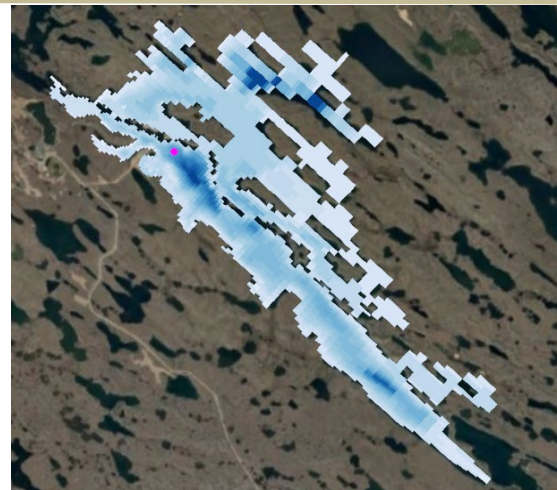
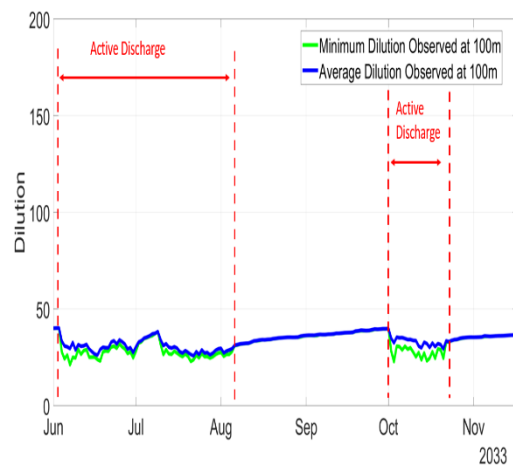


Meliadine Extension 3-D Hydrodynamics Modelling of Meliadine Lake



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SUMMARY

Tetra Tech Canada Inc. (Tetra Tech) was engaged by Agnico Eagle Mines Limited (Agnico Eagle) to conduct a three-dimensional hydrodynamic modelling of Meliadine Lake in support of the Meliadine Extension at the Meliadine Gold Mine near Rankin Inlet, NU.

The objective of this study is to assess the discharge, transport and mixing of the mine's effluent released in the southeast sub-basin of Meliadine Lake, as part of the mine's operations, and then continued mixing in closure once discharge of effluent has ceased. A three-dimensional (3-D) hydrodynamic model allows to quantify the fate and behavior of the released effluent, taking into account the physics of the lake. Mine effluent dilutions and effluent constituent (including Total Dissolved Solids (TDS)) concentrations in the lake are assessed by conducting a multi-year simulation up to year 2043 (operations phase) and up to 2050 (closure phase) for the Meliadine Extension.

The existing modelling framework and extent developed in 2017 (Tetra Tech 2017) and updated in 2020 (Tetra Tech 2020), has been extended from the south sub-basin to the entire southeast sub-basin of the Meliadine Lake system, allowing water exchanges across channels connecting south and east sub-basin. This update to the model domain contributes to producing modelling results with the full physics of the entire sub-basin captured.

Model calibration was conducted for this updated 3-D model with an extension in the model domain. Validation simulation contains a multi-year discharge starting from year 2018 to 2020 with the observed effluent discharge schedule. Modelled results are compared with the available observations in terms of dilutions, TDS concentrations and water temperature. The main conclusions are as follows:

- Comparable modelled dilutions with observed dilutions measured in 2020;
- Good match on modelled TDS concentrations with TDS observations measured in 2018, 2019 and 2020; and
- Good modelled water temperatures compared with observations taken in 2020.

Therefore, augmented with the validation results obtained in year 2020, this updated 3-D model is then used over a multi-year simulation period ranging from year 2021 up to year 2050, for the Meliadine Extension, to assess the dilutions and TDS concentrations in the lake. The discharge period was modelled to span over five months from June to October for year 2021 and onward and stops at the end of October 2043. The highlight of the Meliadine Extension conclusions are the followings:

- Dilutions results are aligned with past simulations conducted in Meliadine Lake;
- Minimum dilution achieved at the edge of the mixing zone varies between 19:1 and 39:1 throughout the multi-year discharge period from year 2021 to 2043. A dilution of 19:1 is obtained as the minimum dilution over the entire multi-year discharge period;
- Maximum TDS concentration achieved at the edge of the mixing zone ranges between 67 mg/L and 82 mg/L. 82 mg/L is the peak TDS level considered as the maximum TDS concentration reached over the entire multi-year discharge period; and
- The southeast sub-basin of Meliadine Lake shows adequate capability in mixing and diluting the effluent. Ultimately, the southeast sub-basin of Meliadine Lake appears to recover back to pre-discharge condition within about 6 to 7 years following the end of the 26 years of open-water season discharge (year 2018 - 2043).

Results from this updated model to reflect the Meliadine Extension do not change from those presented in the water licence amendment (Agnico Eagle 2020) and thus the conclusions for the assessment of changes to Meliadine Lake do not change.

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APPENDIX SECTIONS

APPENDICES

- Appendix A Tetra Tech’s Limitations on the Use of this Document
- Appendix B HHERA Meliadine Spreadsheet

ACRONYMS & ABBREVIATIONS

Acronyms/Abbreviations	Definition
TDS	Total Dissolved Solids

LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of Agnico Eagle Mines and their agents. Tetra Tech Canada Inc. (Tetra Tech) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than Agnico Eagle Mines, or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this document is subject to the Limitations on the Use of this Document attached in the Appendix or Contractual Terms and Conditions executed by both parties.

1.0 INTRODUCTION

Tetra Tech Canada Inc. (Tetra Tech) was engaged by Agnico Eagle Mines Limited (Agnico Eagle) to conduct a three-dimensional hydrodynamic modelling in the Meliadine Lake in support of the Meliadine Extension at the Meliadine Gold Mine near Rankin Inlet, NU.

