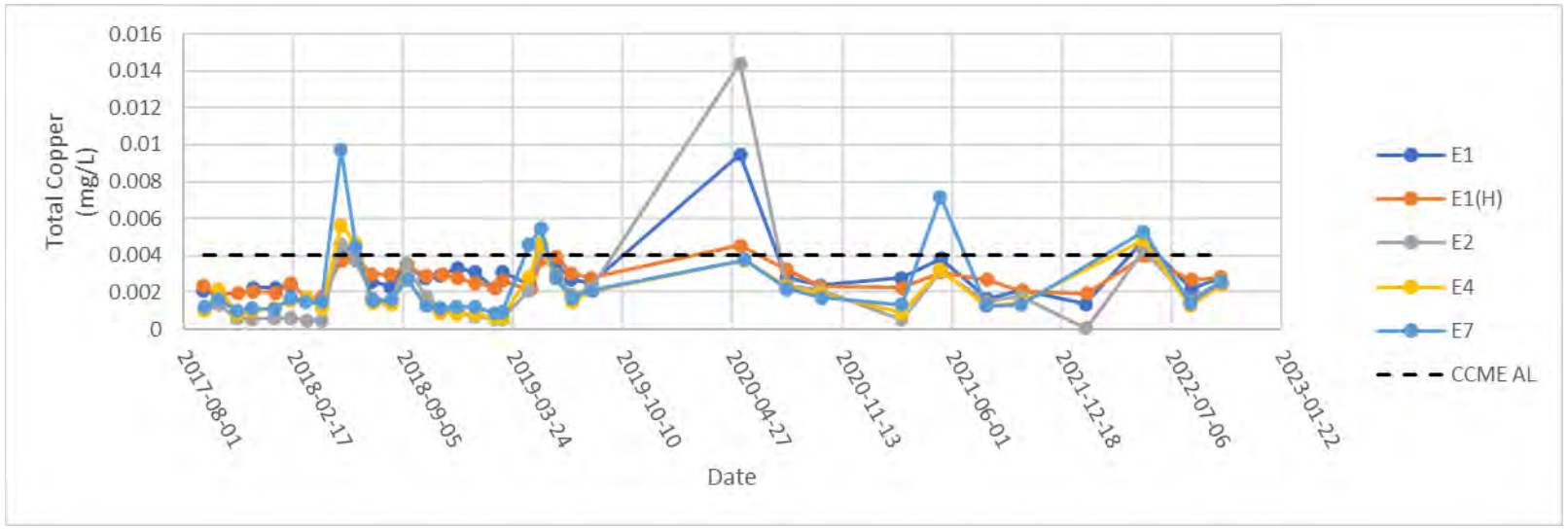


Figure 46. Total copper concentrations at Clinton Creek sites E1, E1(H), E2, E4, and E7 between September 2017 and October 2022.

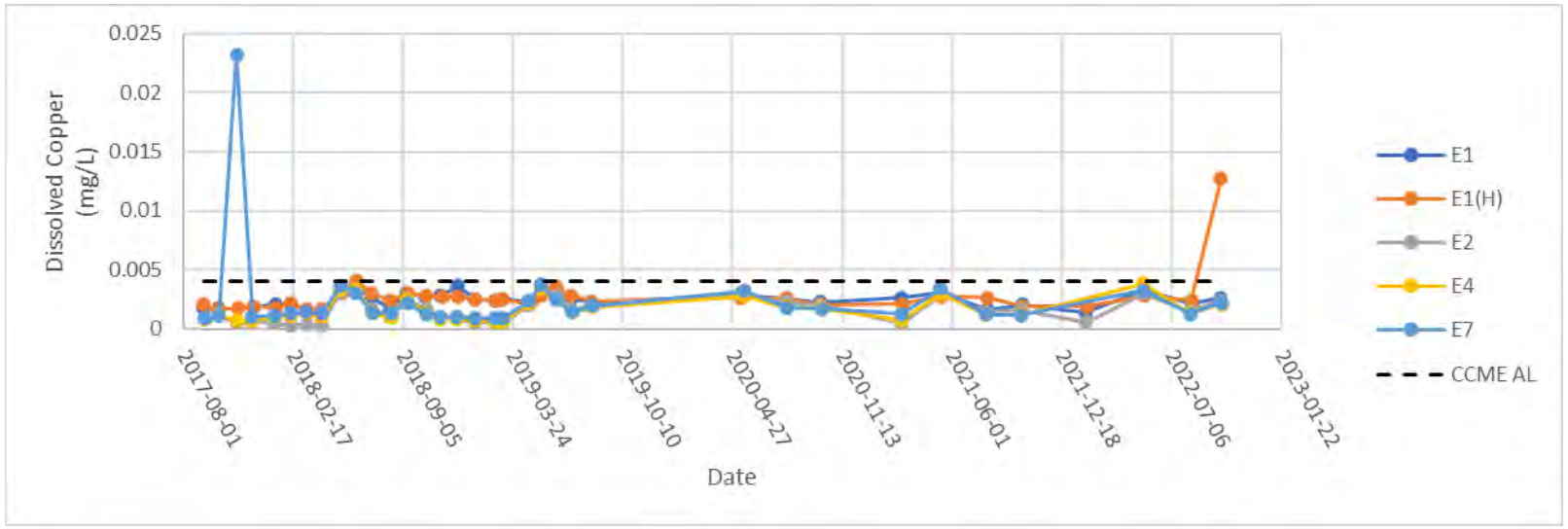


Figure 47. Dissolved copper concentrations at Clinton Creek sites E1, E1(H), E2, E4, and E7between September 2017 and October 2022.

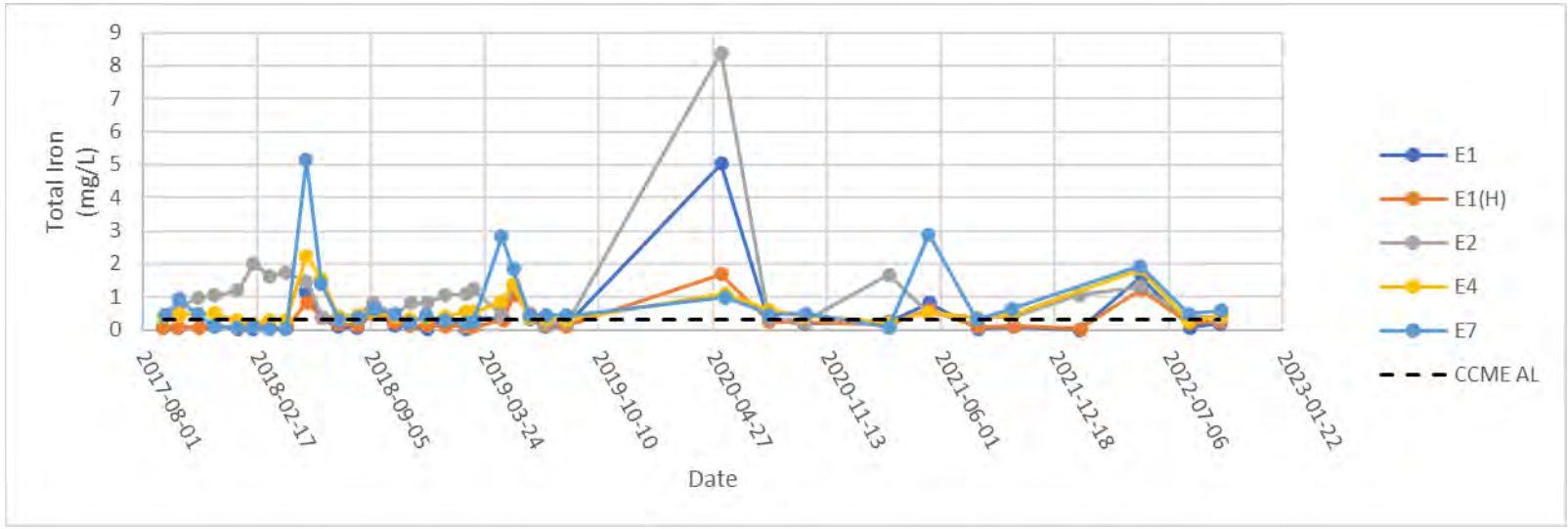


Figure 48. Total iron concentrations at Clinton Creek sites E1, E1(H), E2, E4, and E7 between September 2017 and October 2022.

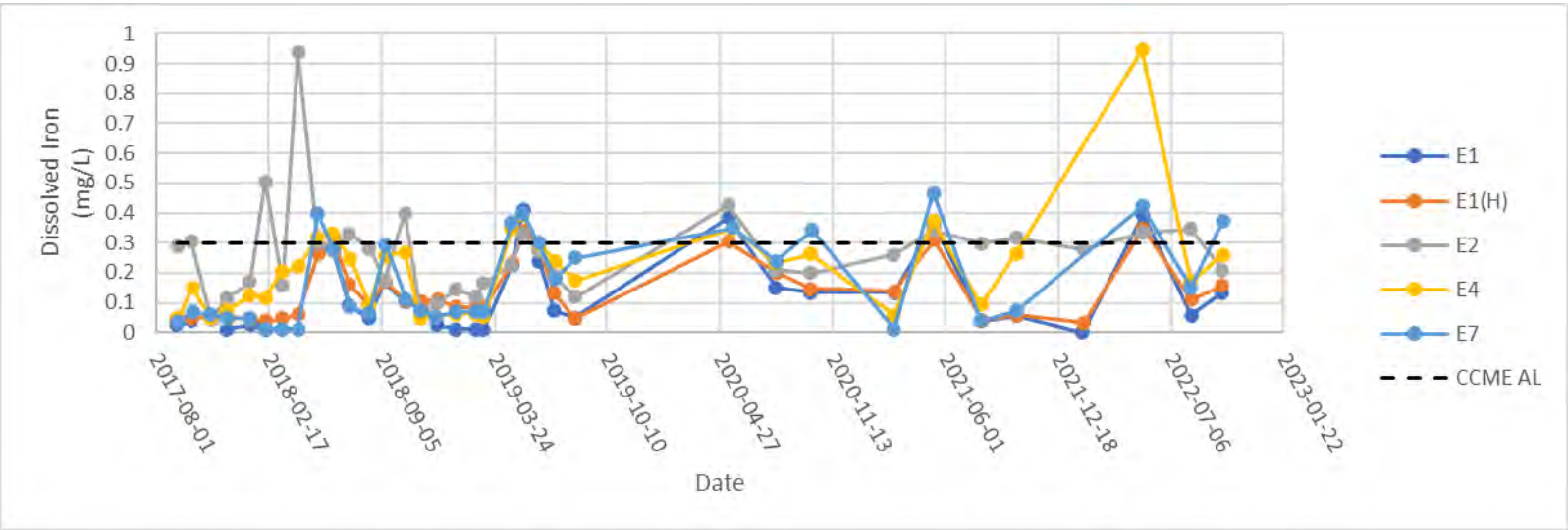


Figure 49. Dissolved iron concentrations at Clinton Creek sites E1, E1(H), E2, E4, and E7 between September 2017 and October 2022.

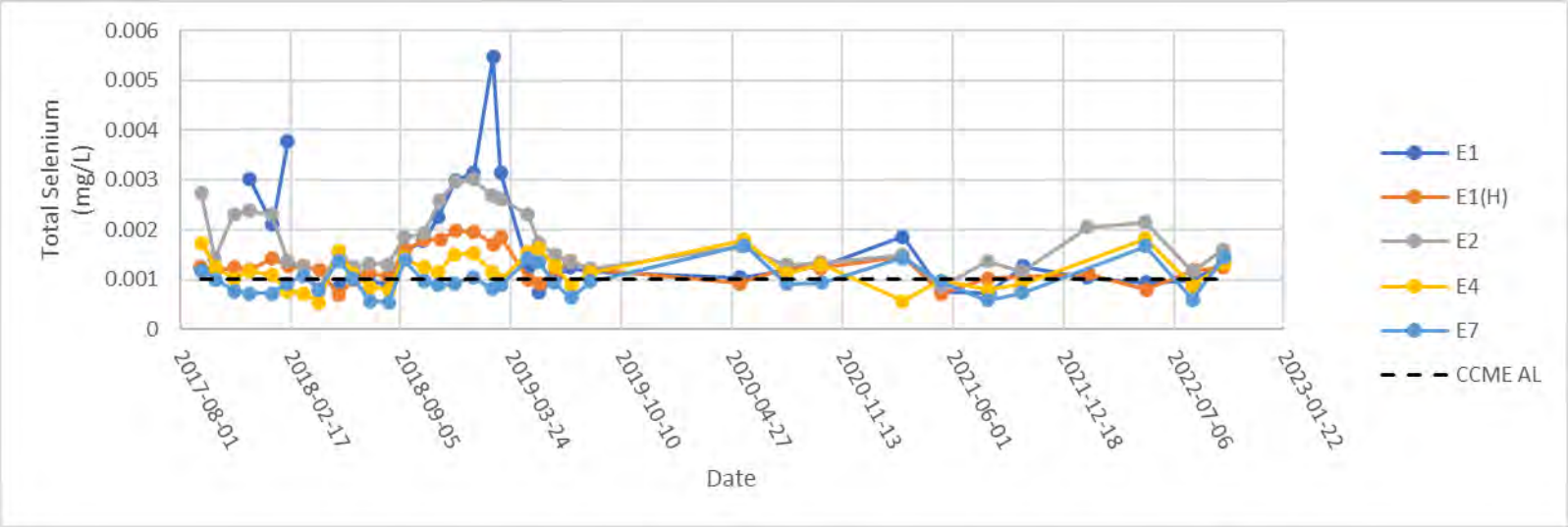


Figure 50. Total selenium concentrations at Clinton Creek sites E1, E1(H), E2, E4, and E7 between September 2017 and October 2022.

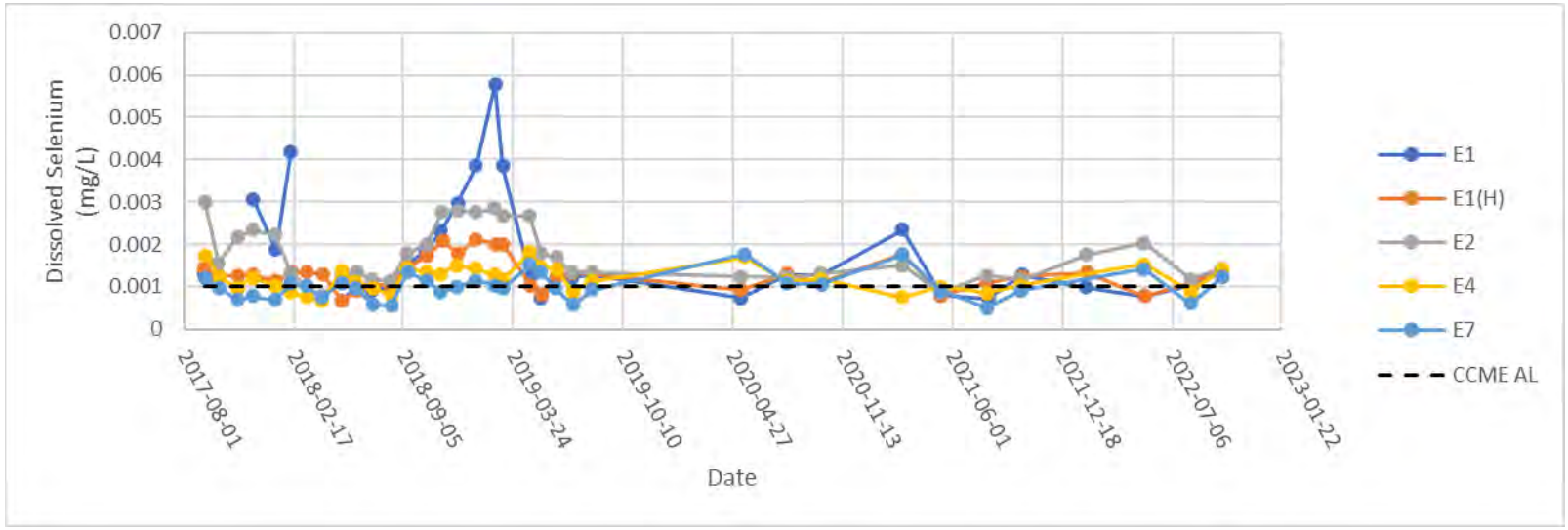


Figure 51. Dissolved selenium concentrations at Clinton Creek sites E1, E1(H), E2, E4, and E7 between September 2017 and October 2022.

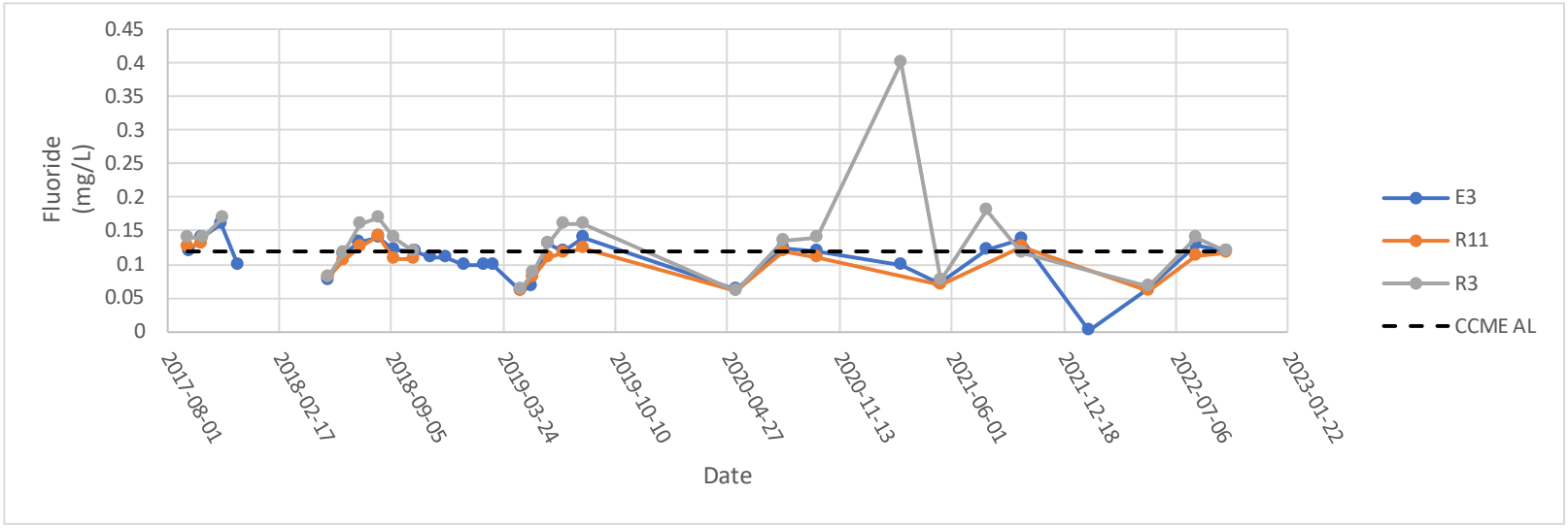


Figure 52. Sulphate concentrations at Wolverine Creek Sites E3, R11, and R3 between September 2017 and October 2022.