1.1 Meliadine Extension

Agnico Eagle is proposing an extension (referred to as the Meliadine Extension) to the Approved Meliadine Mine located approximately 25 kilometers north of Rankin Inlet, and 80 kilometers southwest of Chesterfield Inlet in the Kivalliq region of Nunavut.

The Meliadine Extension proposes to include underground mining and associated saline water management infrastructures at the Pump, F zone, and Discovery deposits. Saline water will be managed and discharged to Itivia Harbour seasonally through the waterline and surface contact water will be managed and seasonally discharged to Meliadine Lake. Approved Project infrastructure, such as the camp, mill, water management infrastructures, power plant, tailings storage facility, All-weather Access Road, freshwater intakes and treatment plants would continue to be used. There are no changes proposed to the Rankin Inlet facilities for the Meliadine Extension. The current life of mine includes operations to 2032. Through the Meliadine Extension, the life of the mine would be extended by an additional 11 years until 2043, closure will occur from 2044 to 2050, and post-closure from 2051 to 2060.

1.2 Summary of Past Meliadine Lake Modelling Projects

Tetra Tech has developed a 3-D hydrodynamic model coupled with a plume model (US-EPA Visual Plumes model) during the detailed design of the now-existing Meliadine Lake diffuser (Tetra Tech 2017). During this study, a minimum dilution of 23:1 was obtained at the edge of the mixing, following a 14-year long simulation.

The same modelling framework was further applied to assess dilutions in the lake with an 8-year simulation to support the 2020 Water License Application (Tetra Tech 2020). The results showed that, over an 8-year long simulation, a minimum dilution at the edge of the mixing zone of 26:1 was obtained for base case scenario and 23:1 for the wet year scenario. For both scenarios, no exceedances of the 1,000 mg/L TDS concentration threshold were observed at the edge of the mixing zone, assuming a conservative discharge concentration of 3,500 mg/L over the 8 years of active discharge.

1.3 General Updates to Current Modelling Framework

The objective of this study is to assess the discharge, transport and mixing of the mine's effluent released in the southeast sub-basin of Meliadine Lake, as part of the mine's operations. A three-dimensional hydrodynamic model allows to quantify the fate and behavior of the released effluent, taking into account the physics of the lake. Mine effluent dilutions and Total Dissolved Solids (TDS) concentrations in the lake are assessed by conducting a multi-year simulation up to year 2043, corresponding to the operations phase of the Meliadine Extension, and up to 2050 corresponding to the closure phase. Modelling was completed with the updated 3-D hydrodynamic model used to support the detailed design of the now-existing Meliadine Lake diffuser.

Based on the existing modelling framework, the model domain has been expanded from the south sub-basin of Meliadine Lake (where the discharge occurs) to the complete southeast sub-basin. The larger and more complete model domain allows to capture the full physics of the entire sub-basin with water exchange occurring across

channels connecting the south sub-basin and the east sub-basin and therefore effluent transport and mixing processes across the full sub-basin.

1.4 Report Structure

The report first presents the Methodology in Section 2, including model overview and model grid, model extent and bathymetry, meteorological data, model validation overview and a description of the Meliadine Extension Scenario. Results for the model validation and the Meliadine Extension scenario modelling are shown in Section 3. The conclusion of this study is drawn in Section 4.

2.0 METHODOLOGY

2.1 Model Overview and Model Grid

Tetra Tech's proprietary three-dimensional hydrodynamic and sediment transport model, H3D, is used to carry out this study. The same H3D model was used as part of the design of the now-existing diffuser in the Meliadine Lake.

The H3D model is an implementation of the numerical model developed by Backhaus (1983; 1985), which has had numerous applications to the European continental shelf, (Duwe et al., 1983; Backhaus and Meir Reimer, 1983), Arctic waters (Kampf and Backhaus, 1999; Backhaus and Kampf, 1999) and deep estuarine waters (Stronach et al., 1993). Locally, H3D has been used to model the temperature structure of Okanagan Lake (Stronach et al., 2002), the transport of scalar contaminants in Okanagan Lake, (Wang and Stronach, 2005), sediment movement and scour/deposition in the Fraser River, circulation and wave propagation in Seymour and Capilano dams, salinity movement in the lower Fraser River and recent coastal ocean modelling along the entire BC coast, in the Gulf of the St Lawrence and in the Bay of Fundy (Hospital et al, 2019).

The H3D model forms the basis of the model developed by Saucier and co-workers for the Gulf of St. Lawrence (Saucier et al., 2003), and has been applied to the Gulf of Mexico (Rego et al., 2010). H3D and its hydrocarbon transport and weathering module have been used in environmental assessment applications before the appropriate regulatory agencies. H3D was used to do oil spill modelling for the environmental and engineering assessments for the proposed Gateway project involving oil shipment out of Kitimat. The modelling work forms part of the information package submitted to the National Energy Board. Similarly, H3D was used to assess the fate of accidental fuel spills arising from a proposed jet fuel terminal in the Fraser River. Recent National Energy Board applications were linked with H3D simulating currents and oil spill as part of the Energy East and Trans Mountain projects.

H3D is a three-dimensional hydrodynamic model, which means that the model is discretized in both horizontal and vertical directions: each cell covering the Meliadine Lake domain is divided in different vertical layers throughout the water column to capture various lake processes. Figure 2.1 illustrates a typical 3-D model grid.

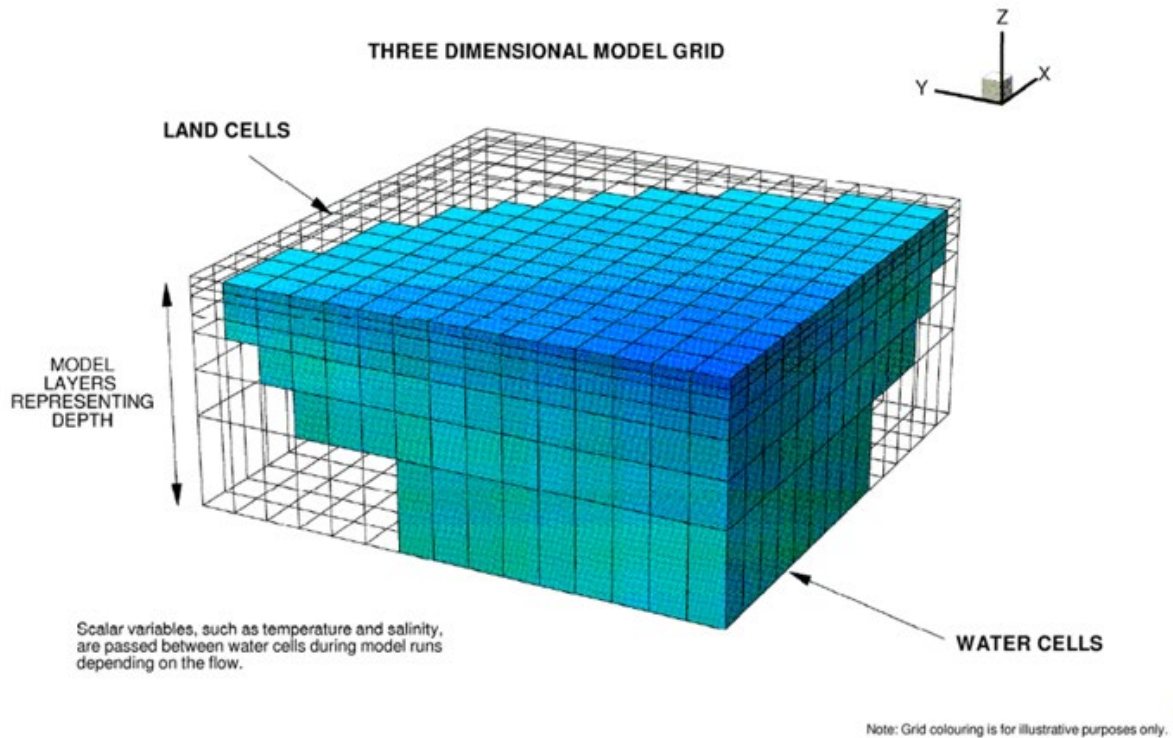


Figure 2.1: Typical 3-D Hydrodynamic Model Grid

2.2 Model Extent and Bathymetry

Figure 2.2 presents the updated model extent and bathymetry. While the Meliadine Lake modelling focused to-date on the area within the dashed red lines, the model domain now encompasses the complete southeast sub-basin of Meliadine Lake, including the east portion of channels beyond the box circled by the red dashed line in Figure 2.2. It allows a more complete assessment of actual dilutions taking place due to water exchanges between the two bodies of water along the red dashed line. Effluent is discharged at the existing diffuser location as shown in pink circle in Figure 2.2 and at a depth of 11.4 m at time of construction.

Bathymetry in the existing south portion of the sub-basin (i.e., area inside the red box of Figure 2.2) was available from the past modelling submission in 2020. Bathymetry for the remaining areas (i.e., area outside the red box of Figure 2.2) of the model domain were interpolated based on a scanned bathymetry map (R. L. & L. Environmental Services, 1997, presented in *140506-11MN034-SD 7-1-Aquatic Synthesis-Pt 10-IA2E.pdf, page 24*) recently made available. Maximum depth of the entire southeast sub-basin is 23.7 m, located about 600 m southeast of the diffuser location.

The model mesh is based on a rectilinear grid. Horizontal grid resolution varies:

- Approximately 50-m grid spacing around the diffuser area; and
- 50-m to 200-m grid spacing in areas further away from the vicinity of the diffuser.