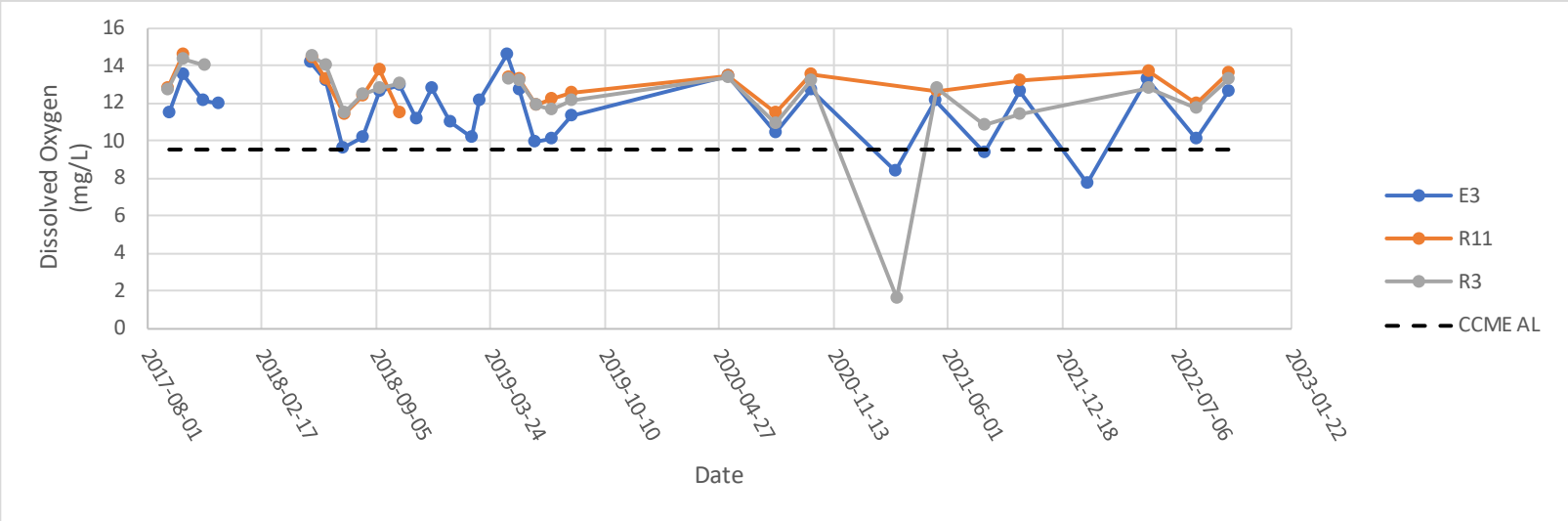


Figure 53. Dissolved oxygen concentrations at Wolverine Creek Sites E3, R11, and R3 between September 2017 and October 2022.

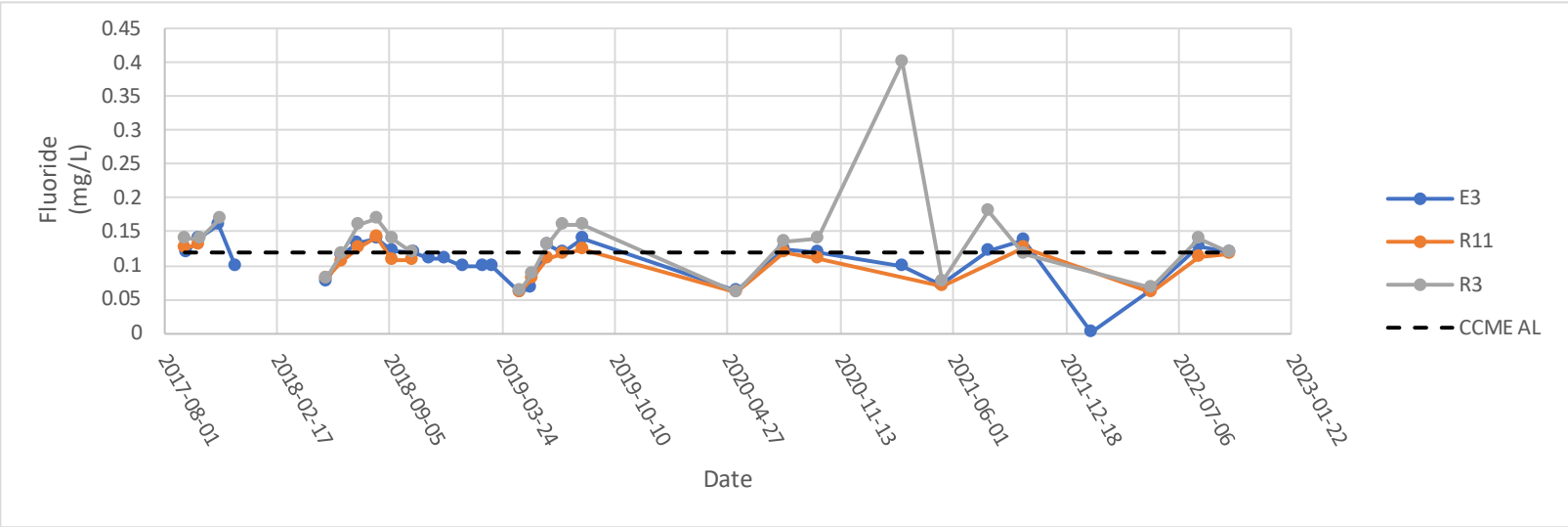


Figure 54. Fluoride concentrations at Wolverine Creek Sites E3, R11, and R3 between September 2017 and October 2022.

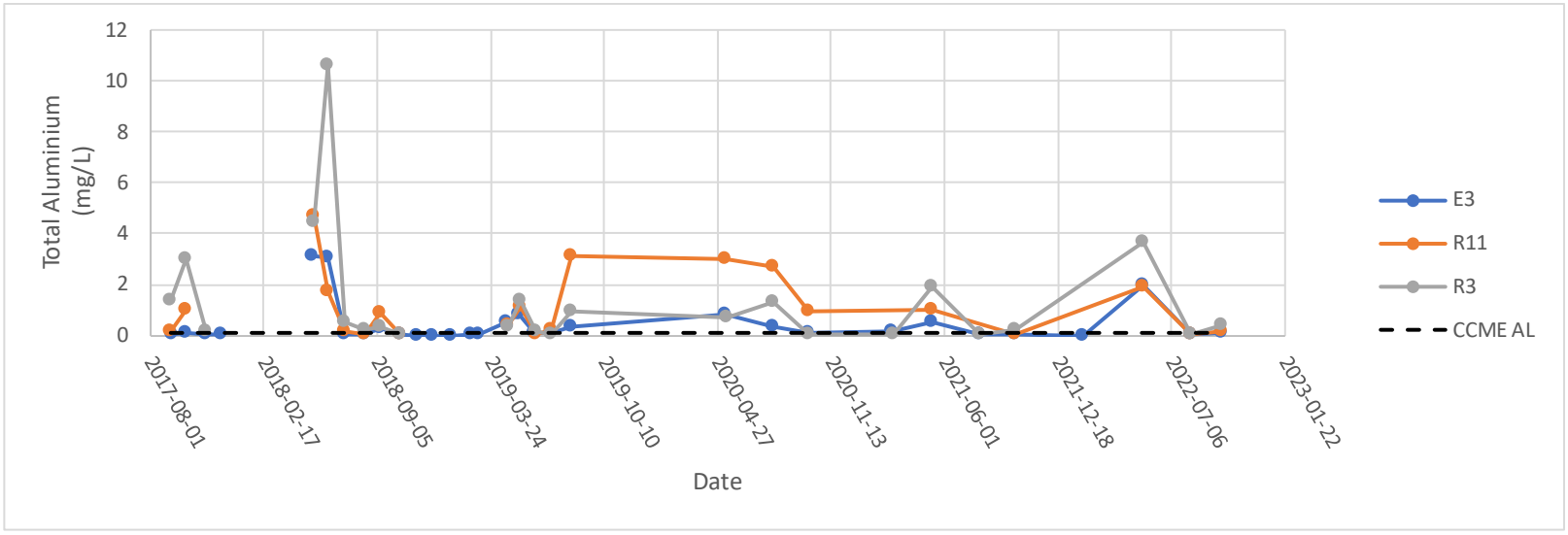


Figure 55. Total aluminium concentrations at Wolverine Creek Sites E3, R11, and R3 between September 2017 and October 2022.

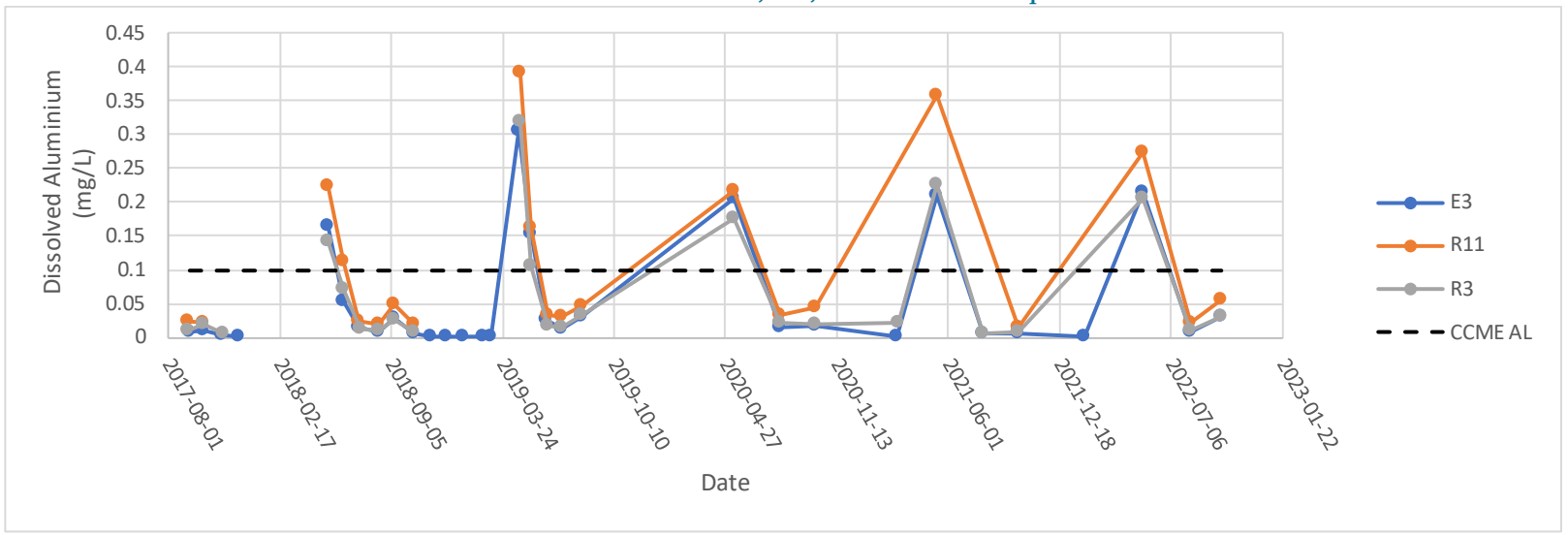


Figure 56. Dissolved aluminium concentrations at Wolverine Creek Sites E3, R11, and R3 between September 2017 and October 2022.

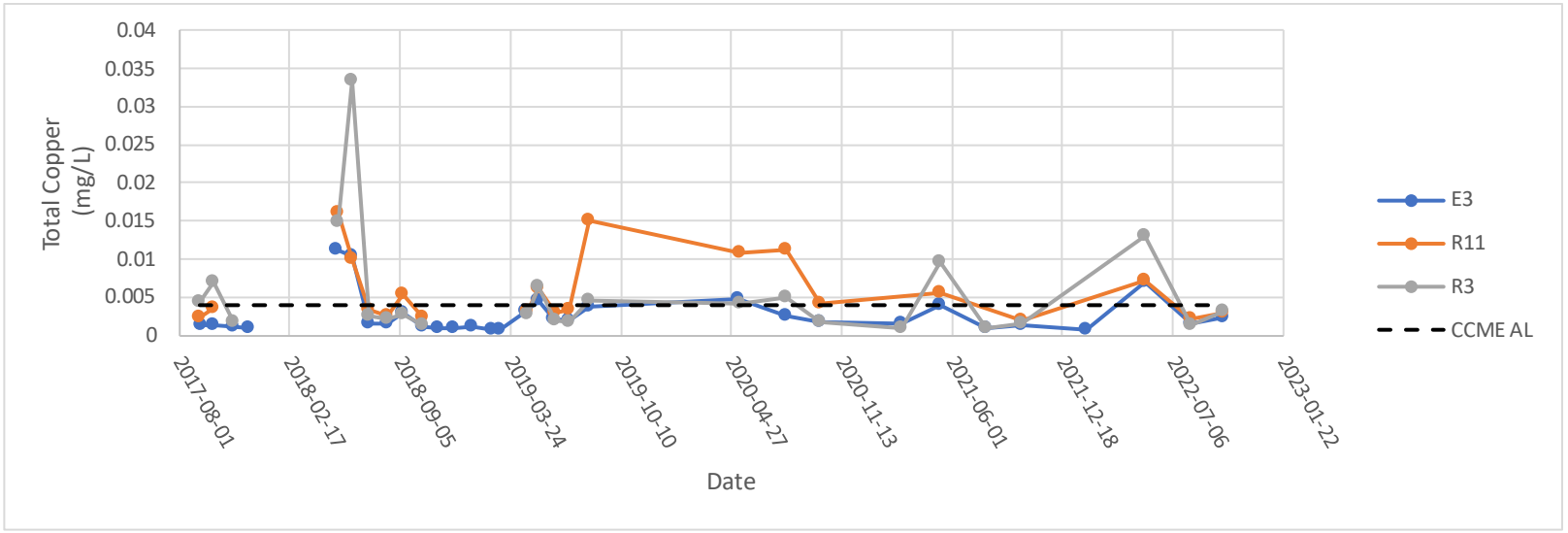


Figure 57. Total copper concentrations at Wolverine Creek Sites E3, R11, and R3 between September 2017 and October 2022.

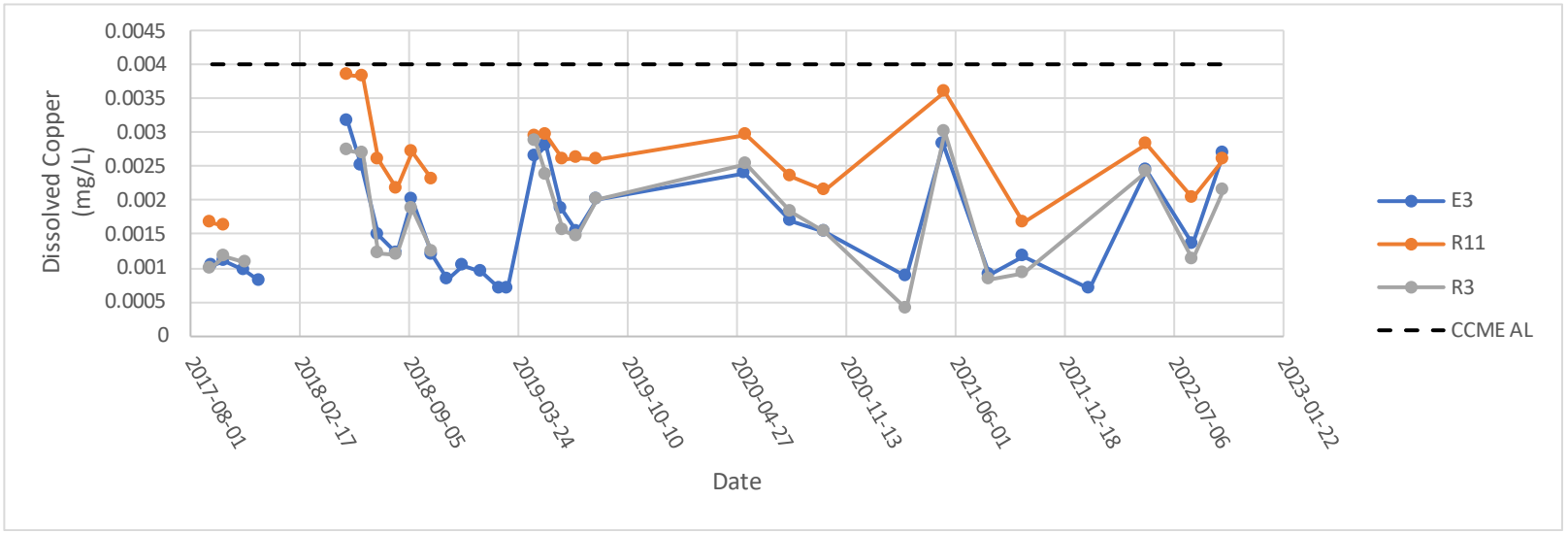


Figure 58. Dissolved copper concentrations at Wolverine Creek Sites E3, R11, and R3 between September 2017 and October 2022.

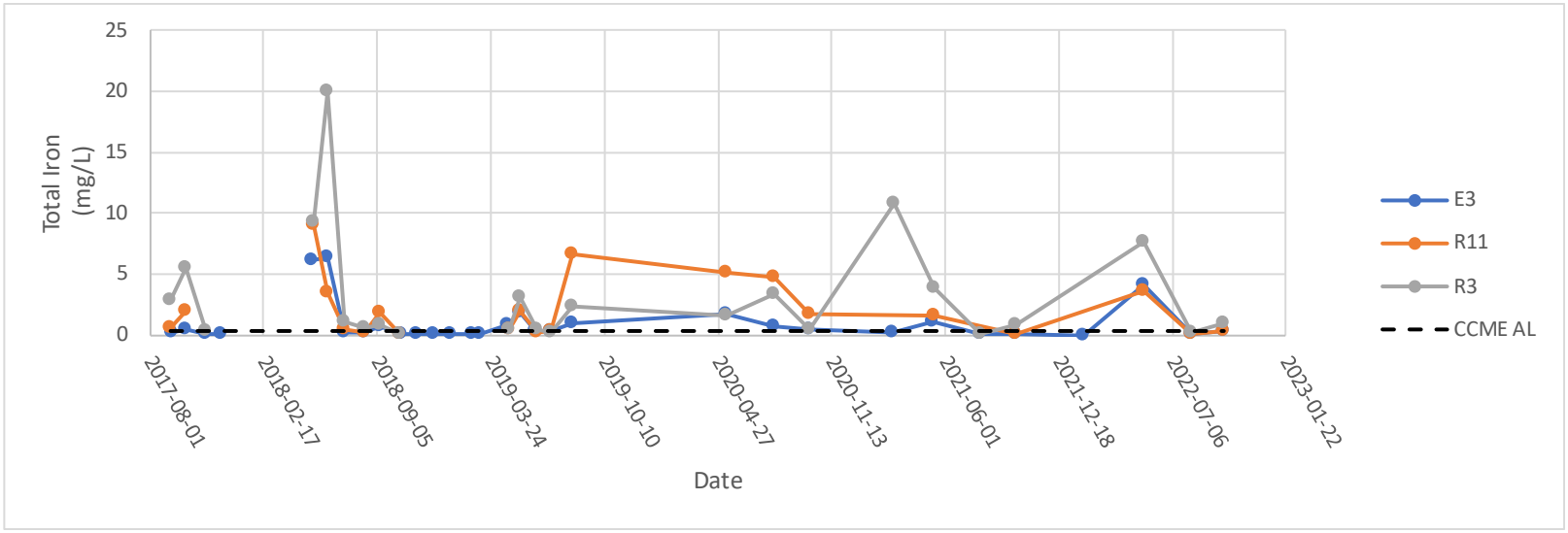


Figure 59. Total iron concentrations at Wolverine Creek Sites E3, R11, and R3 between September 2017 and October 2022.