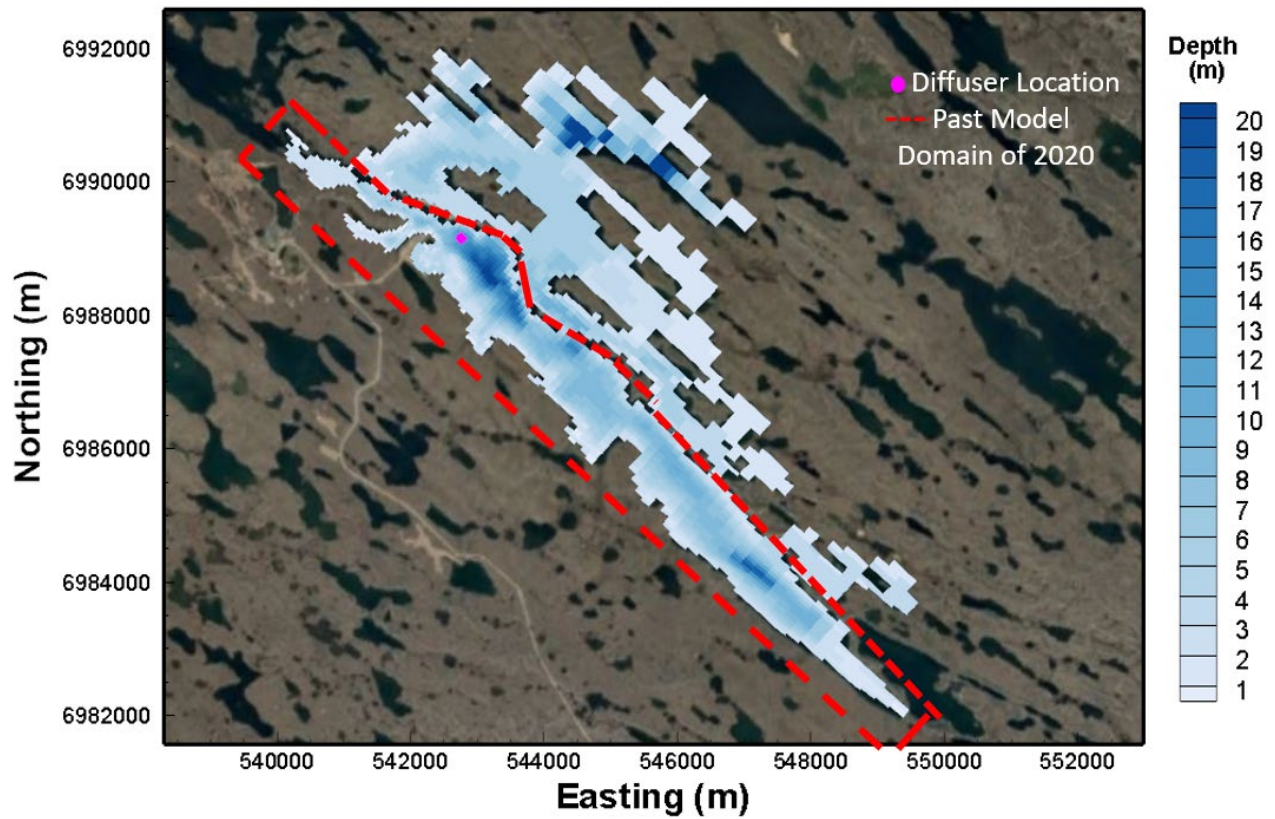


Figure 2.2: Model Extent and Bathymetry.

Table 2.1 presents the comparison of volume of water in various depth layers between the 1997 bathymetric survey and model bathymetry in the southeast sub-basin. Overall, model bathymetry is very comparable with the scanned bathymetry map, given the very coarse resolution of the scanned map. The slightly higher volume of water within the model is mostly caused by an updated localized bathymetric survey conducted in 2014 identifying a slightly deeper basin.

Table 2.1: Comparison of Vertical Distribution of Water Volume and Percent in the Southeast Sub-Basin of Meliadine Lake

Depth (m)	1997 Bathymetric Survey		Model Bathymetry	
	(Mm ³)	(% Deeper than)	(Mm ³)	(% Deeper than)
>0	98.9	100	116.9	100
>2	64.0	64.7	73.2	62.5
>4	37.1	37.6	14.8	35.7
>6	18.3	18.5	21.6	18.4
>8	7.4	7.5	11.4	9.7
>10	2.9	2.9	7.1	6.1
>12	1.3	1.4	4.9	4.1
>14	0.5	0.48	3.1	2.7
>16	0.09	0.09	1.8	1.6
>18	0.01	0.01	0.1	0.8
>20	0.0	<0.01	0.0	0.3
>22	-	-	0.0	<0.01

2.3 Meteorological Data

Meteorological and wind data were provided by the observed station at Rankin Inlet Airport (Climate ID: 2303405) in recent years from 2018 to 2020. These same years were then repeated over the multi-year discharge duration, so that realistic and representative wind and air temperature conditions could be utilized. Missing data records were filled up using inverse-distance weighting interpolation method with all available data points. Figure 2.3 presents the hourly air temperature time series from year 2018 to 2020. In general, air temperatures follow similar trend for all three years without potential extreme values.

Rankin Inlet Airport station also provides weather information in the form of word descriptions. Numeric cloud coverage fractions were converted from those descriptive weather message with our developed translation algorithm. The cloud coverage fraction is then used as the 3-D model input.

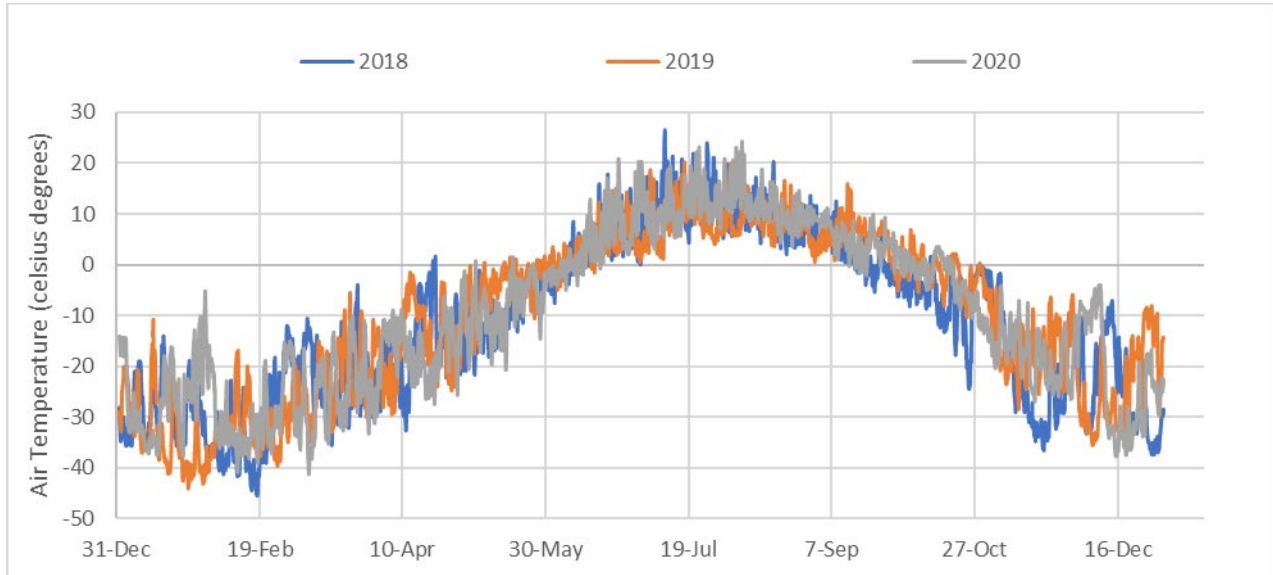


Figure 2.3: Time Series of Air Temperature from Year 2018 to 2020 at Rankin Inlet Airport (Climate ID: 2303405)

2.4 Model Validation Overview

The model calibration/validation is conducted to confirm that adequacy of the model in simulating dilution, TDS concentrations and water temperatures with to-date measurements. The validation conditions are described as follows:

- A single consecutive simulation started during open water seasons from year 2018 to year 2020 with existing (i.e., measured) effluent discharge schedule;
- Conditions at the end of year 1 are used as initial conditions for the beginning of year 2 and therefore, allowing to account for the accumulation of effluent over time;
- Meteorological and wind conditions from year 2018 to 2020 observed from Rankin Inlet Airport were used for each corresponding year simulation; and
- Water temperature was initialized as 0.5°C throughout the entire model domain, corresponding to lake conditions at the time of the start of the simulation. Water temperature then rises and cools off, depending on met conditions.