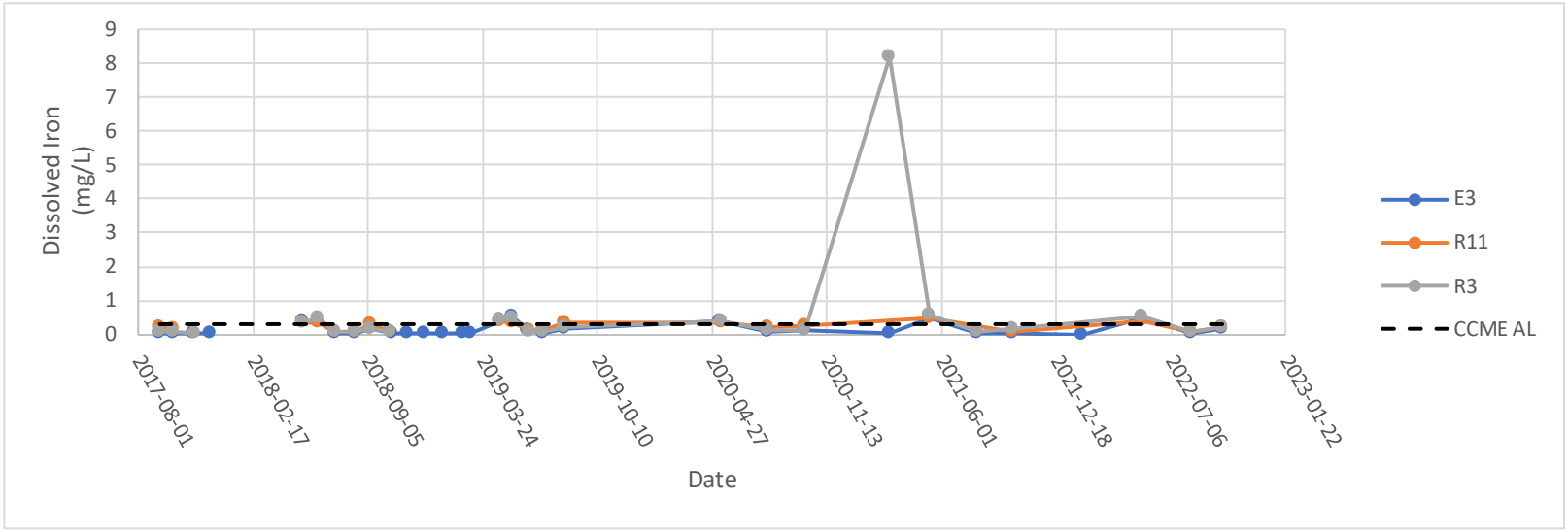


Figure 60. Dissolved iron concentrations at Wolverine Creek Sites E3, R11, and R3 between September 2017 and October 2022.

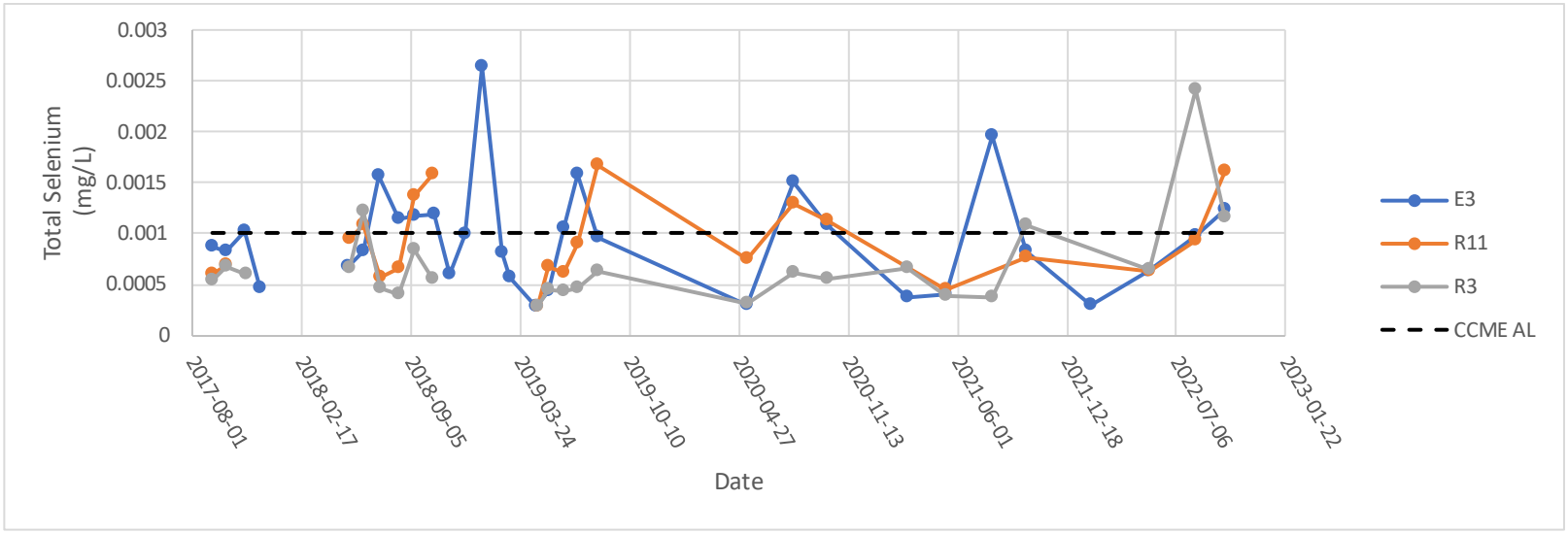


Figure 61. Total selenium concentrations at Wolverine Creek Sites E3, R11, and R3 between September 2017 and October 2022.

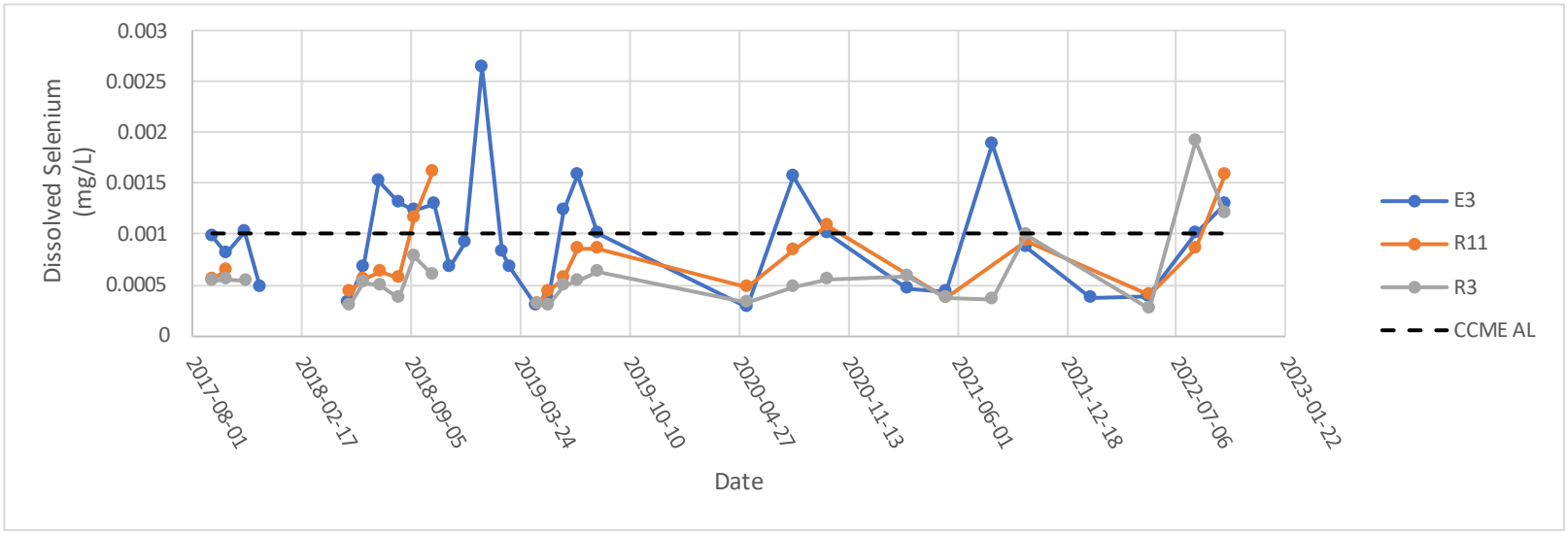


Figure 62. Dissolved selenium concentrations at Wolverine Creek Sites E3, R11, and R3 between September 2017 and October 2022.

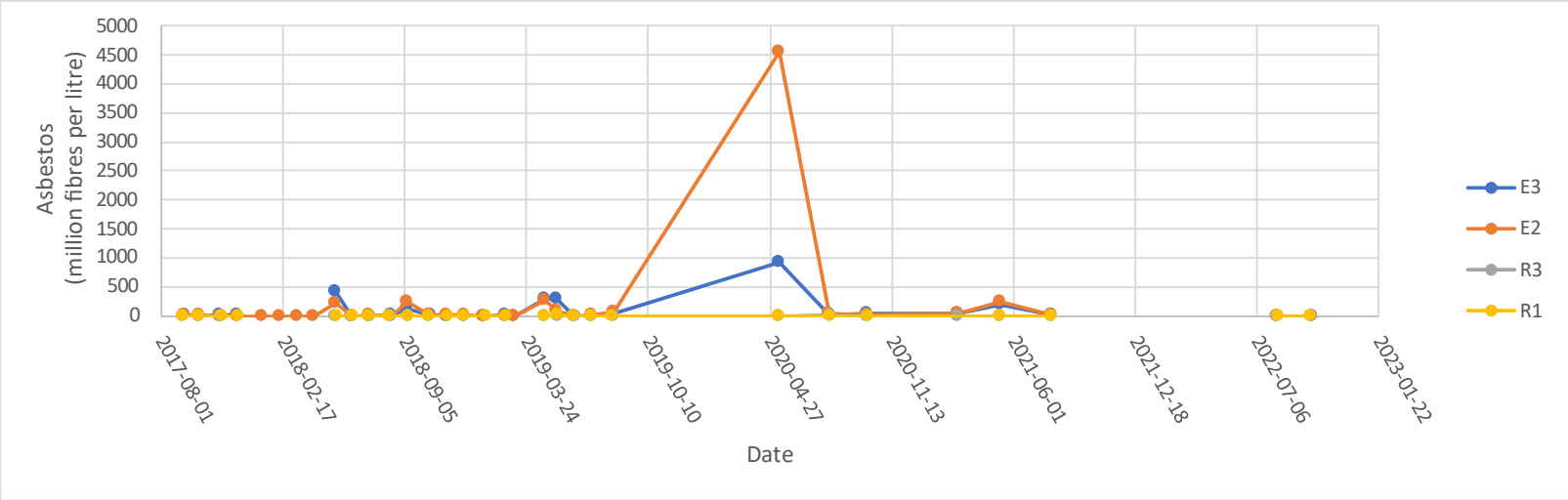


Figure 63. Total asbestos concentrations at R3, E2, R3, and R1 between September 2017 and October 2022.

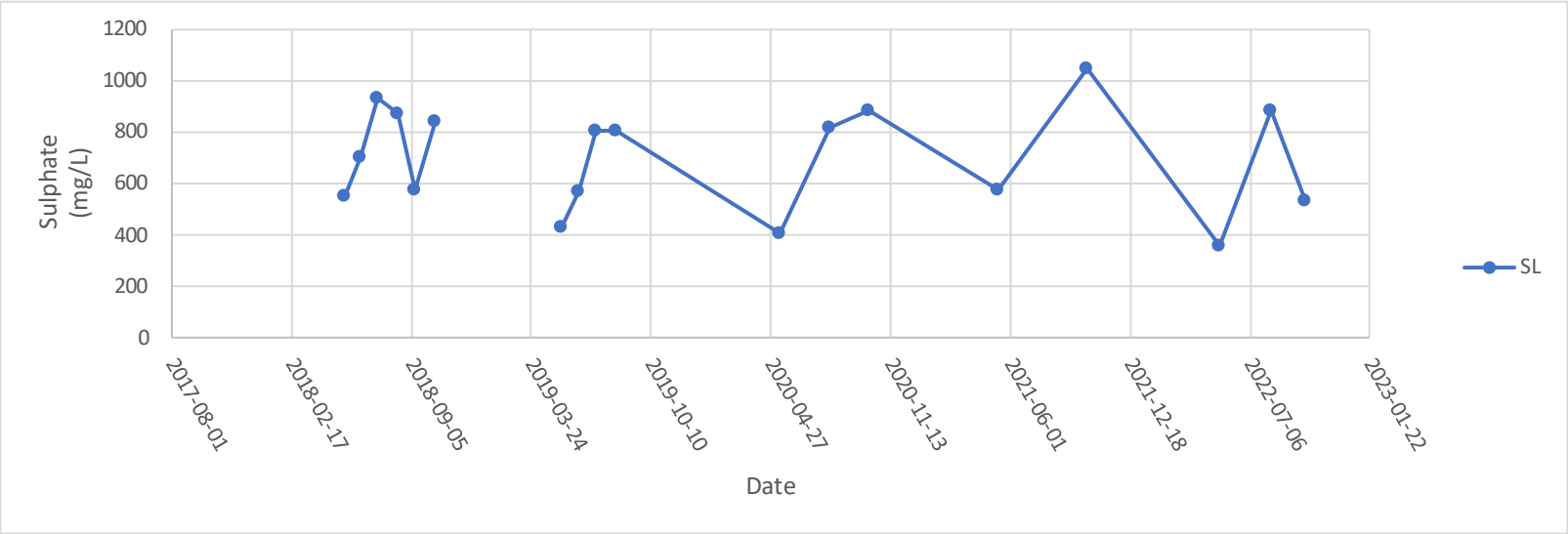


Figure 64. Sulphate concentrations at Snowshoe Lake site SL between September 2017 and October 2022.

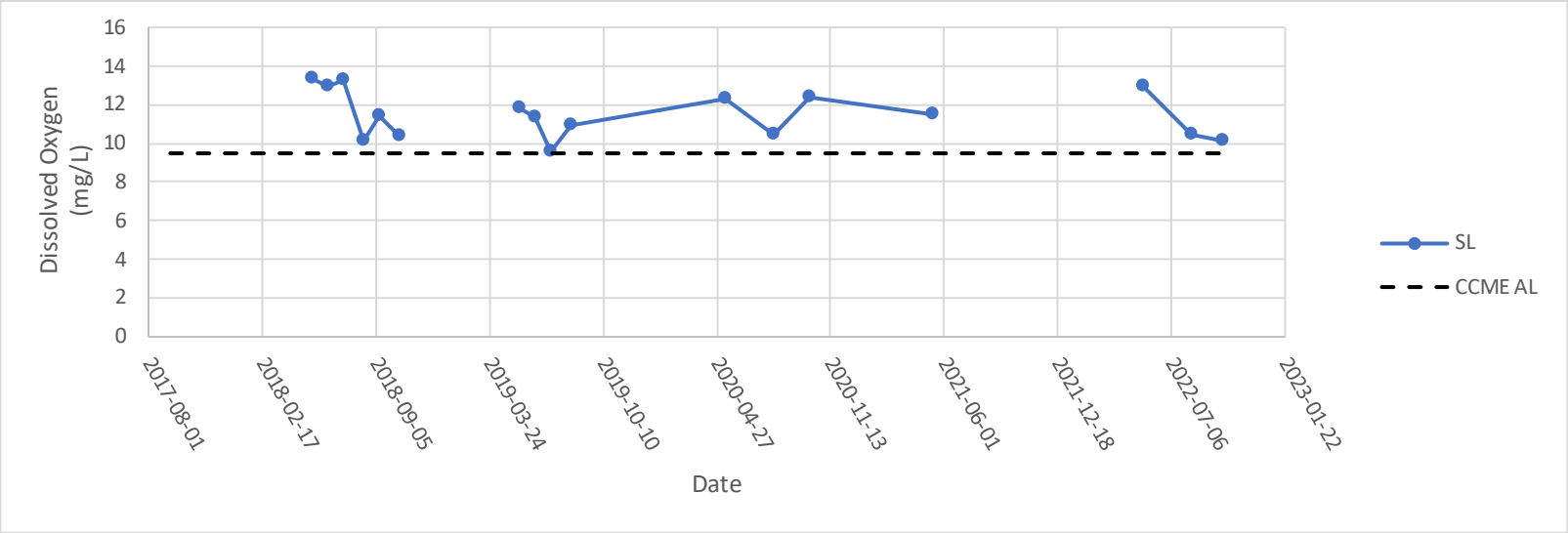


Figure 65. Dissolved oxygen concentrations at Snowshoe Lake site SL between September 2017 and October 2022.

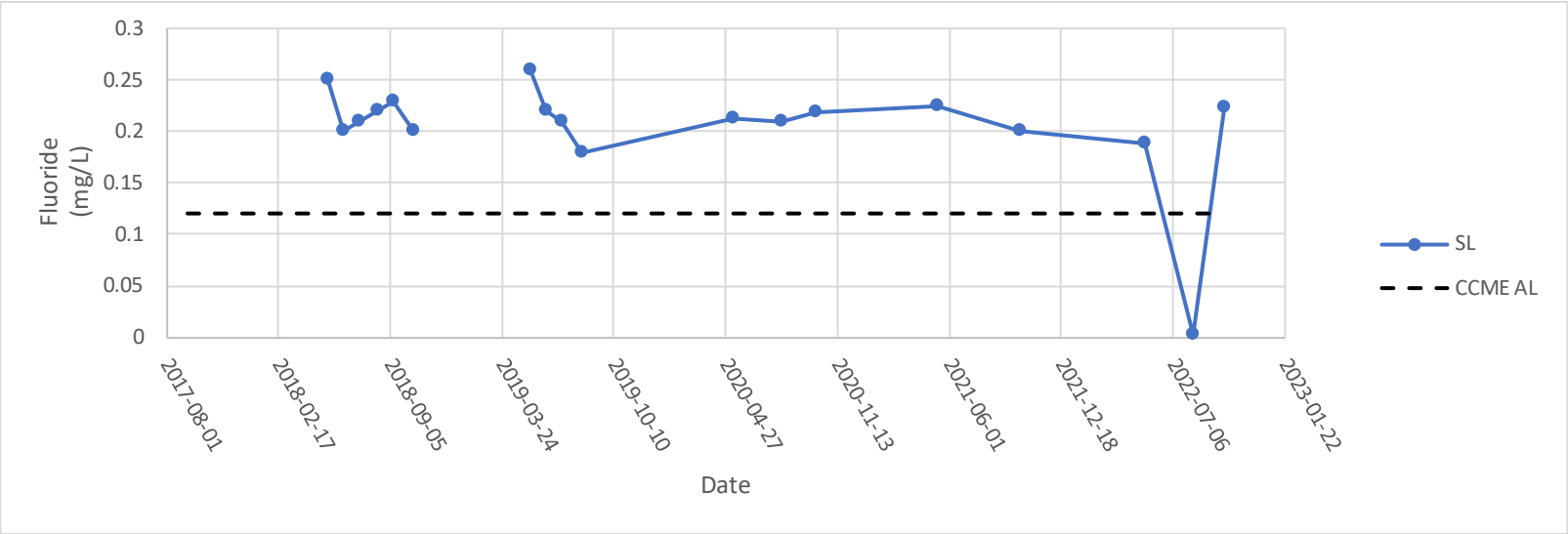


Figure 66. Fluoride concentrations at Snowshoe Lake site SL between September 2017 and October 2022.

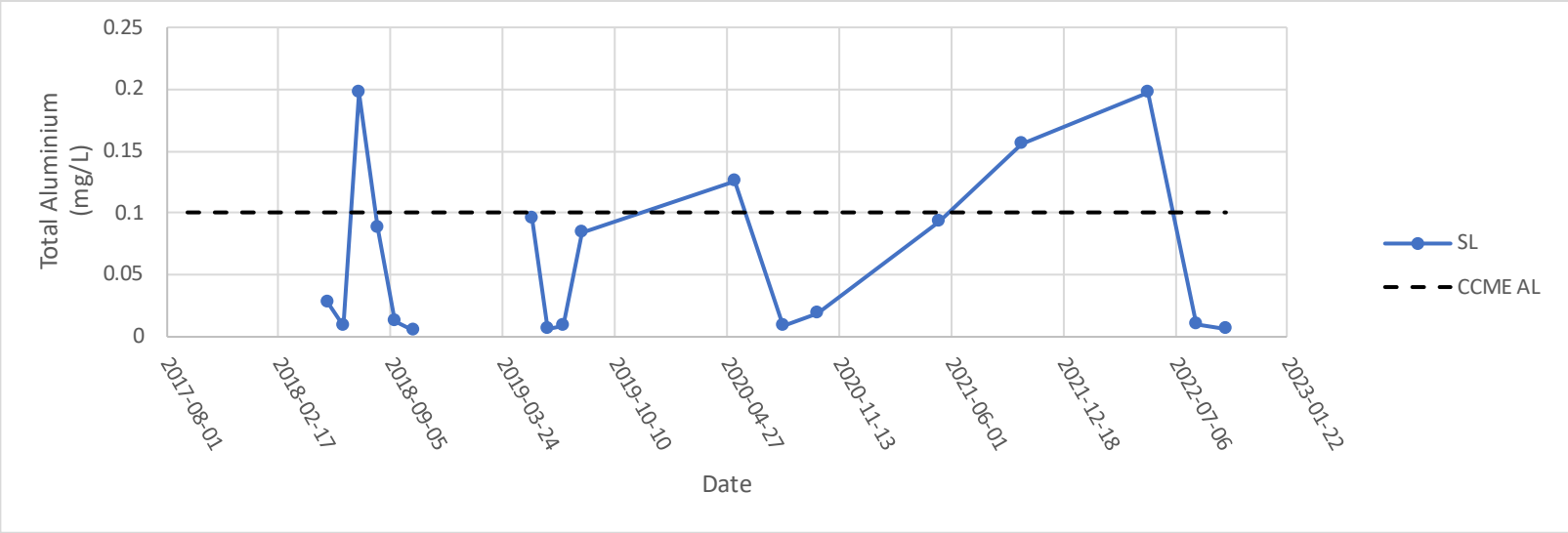


Figure 67. Total aluminium concentrations at Snowshoe Lake site SL between September 2017 and October 2022.

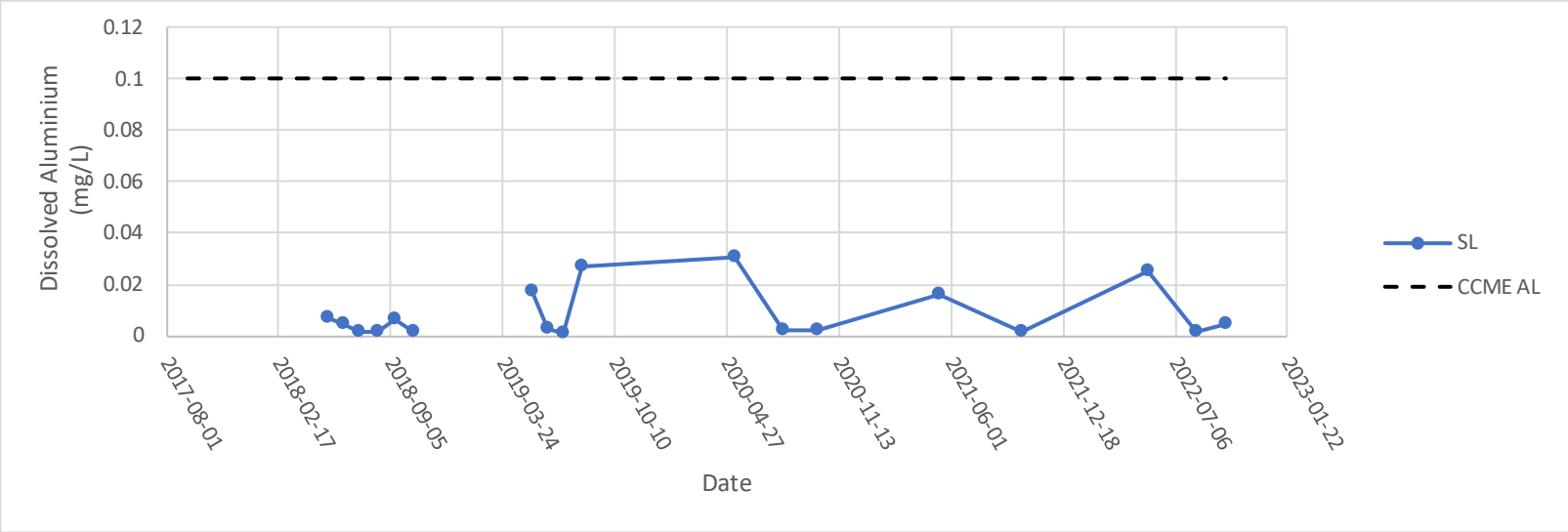


Figure 68. Dissolved aluminium concentrations at Snowshoe Lake site SL between September 2017 and October 2022.

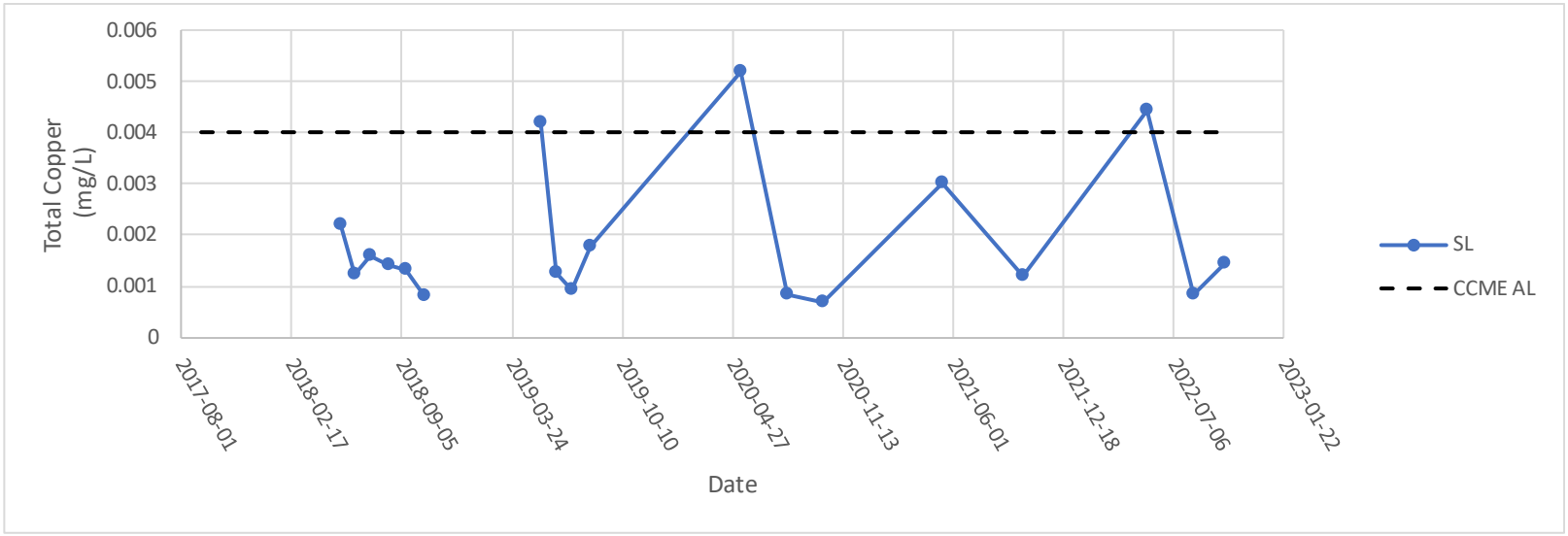


Figure 69. Total copper concentrations at Snowshoe Lake site SL between September 2017 and October 2022.

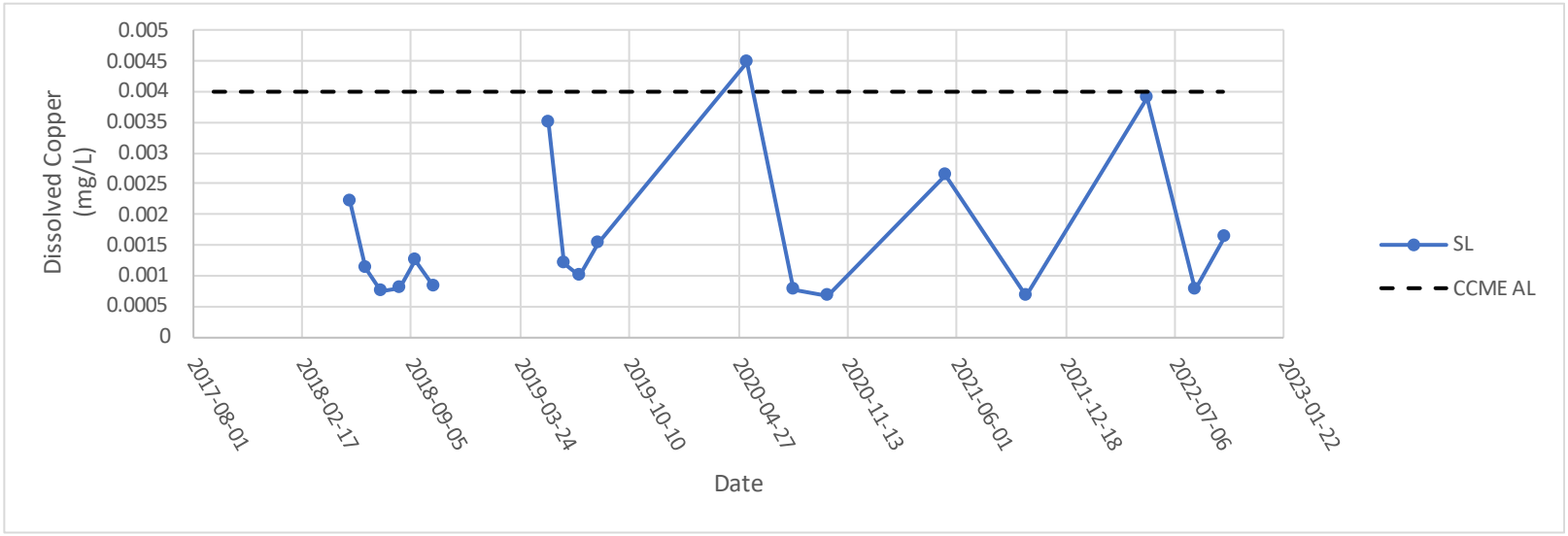


Figure 70. Dissolved copper concentrations at Snowshoe Lake site SL between September 2017 and October 2022.

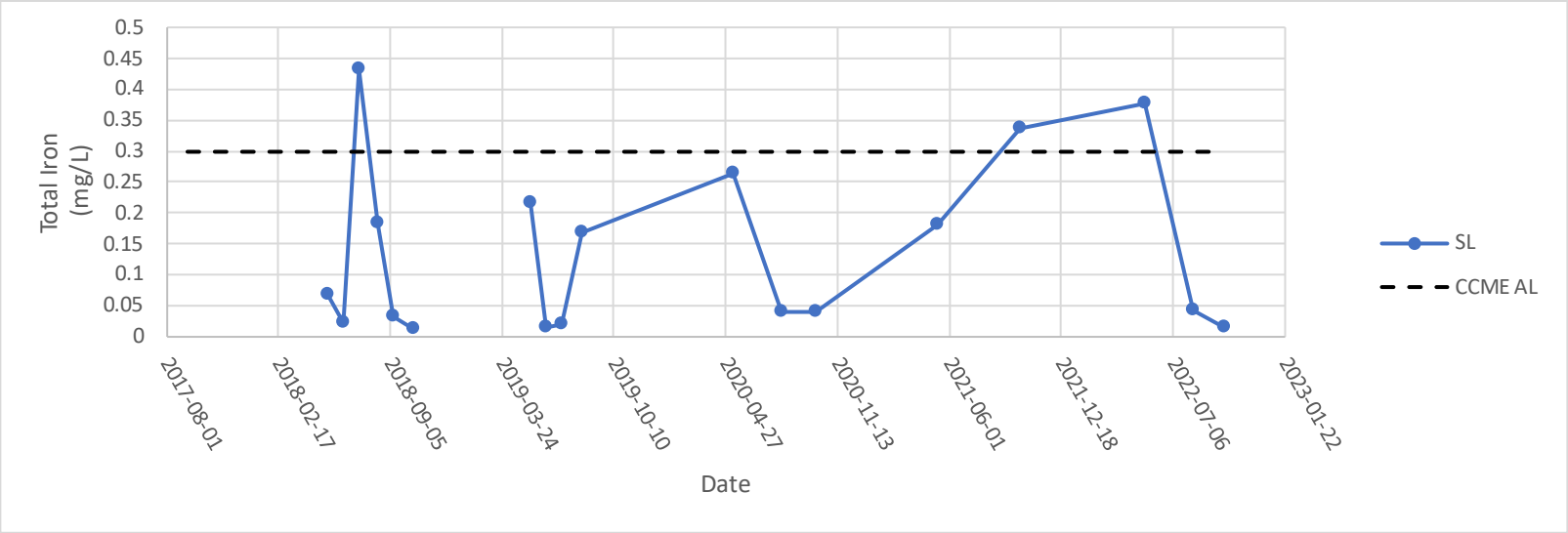


Figure 71. Total iron concentrations at Snowshoe Lake site SL between September 2017 and October 2022.

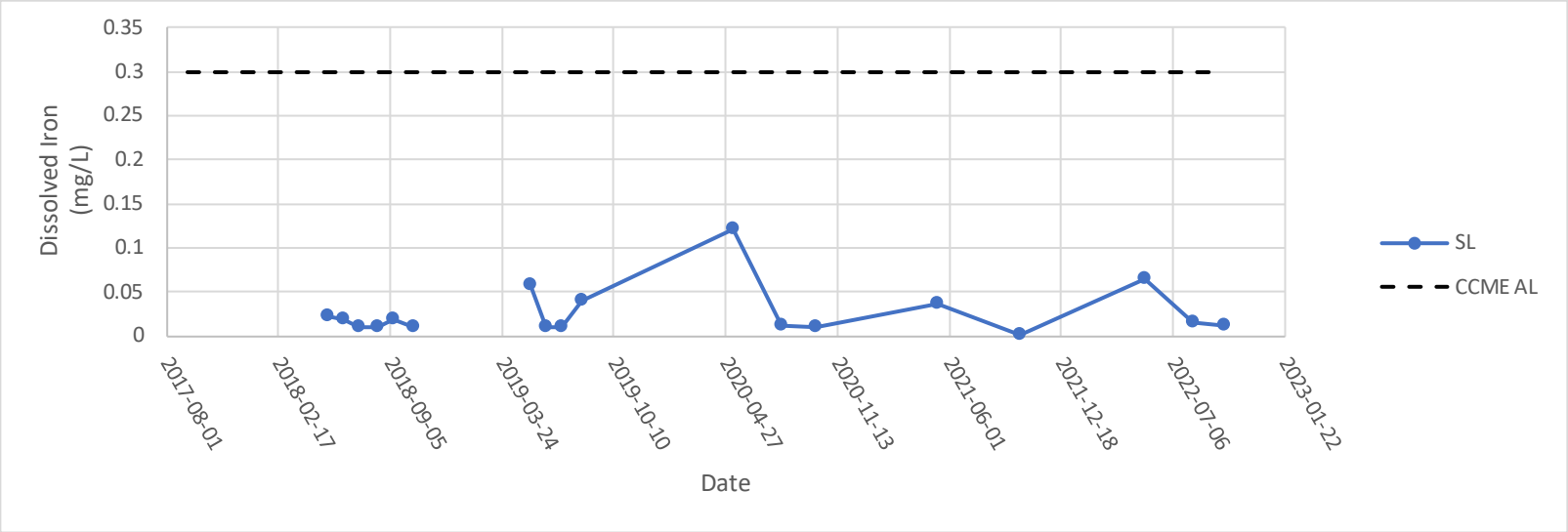


Figure 72. Dissolved iron concentrations at Snowshoe Lake site SL between September 2017 and October 2022.

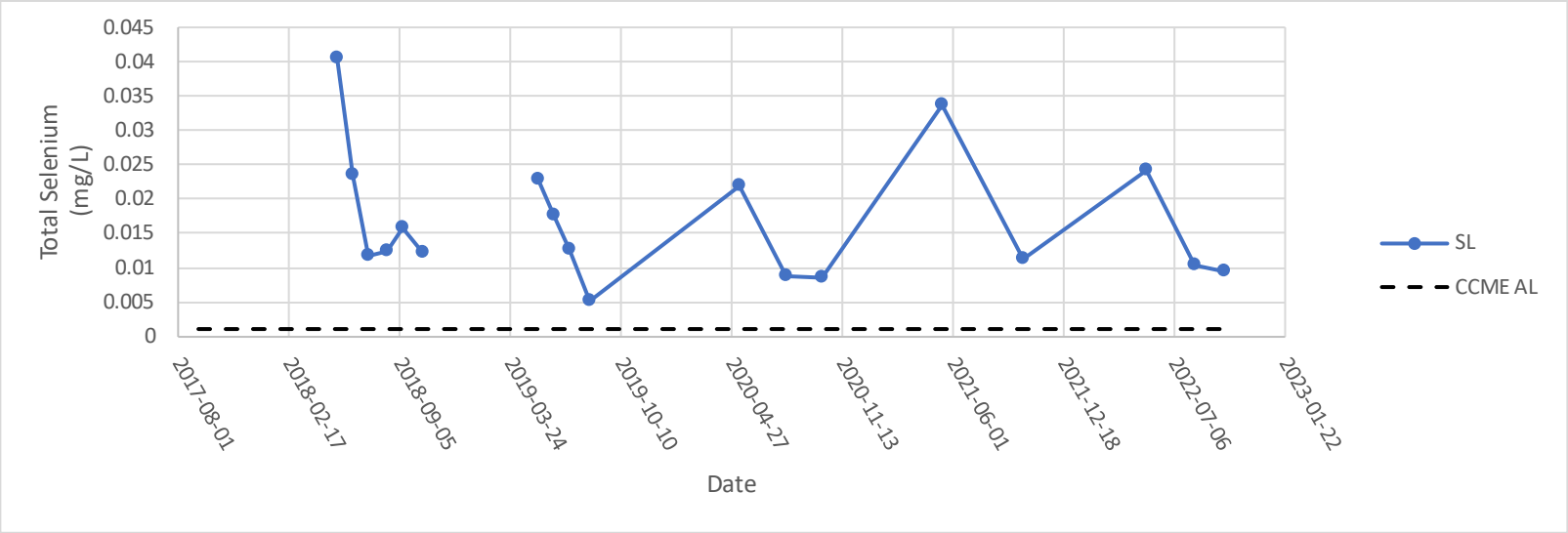


Figure 73. Total selenium concentrations at Snowshoe Lake site SL between September 2017 and October 2022.