Results are presented in the next section: Section 3 Modelling Results.

2.5 Meliadine Extension Scenario Description

The Meliadine Extension scenario contains a multiple-year simulation covering the open-water season and combining the effluent discharge conditions as follows:

- The past existing effluent discharge conditions from year 2018 to 2020 (also corresponding to the validation simulation);
- Predictions of future operations effluent discharge spanning from year 2021 up to year 2043 (2021 to 2023 represents approved mine discharge, and 2024 to 2043 represents Meliadine Extension discharge) with various discharge conditions based on different effluent discharge rates, TDS concentrations and time of release, as provided by Lorax (2021); and
- After the discharge stops in year 2043 (the end of operations), the model keeps running until year 2050 (without any effluent discharge; i.e., closure) to assess the recovery capability of the Meliadine Lake system.

Effluent discharge period for each year spans over five months, starting from June and ending in October, with intermittent flows. In other words, the discharge can cease during the open-water season for some periods of time. As an example, Figure 2.4 to Figure 2.6 shows the daily discharged effluent volume and discharged TDS concentration for year 2021, 2033 and 2043, respectively. One can observe that the discharge is intermittent, sometimes just over a few days, or over a few weeks. Similarly, TDS concentrations vary significantly throughout the year, but also from year to year.

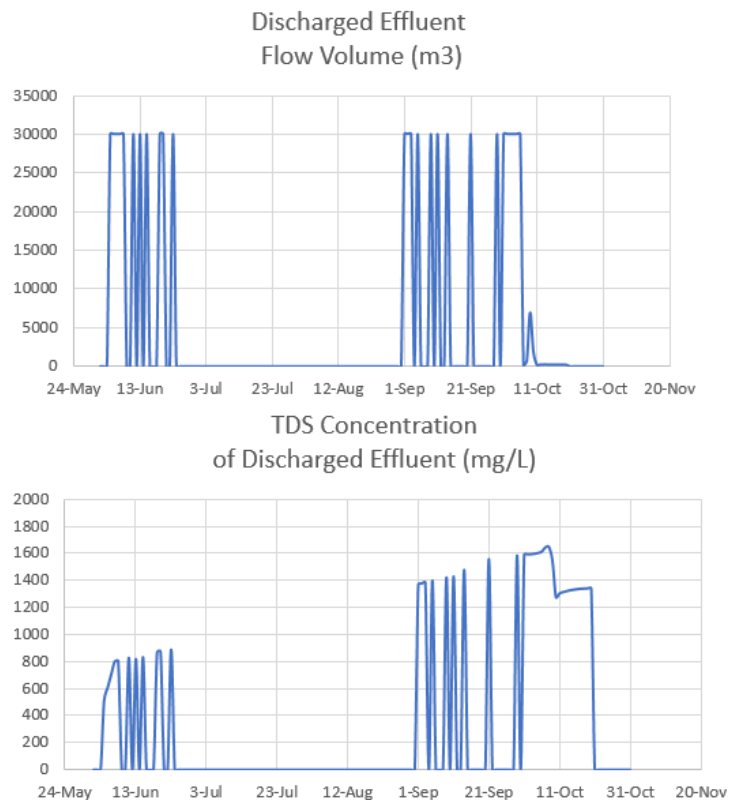


Figure 2.4: Daily Effluent Discharge Rate (Upper Panel) and Daily Discharged TDS Concentration (Lower Panel) of Year 2021

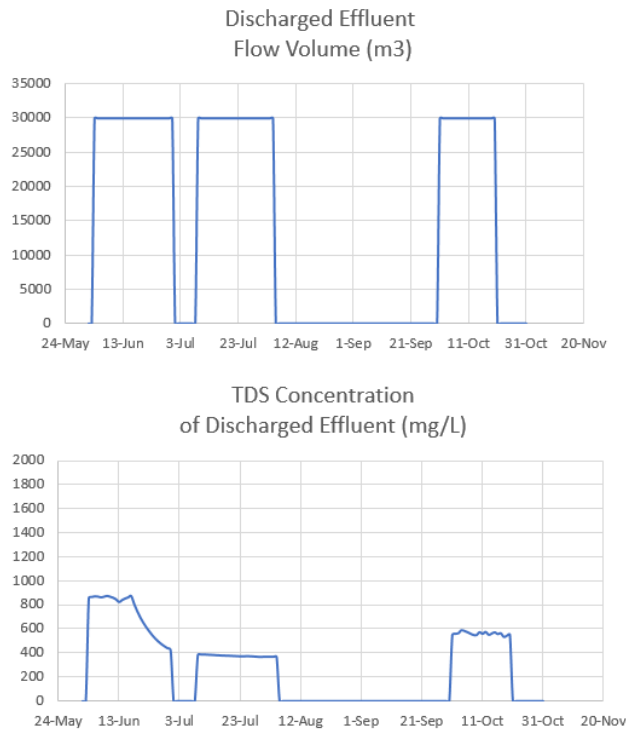


Figure 2.5: Daily Effluent Discharge Rate (Upper Panel) and Daily Discharged TDS Concentration (Lower Panel) of Year 2033