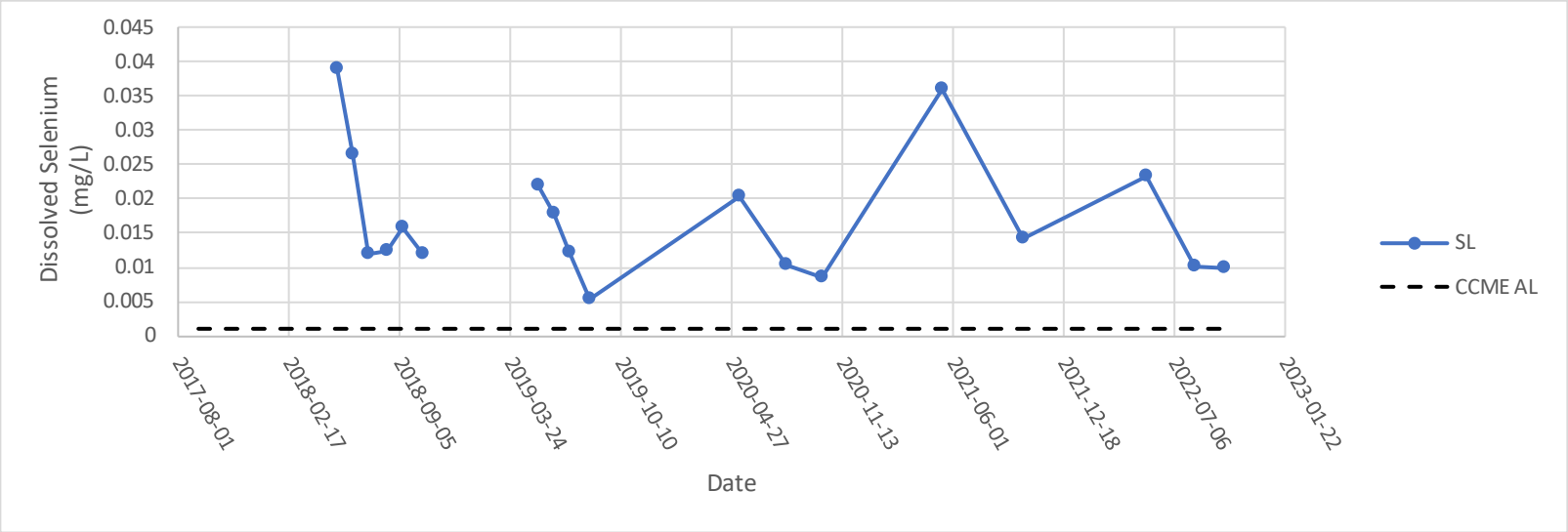


Figure 74. Dissolved selenium concentrations at Snowshoe Lake site SL between September 2017 and October 2022.

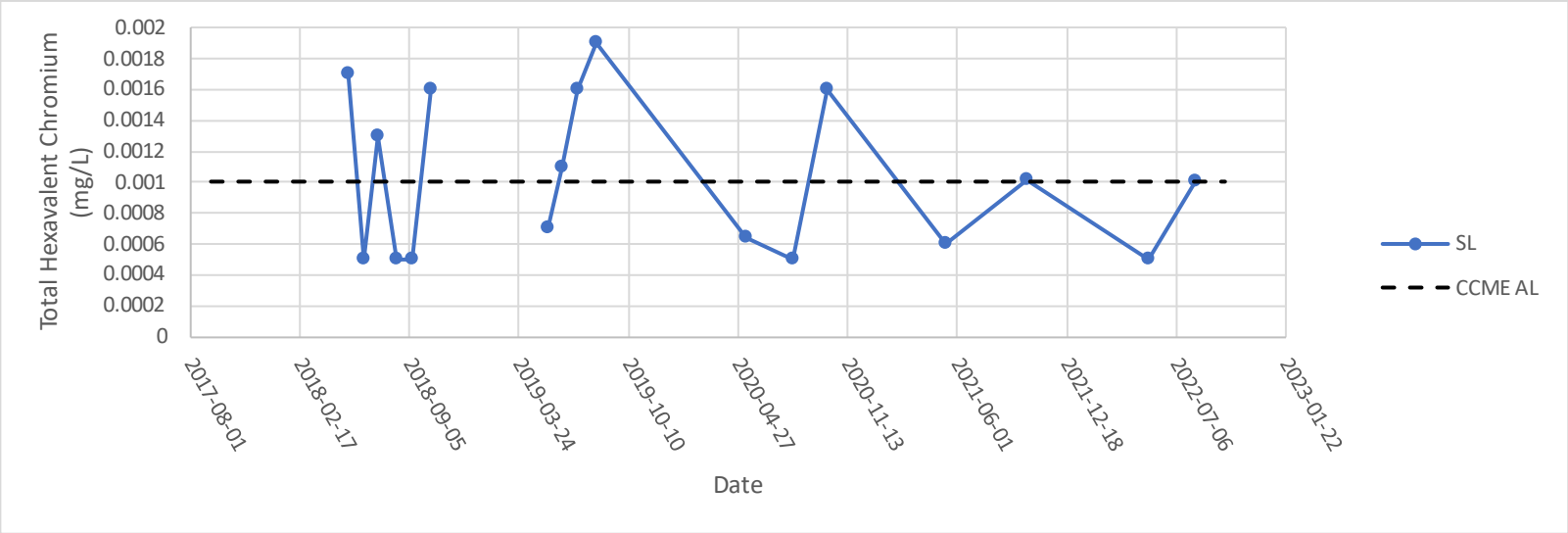


Figure 75. Total hexavalent chromium concentrations at Snowshoe Lake site SL between September 2017 and October 2022.

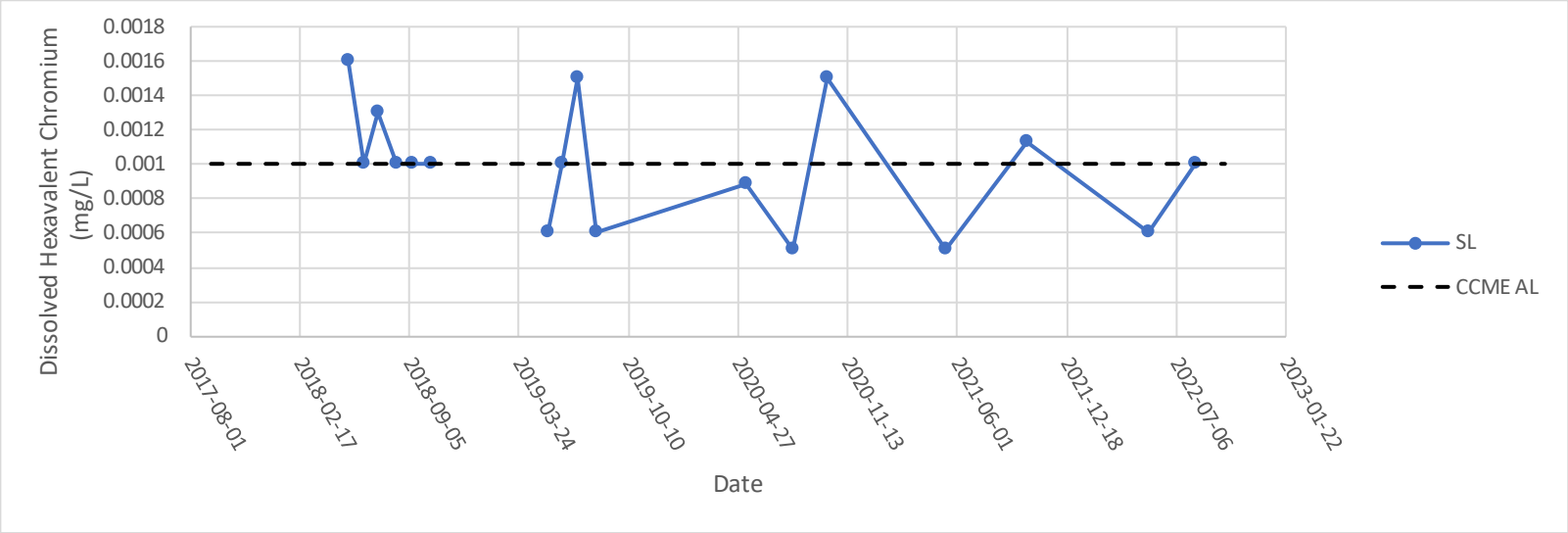


Figure 76. Dissolved hexavalent chromium concentrations at Snowshoe Lake site SL between September 2017 and October 2022.

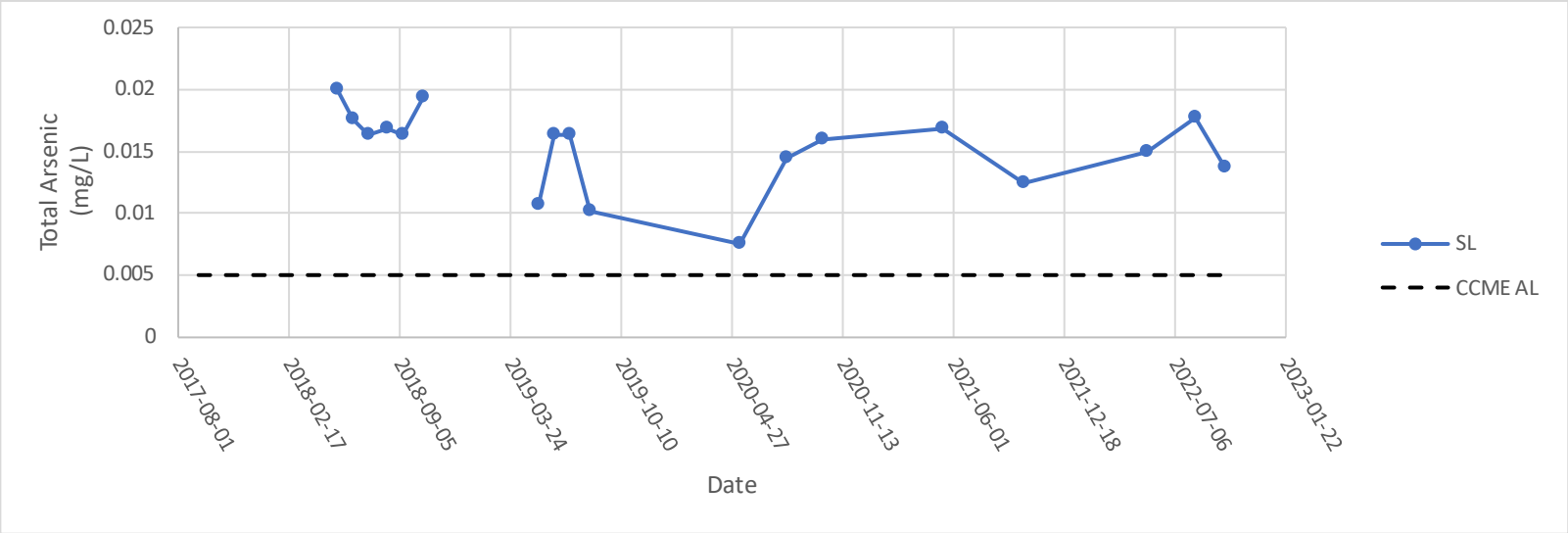
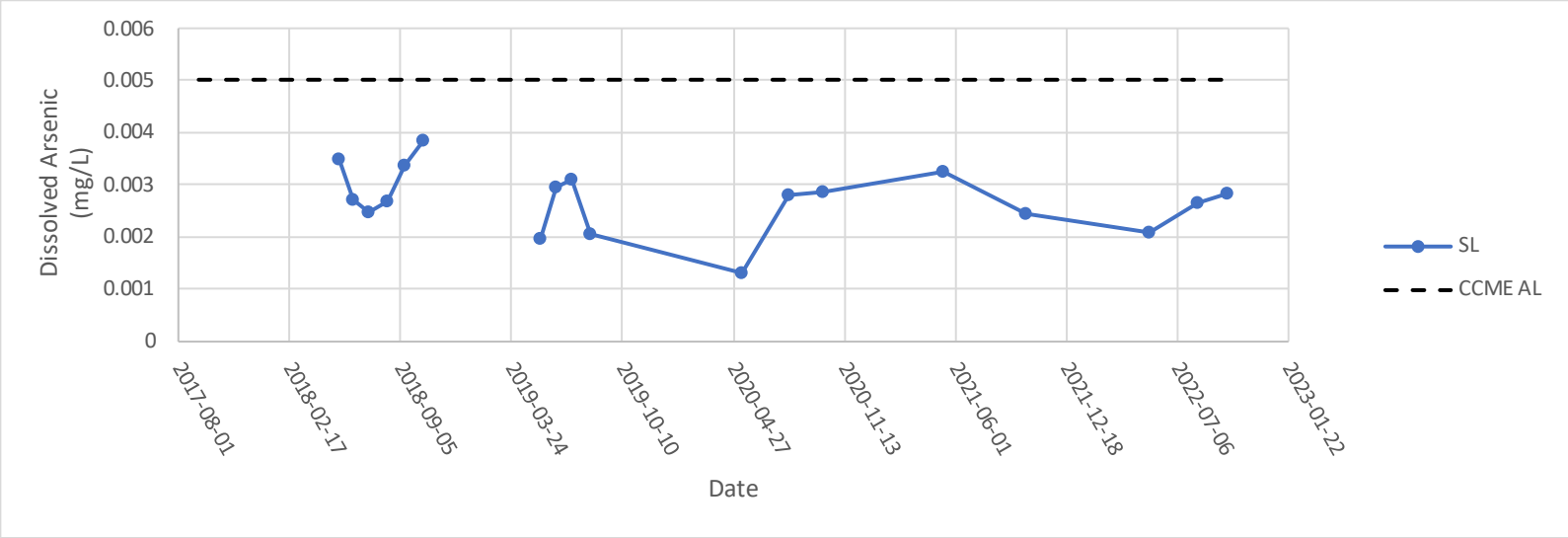


Figure 77. Total arsenic concentrations at Snowshoe Lake site SL between September 2017 and October 2022.



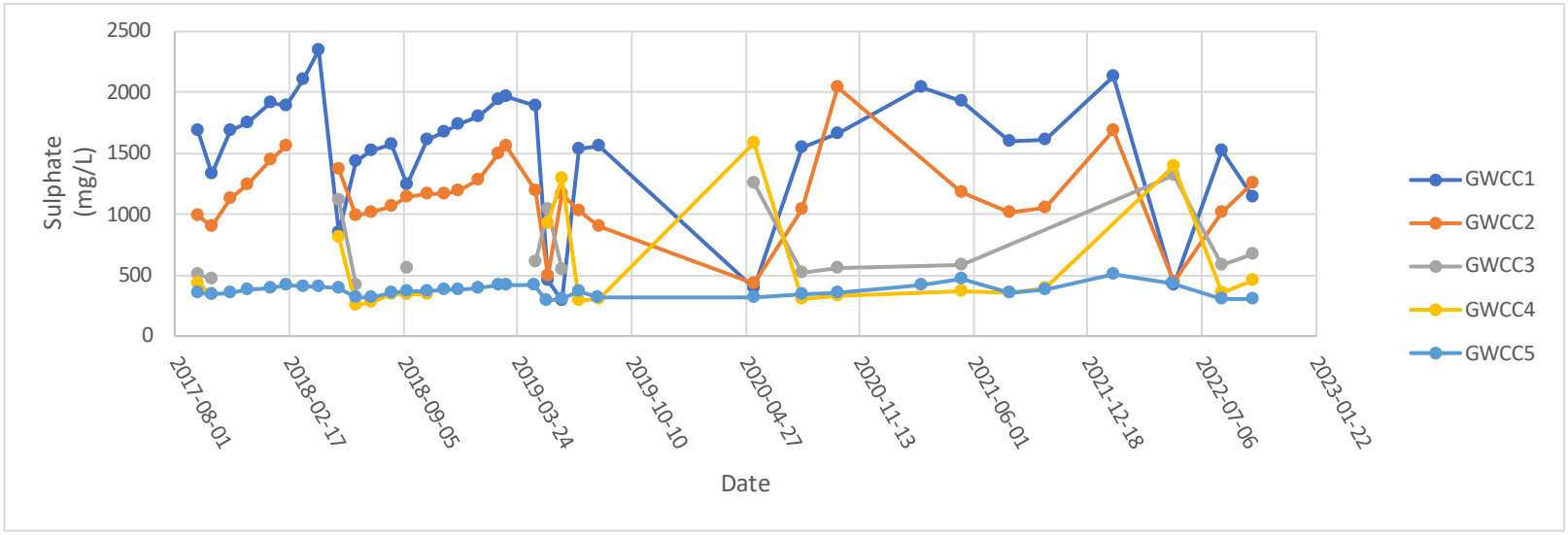


Figure 78. Sulphate concentrations at groundwater seeps sites GWCC1 through GWCC5 between September 2017 and October 2022.

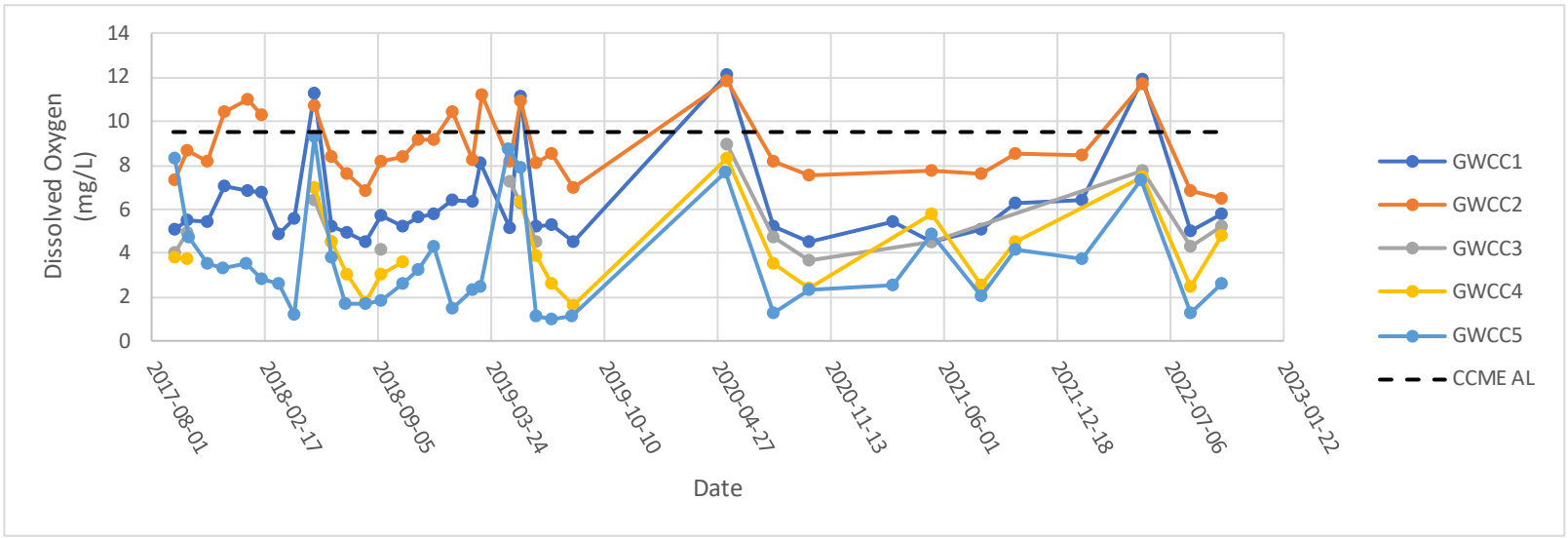


Figure 79. Dissolved oxygen concentrations at groundwater seeps sites GWCC1 through GWCC5 between September 2017 and October 2022.

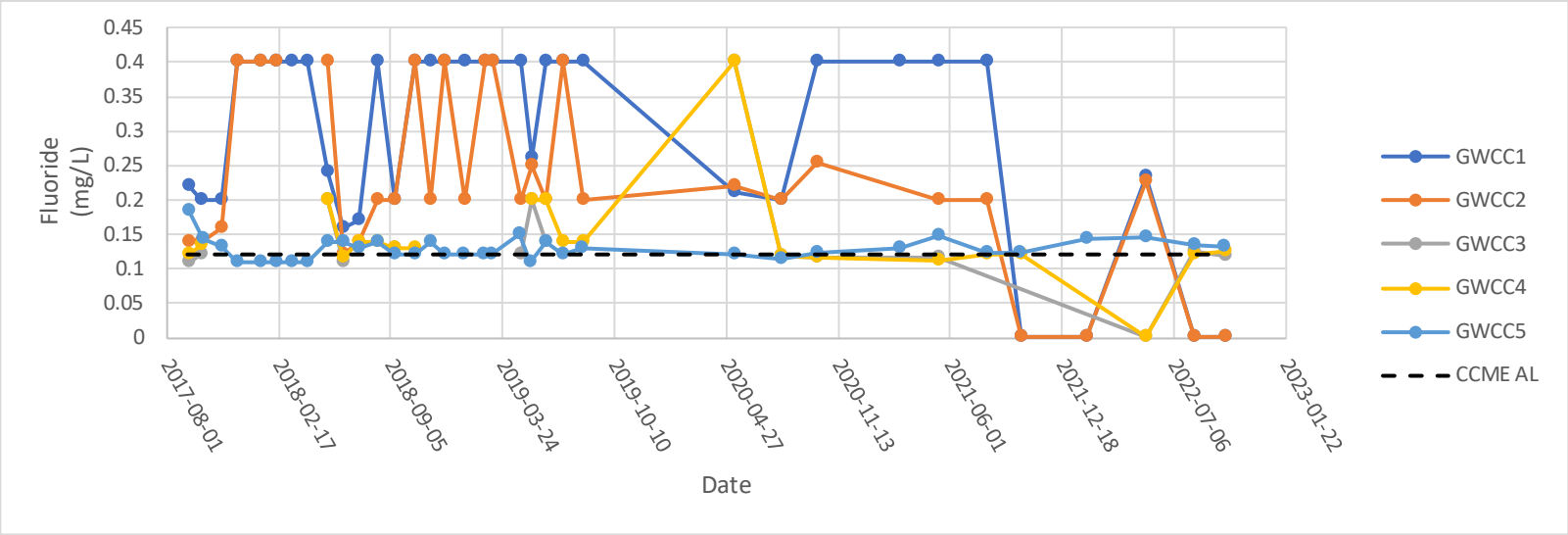


Figure 80. Fluoride concentrations at groundwater seeps sites GWCC1 through GWCC5 between September 2017 and October 2022.

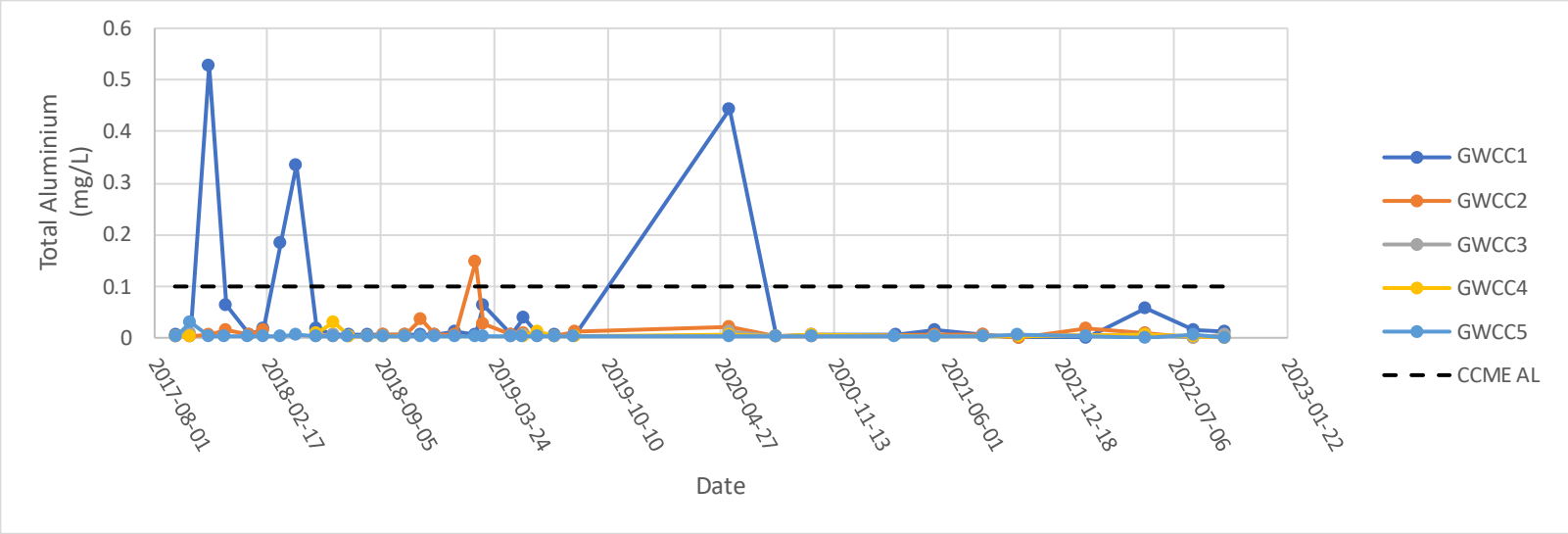


Figure 81. Total aluminium concentrations at groundwater seeps sites GWCC1 through GWCC5 between September 2017 and October 2022.

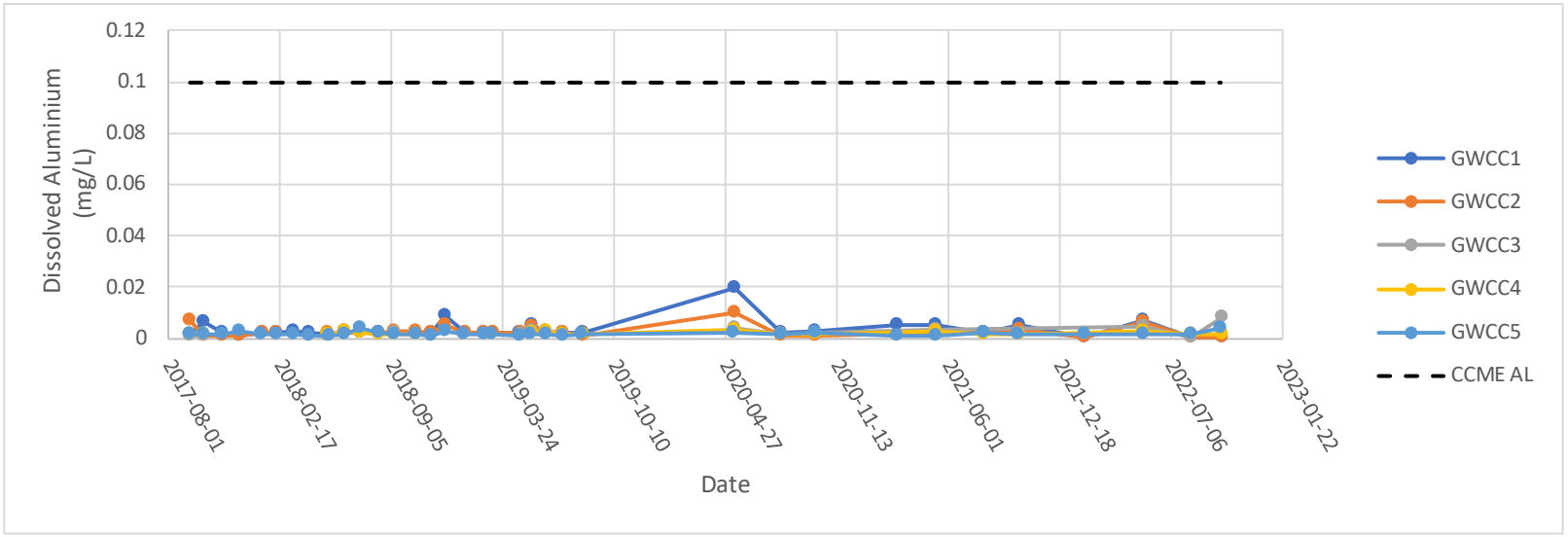


Figure 82. Dissolved aluminium concentrations at groundwater seeps sites GWCC1 through GWCC5 between September 2017 and October 2022.

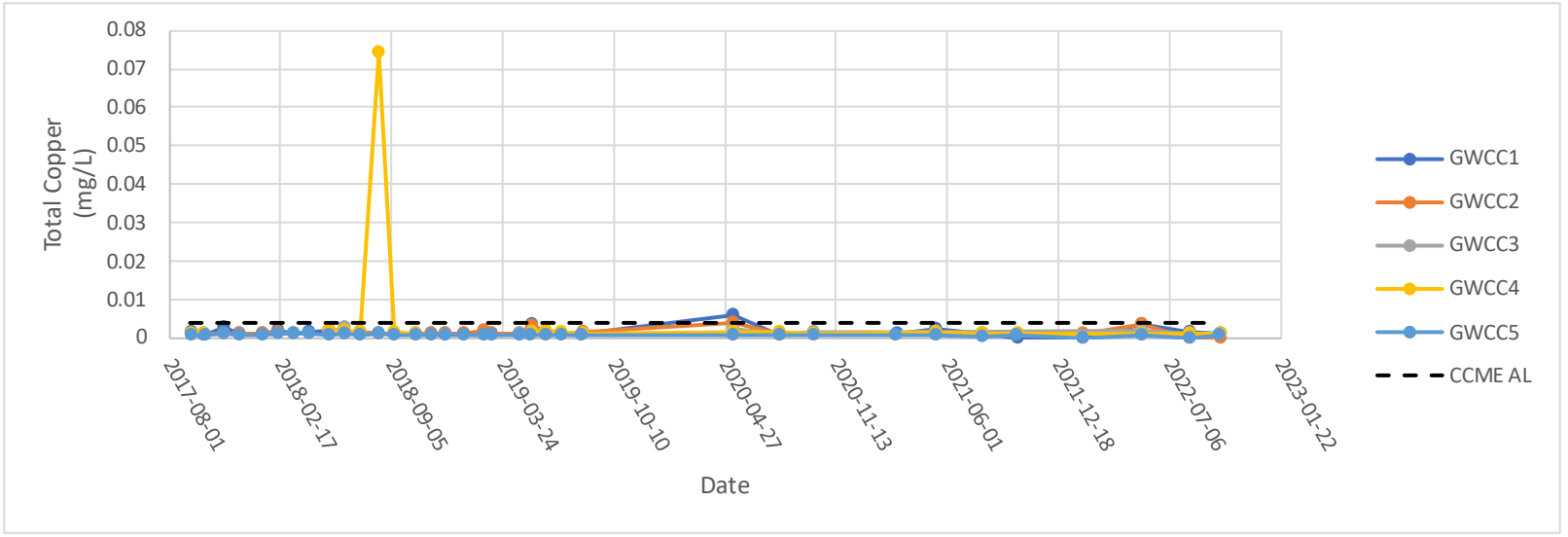


Figure 83. Total copper concentrations at groundwater seeps sites GWCC1 through GWCC5 between September 2017 and October 2022.

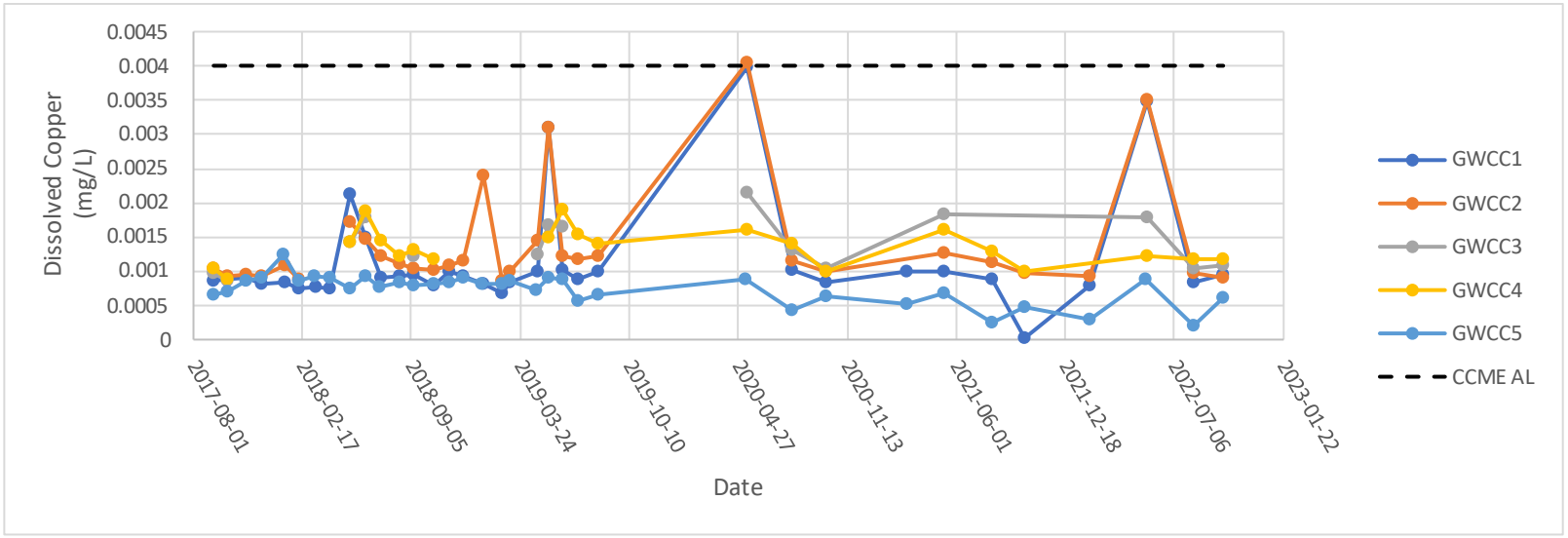


Figure 84. Dissolved copper concentrations at groundwater seeps sites GWCC1 through GWCC5 between September 2017 and October 2022.

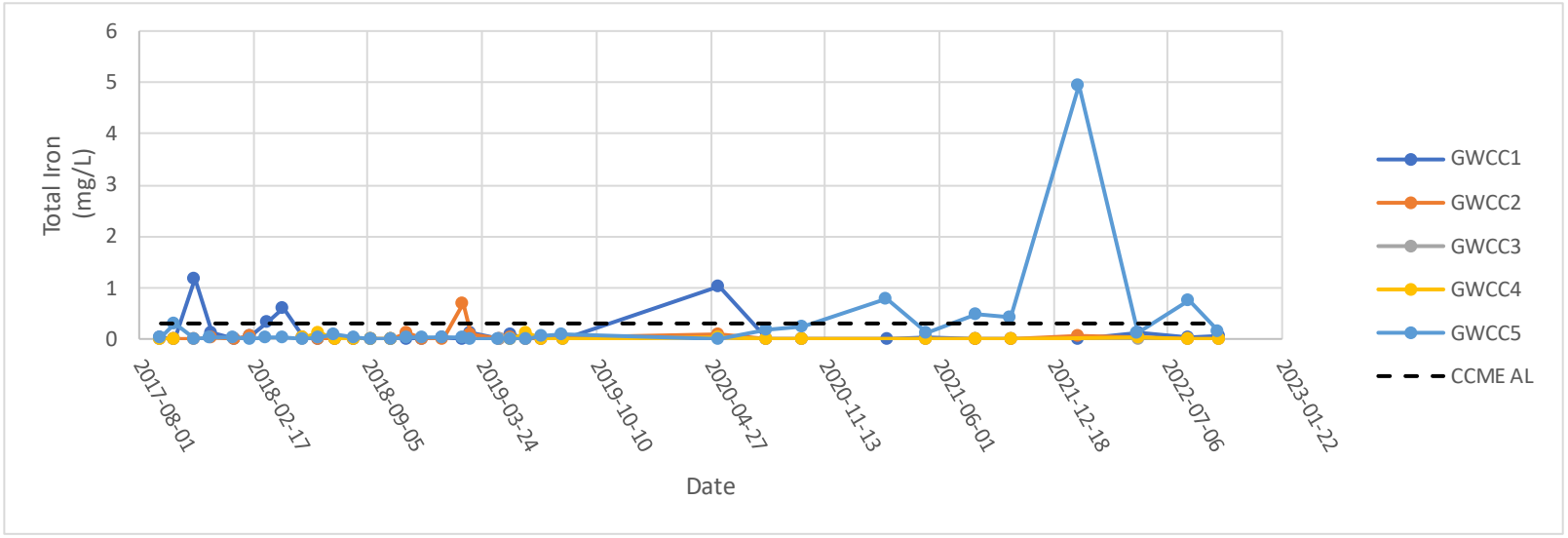


Figure 85. Total iron concentrations at groundwater seeps sites GWCC1 through GWCC5 between September 2017 and October 2022.