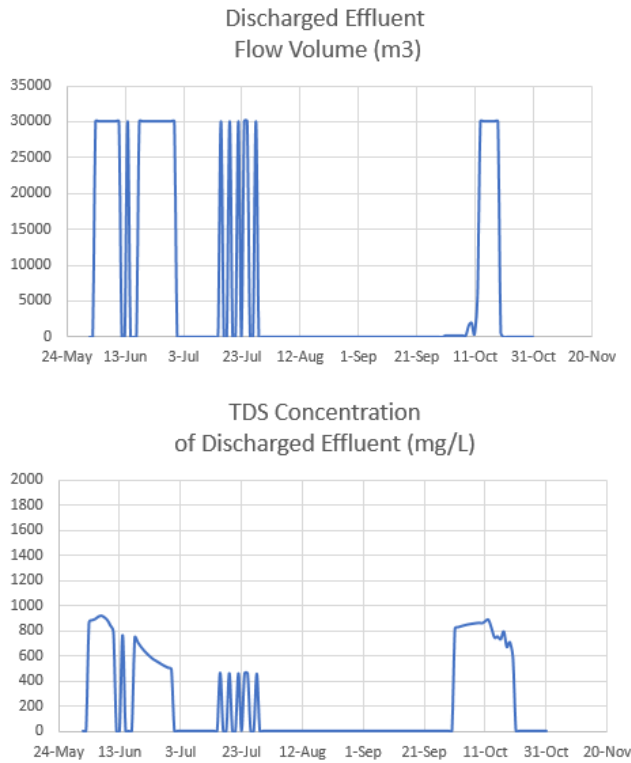


Figure 2.6: Daily Effluent Discharge Rate (Upper Panel) and Daily Discharged TDS Concentration (Lower Panel) of Year 2043

3.0 RESULTS

3.1 Model Validation Results

3.1.1 Dilution and TDS Concentration Validation

In the model, the different constituents of the effluent including TDS concentrations were represented as a passive tracer with an initial concentration of 1. Following the effluent release, this tracer becomes dispersed, mixed and advected by ambient surrounding waters, similar to what the effluent is experiencing in the lake. This approach allows to quantify dilutions achieved within, at and beyond the edge of the mixing zone.

Figure 3.1 presents the comparison between modelled dilution and observed dilution available in year 2020 (Golder, 2020), specifically:

- Blue curve shows the modelled minimum dilution obtained within the mixing zone (i.e., within 100-m);
- Green curve shows the modelled minimum dilution obtained at the 100-m mark characterizing the edge of the mixing zone;
- Red dot shows the observed minimum dilution reached within the mixing zone (i.e., at 50-m); and
- Orange dot shows the observed minimum dilution reached at the edge of the mixing zone.

It can be seen that during the peak of the discharge, observed dilutions varied between 43:1 and 57:1 (red and orange dots in Figure 3.1) at the edge and within the mixing zone. In comparison, the modelled minimum dilution obtained in year 2020 was 57:1, showing an excellent match with observed dilutions. Table 3.1 presents the comparison between averaged observed dilution and modelled dilution. Very satisfactory results are obtained.

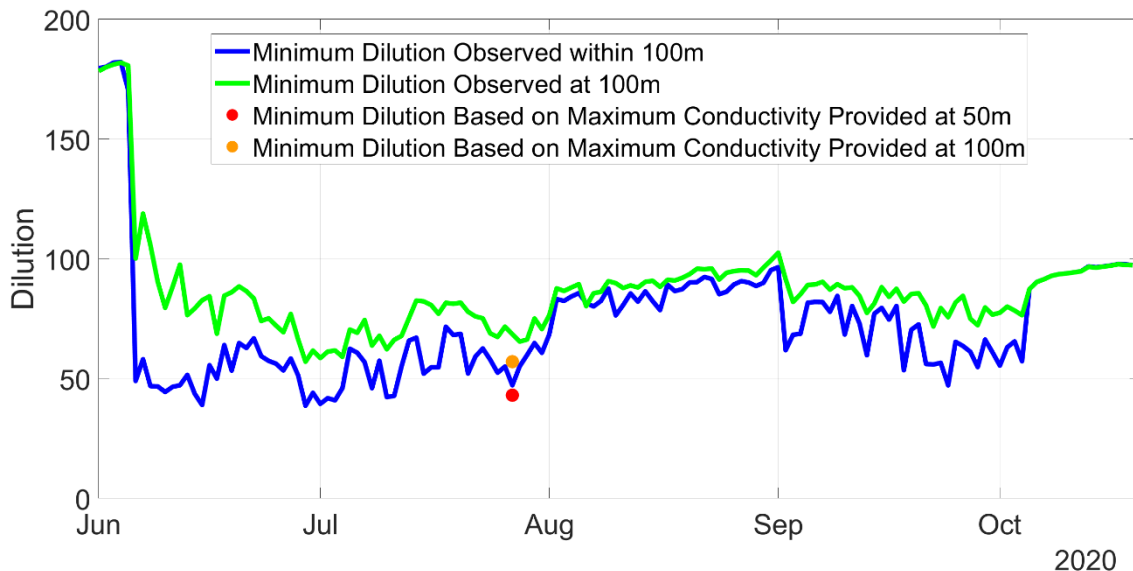


Figure 3.1: Minimum Dilutions of Year 2020 of Validation Run and Comparison with Observed Dilutions

Table 3.1: Averaged Dilution Obtained Within and At the Edge of the Mixing Zone for Year 2020 of Validation Run

Year	Averaged Observed Dilution	Averaged Modelled Dilution
2020	50:1	57:1

Figure 3.2 to Figure 3.4 presents the maximum TDS concentration at the edge of the mixing zone from year 2018 to 2020, incorporating the observed TDS effluent discharged combined with the observed background TDS concentration prior to mine activities (41 mg/L based on samplings in year 2018). Observed TDS are represented as red dots in Figure 3.2, 3.3 and 3.4.

As one can observe, the modelled TDS concentrations are well aligned with the observations in general:

- Note that MEL-13 sampling site is situated very close to the diffuser location and therefore within the edge of the mixing zone, while MEL-13-01, MEL-13-07 and MEL-13-10 sites are located at the edge of the mixing zone. Therefore, it is anticipated that there is a potential lower modelled TDS concentration at the edge of the mixing zone compared to MEL-13 which measures the TDS concentration within the mixing zone.
- As an example, observed TDS concentration indicated a range primarily between 40 mg/L and 80 mg/L at the edge of the mixing zone after 3-years of discharge (Figure 3.4). The modelled TDS concentration was obtained in the similar range with maximum concentration reaching about 70 mg/L.

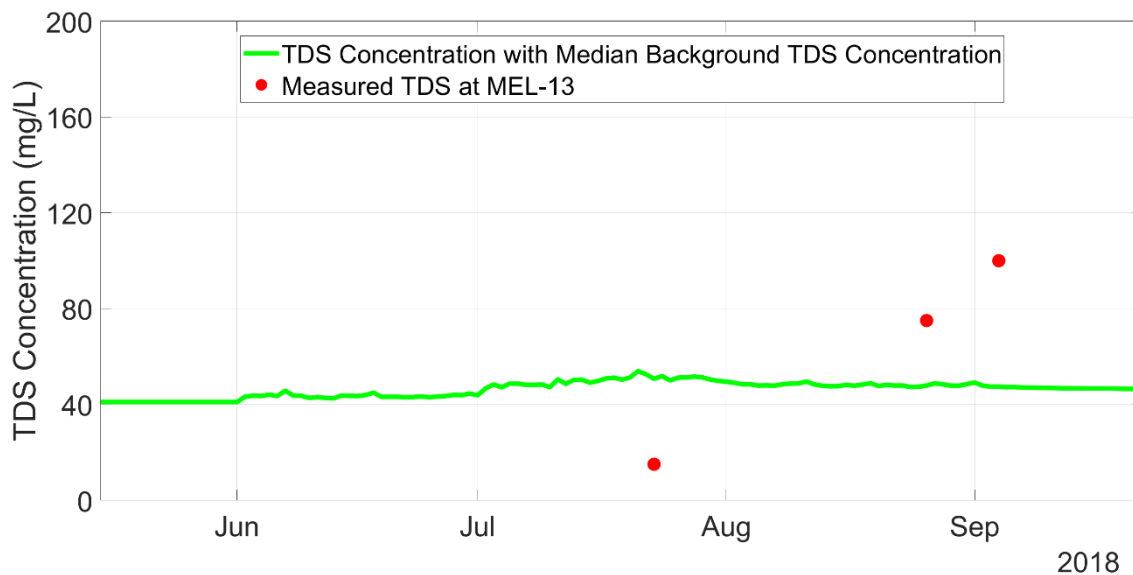


Figure 3.2: Maximum TDS Concentration of Year 2018 of Validation Run and Comparison with Observed TDS

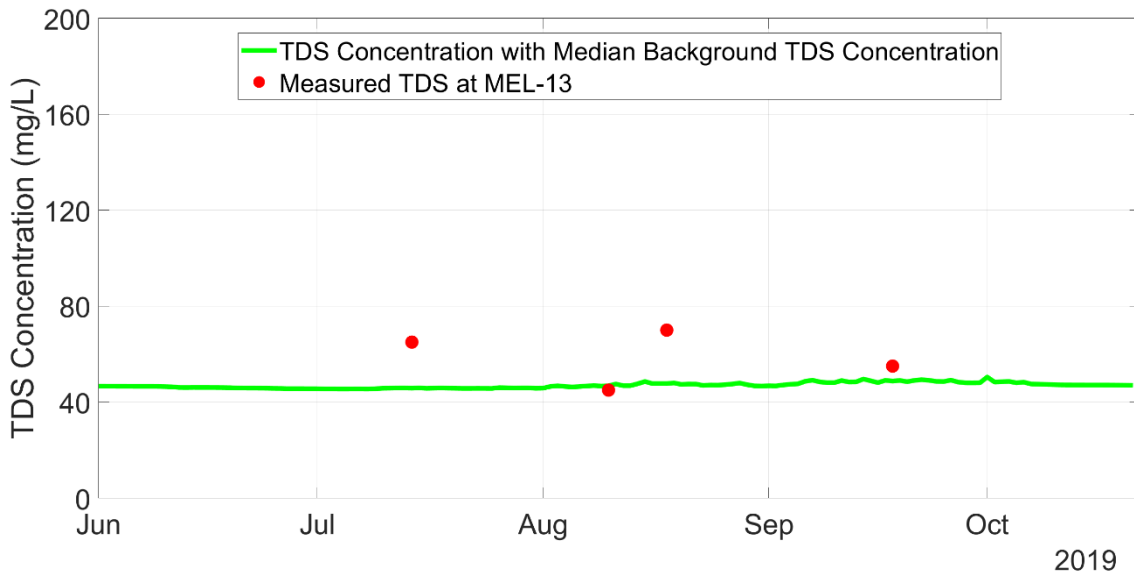


Figure 3.3: Maximum TDS Concentration of Year 2019 of Validation Run and Comparison with Observed TDS

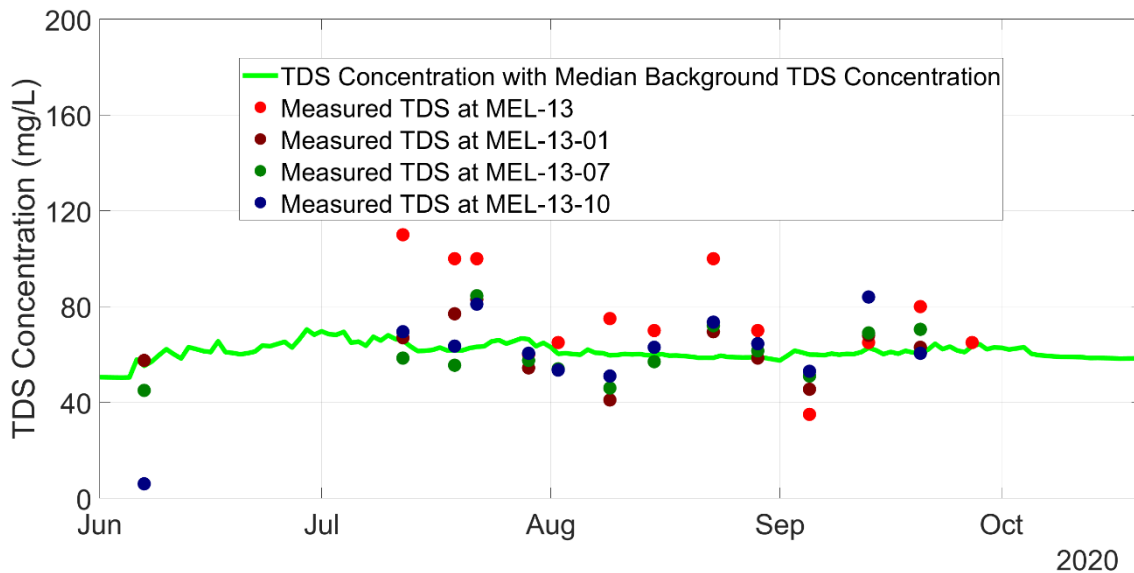


Figure 3.4: Maximum TDS Concentration of Year 2020 of Validation Run and Comparison with Observed TDS