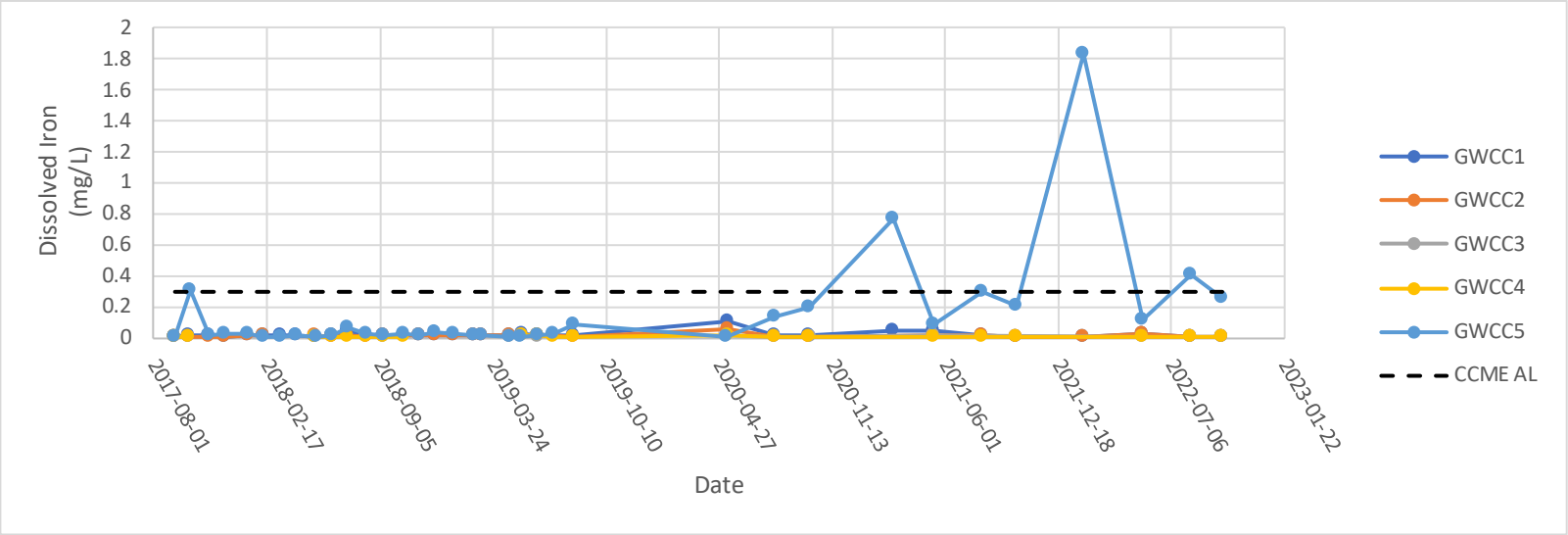


Figure 86. Dissolved iron concentrations at groundwater seeps sites GWCC1 through GWCC5 between September 2017 and October 2022.

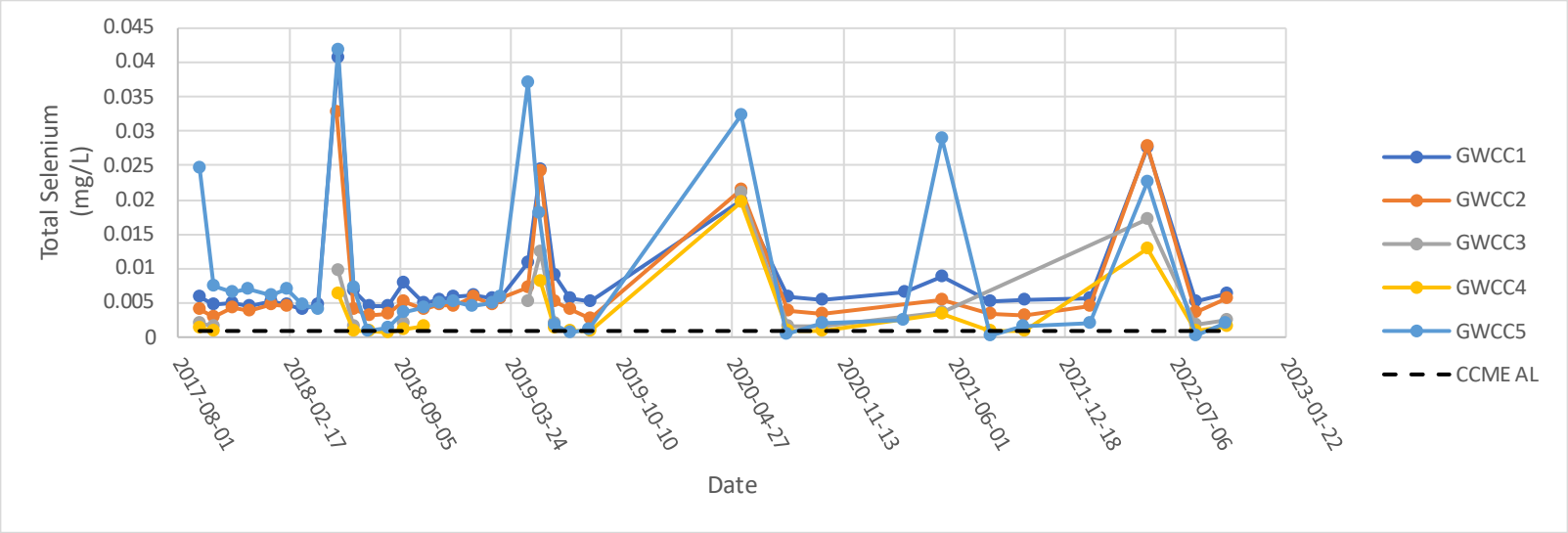


Figure 87. Total selenium concentrations at groundwater seeps sites GWCC1 through GWCC5 between September 2017 and October 2022.

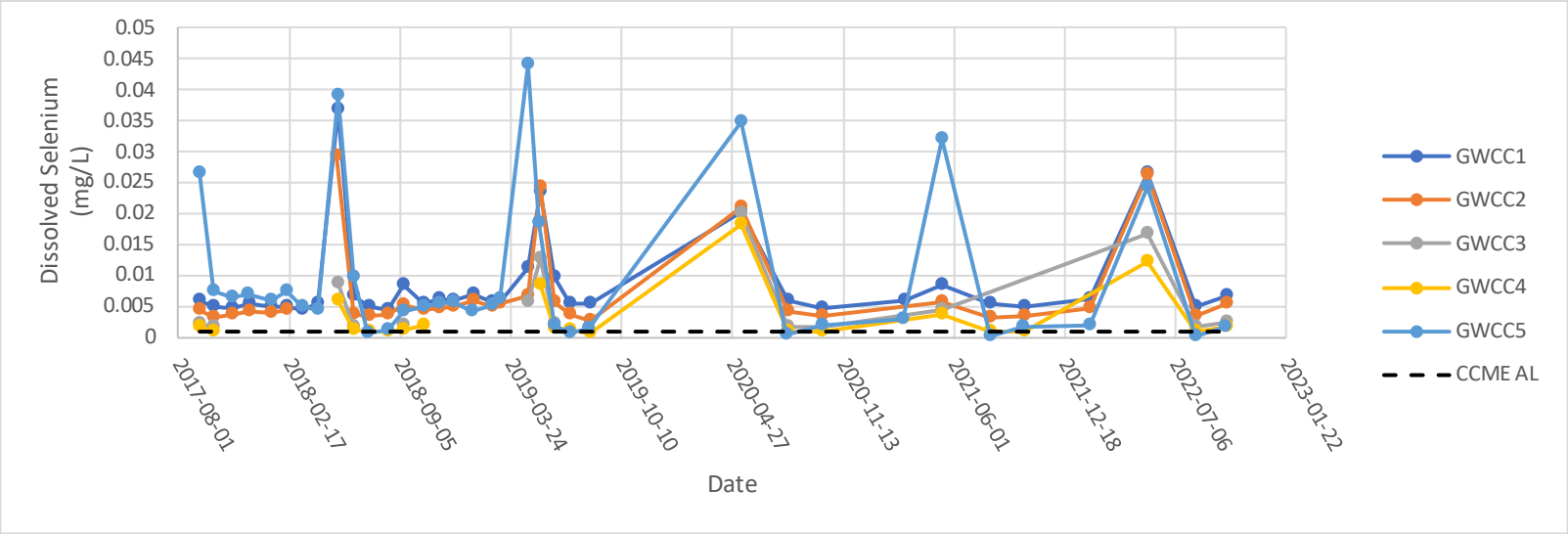


Figure 88. Dissolved selenium concentrations at groundwater seeps sites GWCC1 through GWCC5 between September 2017 and October 2022.

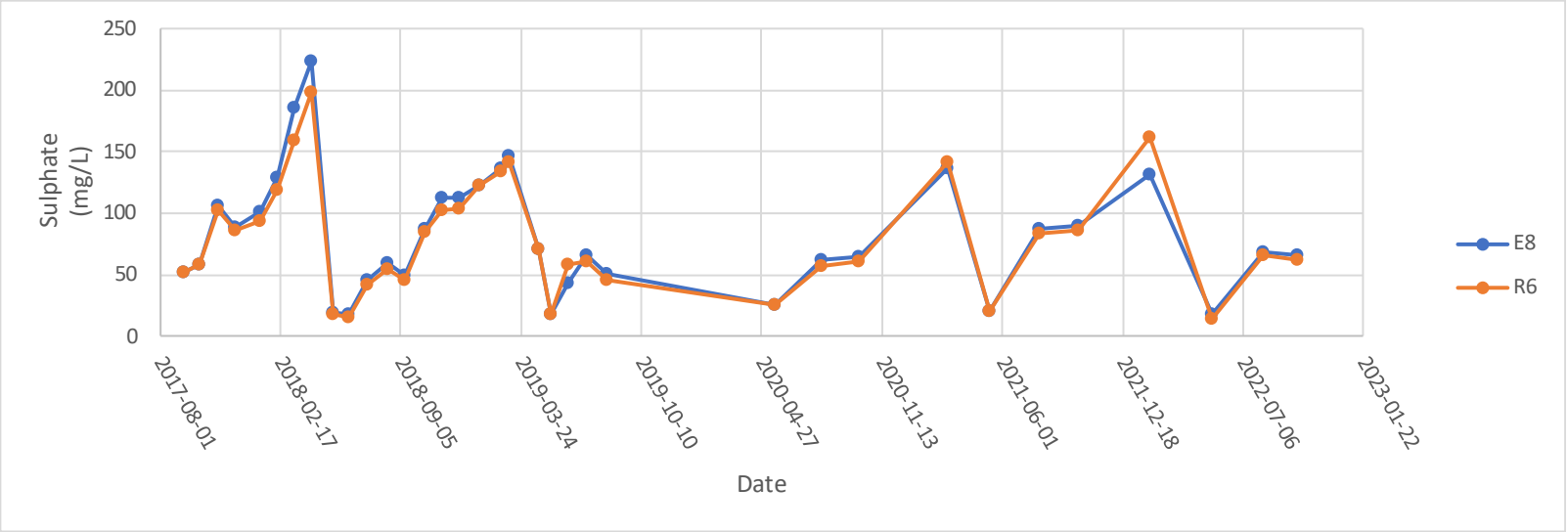


Figure 89. Sulphate concentrations at R6 and E8 on the Forty Mile River between September 2017 and October 2022.

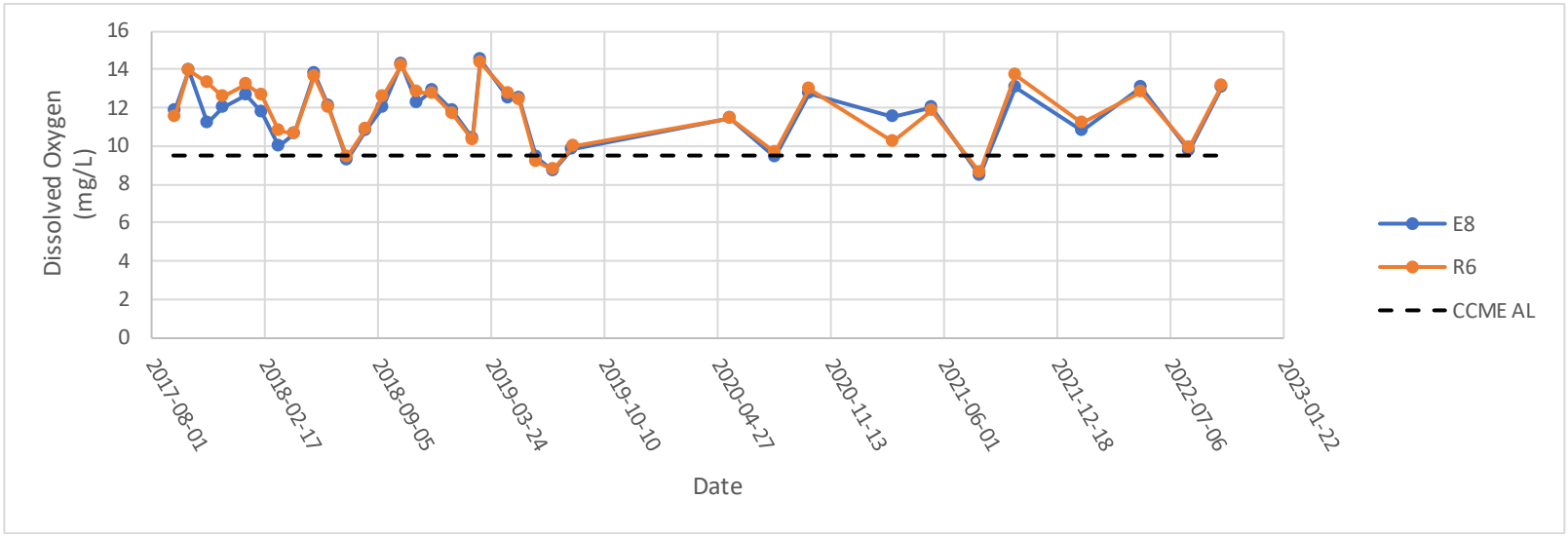


Figure 90. Dissolved oxygen concentrations at R6 and E8 on the Forty Mile River between September 2017 and October 2022.

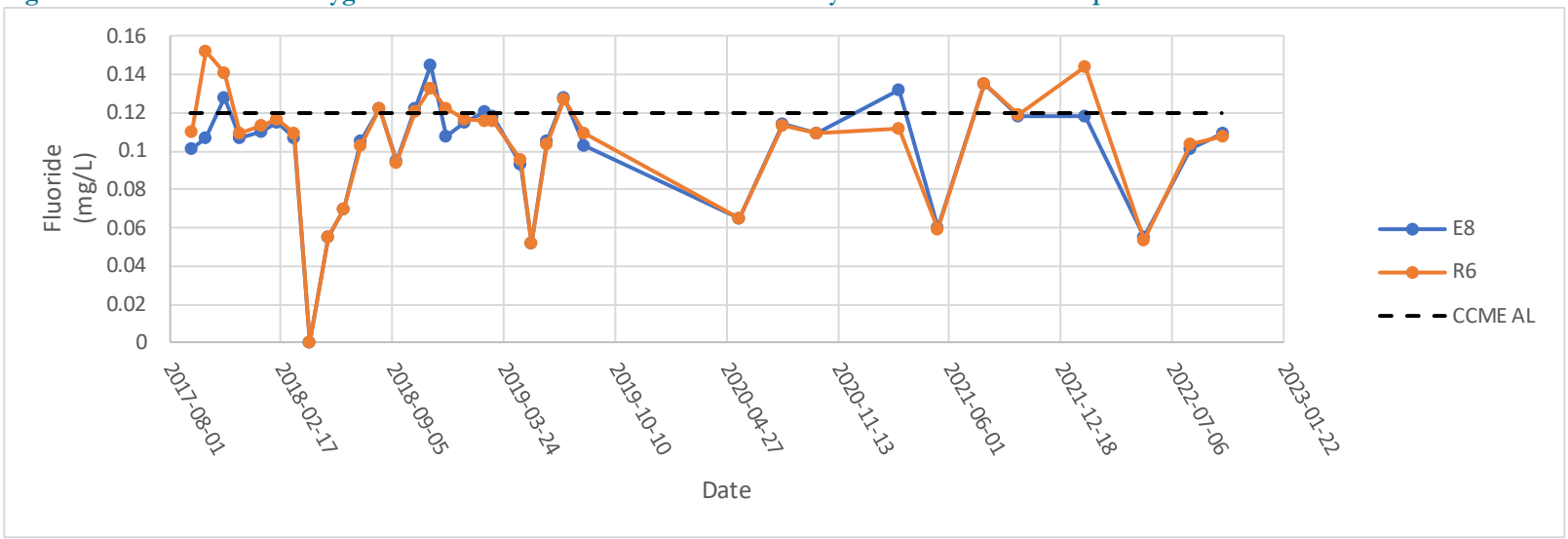


Figure 91. Fluoride concentrations at R6 and E8 on the Forty Mile River between September 2017 and October 2022.

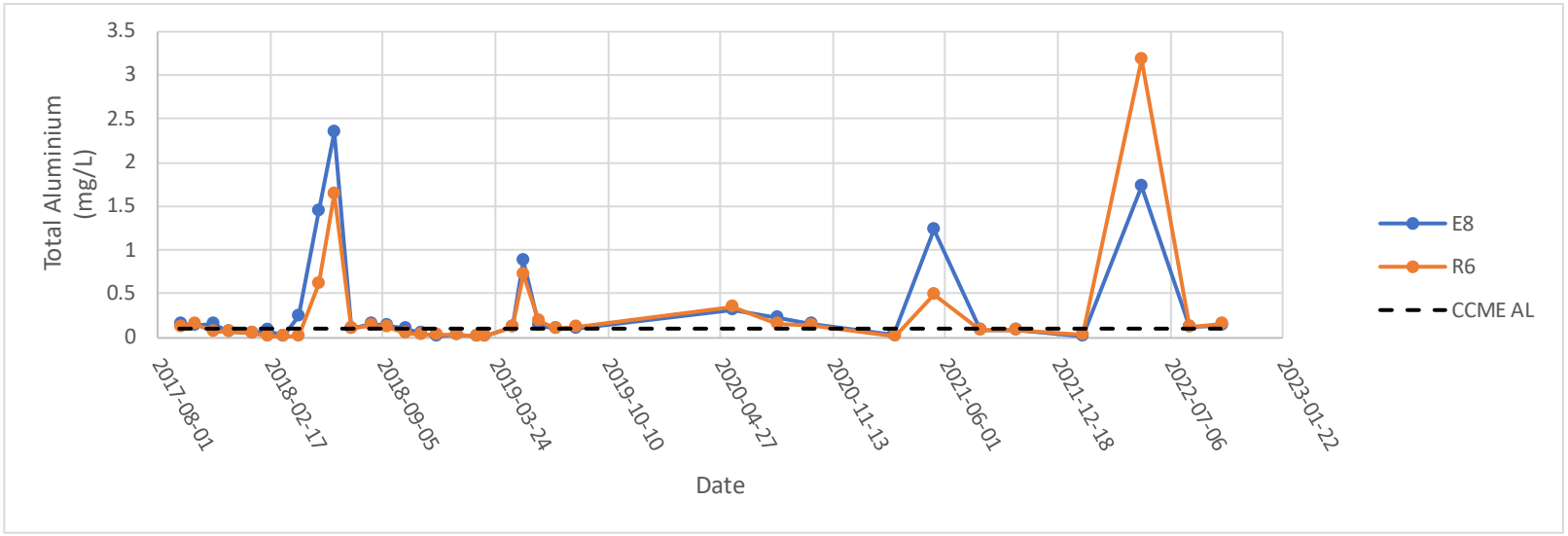


Figure 92. Total aluminium concentrations at R6 and E8 on the Forty Mile River between September 2017 and October 2022.

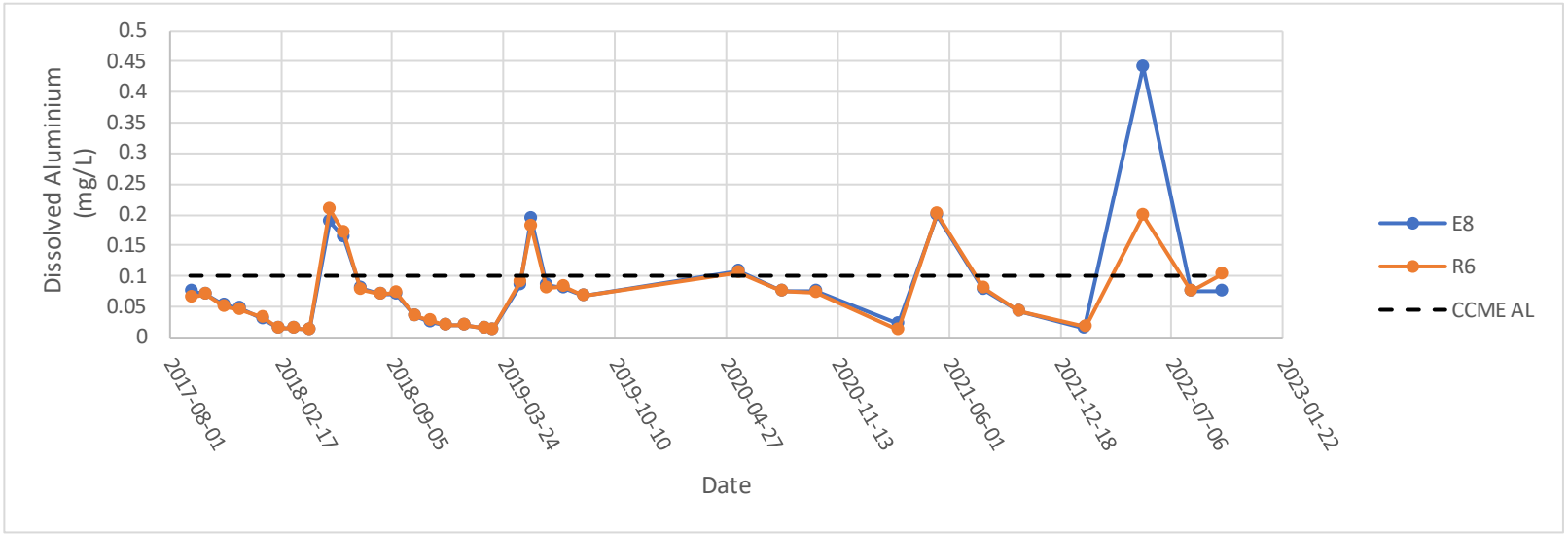


Figure 93. Dissolved aluminium concentrations at R6 and E8 on the Forty Mile River between September 2017 and October 2022.

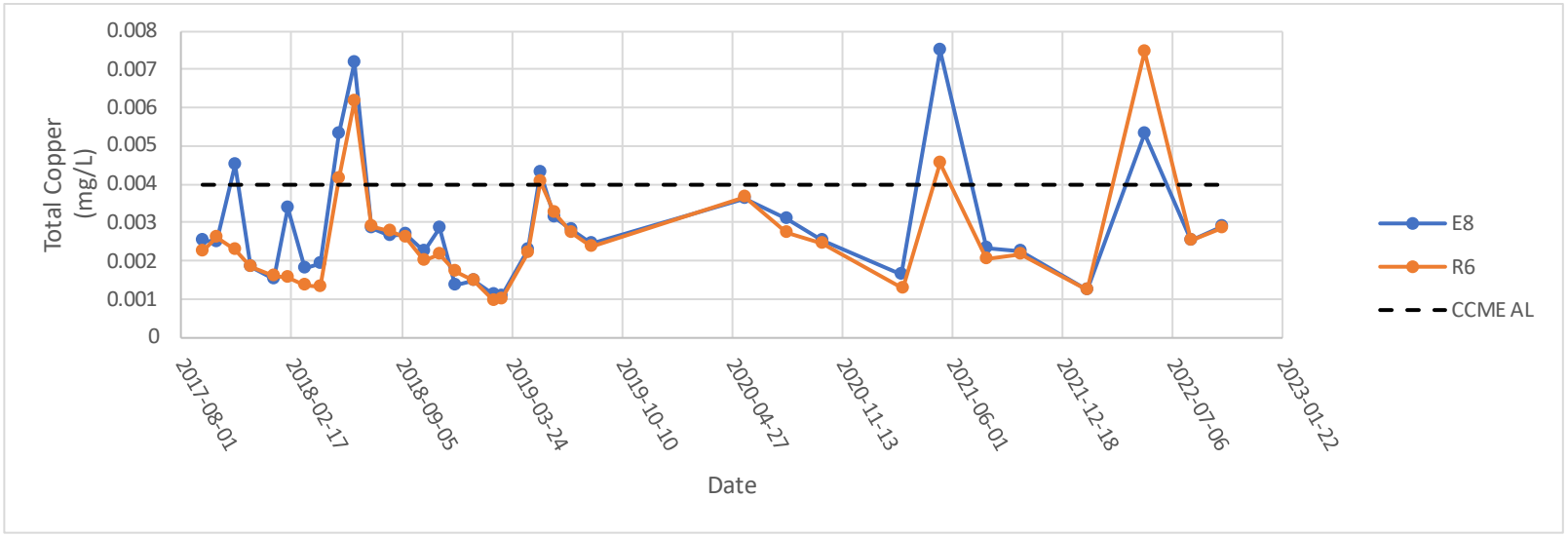


Figure 94. Total copper concentrations at R6 and E8 on the Forty Mile River between September 2017 and October 2022.

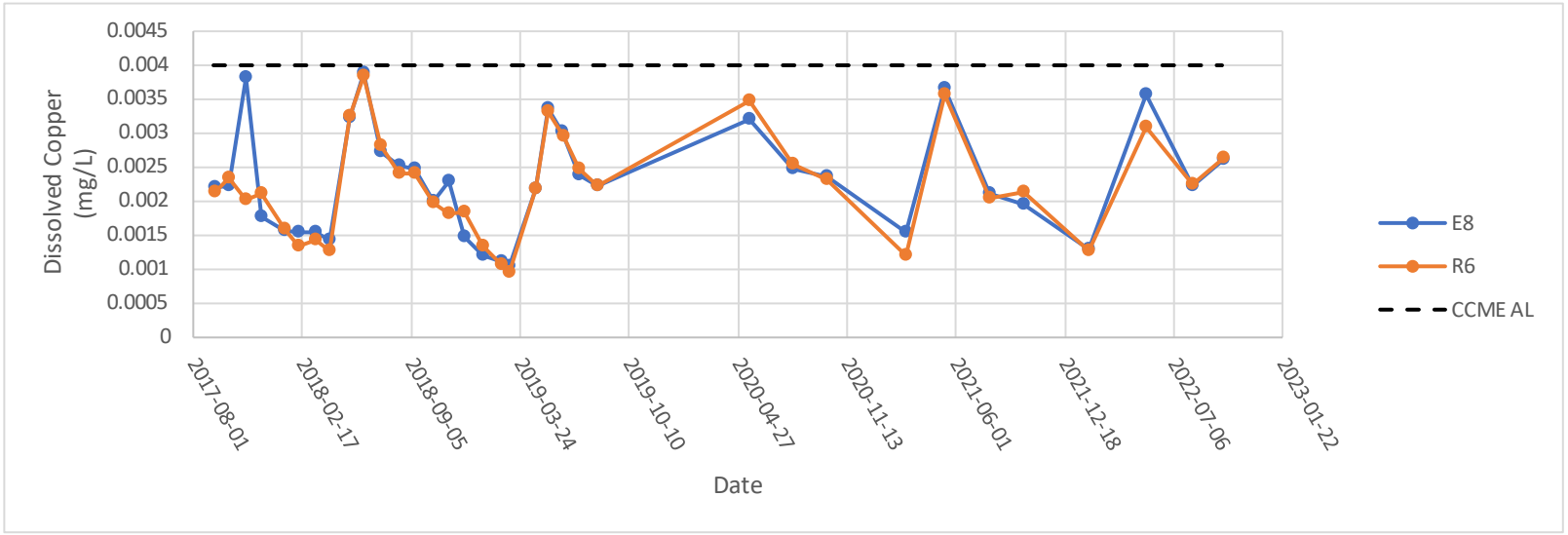


Figure 95. Dissolved copper concentrations at R6 and E8 on the Forty Mile River between September 2017 and October 2022.

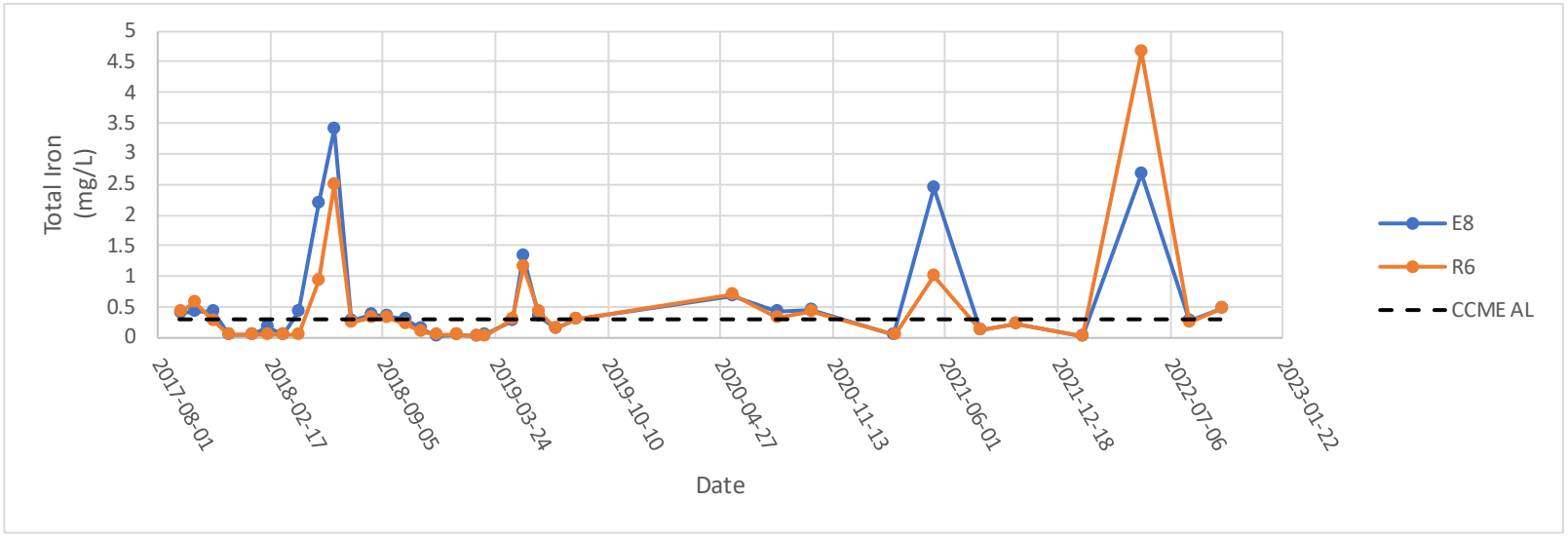


Figure 96. Total iron concentrations at R6 and E8 on the Forty Mile River between September 2017 and October 2022.

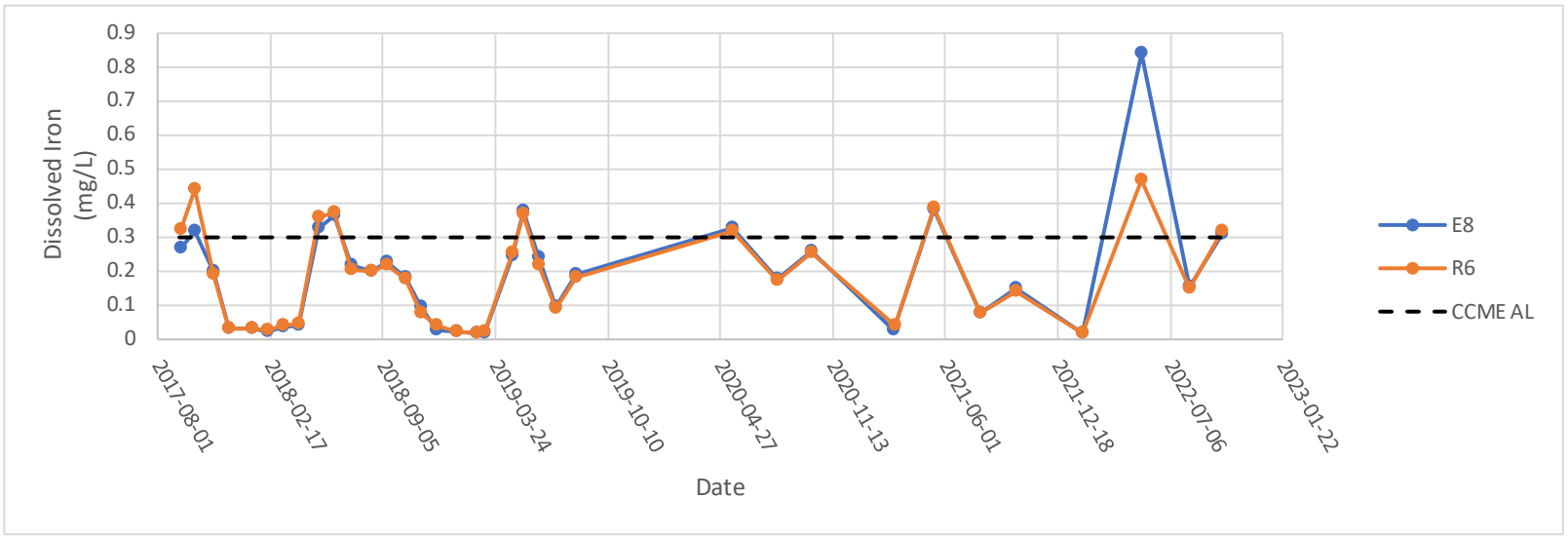


Figure 97. Dissolved iron concentrations at R6 and E8 on the Forty Mile River between September 2017 and October 2022.

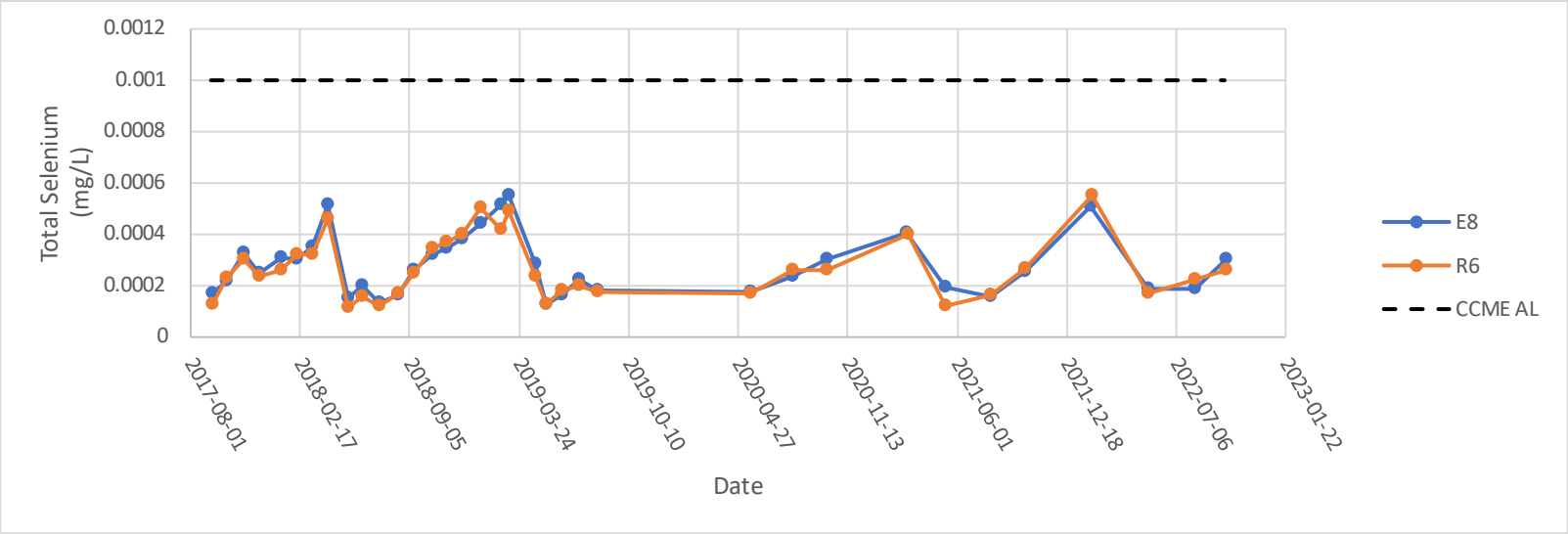


Figure 98. Total selenium concentrations at R6 and E8 on the Forty Mile River between September 2017 and October 2022.

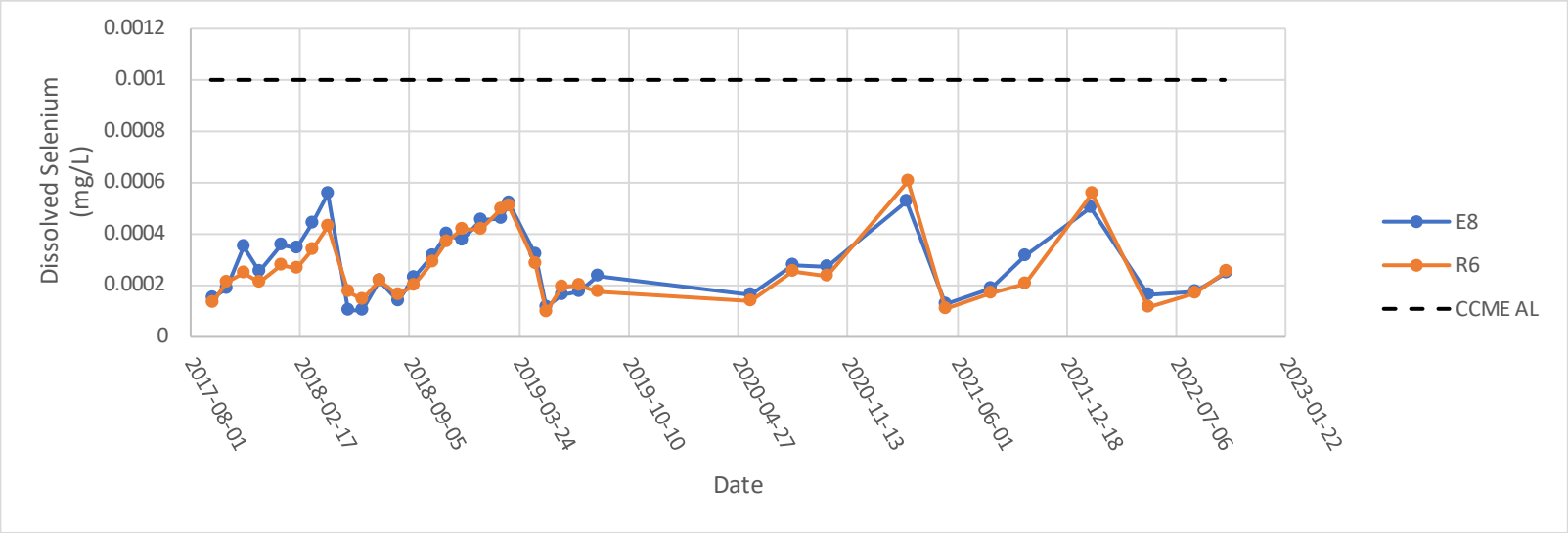


Figure 99. Dissolved selenium concentrations at R6 and E8 on the Forty Mile River between September 2017 and October 2022.