Table 3.2 presents the comparison between averaged observed TDS concentration and averaged modelled TDS concentration from year 2018 to 2020. Although fluctuations were observed in the measured samplings, averaged modelled TDS concentrations are similar with the averaged observed TDS concentration for all three years, confirming the adequacy of the model. A lower modelled TDS concentration in year 2018 and 2019 compared to the averaged observed TDS at MEL-13 during these two years is likely due to the difference in measured and modelled locations:

- MEL-13 was closer to the diffuser location located within the edge of the mixing zone (less than 100-m radius from the diffuser location), whereas modelled TDS concentration represented the TDS level at the edge of the mixing zone (100-m radius mark from the diffuser location), farther from the diffuser; and
- Therefore, the modelled effluent value at the edge of the mixing zone would likely experience more mixing with the ambient water once released from the diffuser and thus resulting in potential lowered modelled TDS concentration compared to the MEL-13 observed site within the mixing zone.

Table 3.2: Comparison of Average TDS Concentration Reached at the Edge of the Mixing Zone for Year 2018, 2019 and 2020 of Validation Run with Observations

Year	Modelled TDS Concentration (mg/L)	Observed TDS Concentration (mg/L)
2018	49	63
2019	47	59
2020	62	65

3.1.2 Water Temperature Validation

Figure 3.5 presents a plan-view map of the surface layer water temperature in early August 2020 therefore including the multi-year discharge. As described in section 3.1.1, MEL-13-01, MEL-13-07 and MEL-13-10 are located at the edge of the mixing zone, and MEL-13 is situated within the mixing zone with closer distance to the diffuser. These locations are represented as one overall green dot in Figure 3.5 due to their close distance.

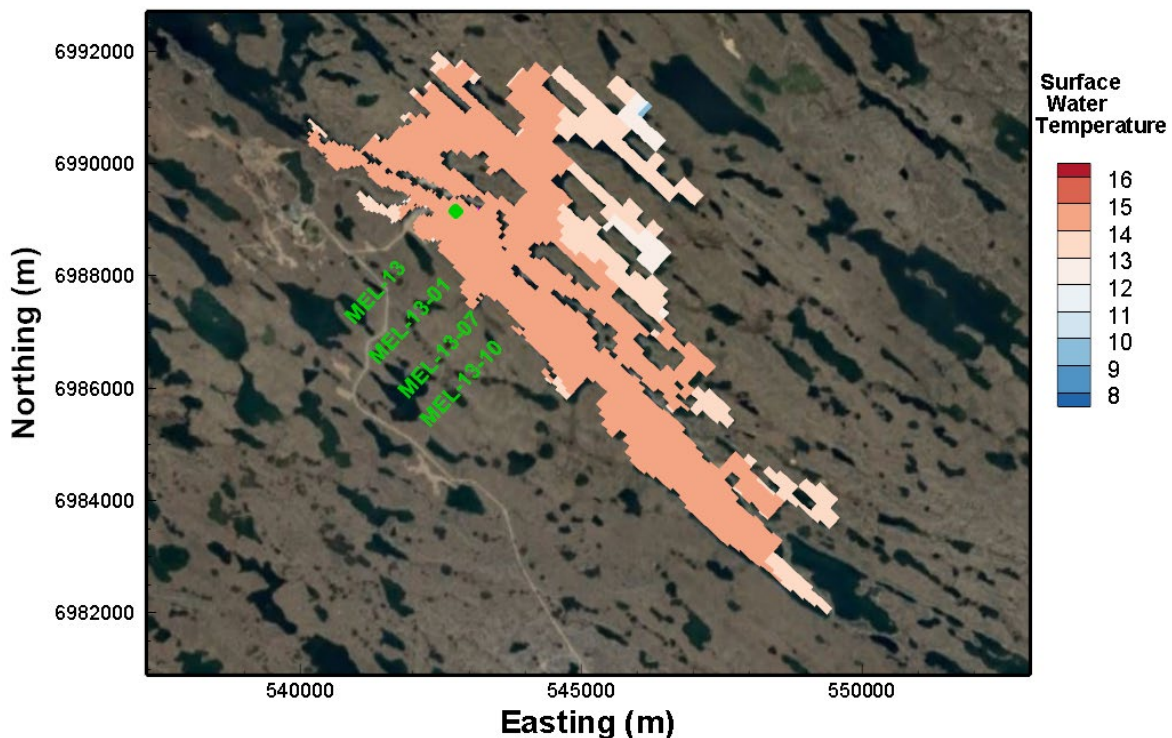


Figure 3.5: Water Temperature Map of Surface Layer in Early August of Year 2020 of Validation Run. Green dots Represent Water Temperature Sampling Locations.

As one can see, surface water temperature shows a quasi-uniformly distributed pattern with maximum temperature reaching up to 15 °C. The relative cooler temperature in the eastern channels is affected by the river inflows from the east end of the domain, which carries slightly cooler water temperatures compared to the lake temperature, while spreading and mixing locally.

Figure 3.6 to Figure 3.9 presents the comparison of modelled surface and bottom layer water temperature with measured water temperature at each single sampling site around the diffuser for year 2020. Overall, modelled water temperatures are well-aligned with the measurements in terms of both values and timing, indicating the model is capable to reproduce proper heating and cooling processes of the water. Another important result is the lack of temperature variations (i.e., no stratification) between the surface and the bottom of the lake. Temperatures are mostly uniform, reflecting the shallow bathymetry of the lake.

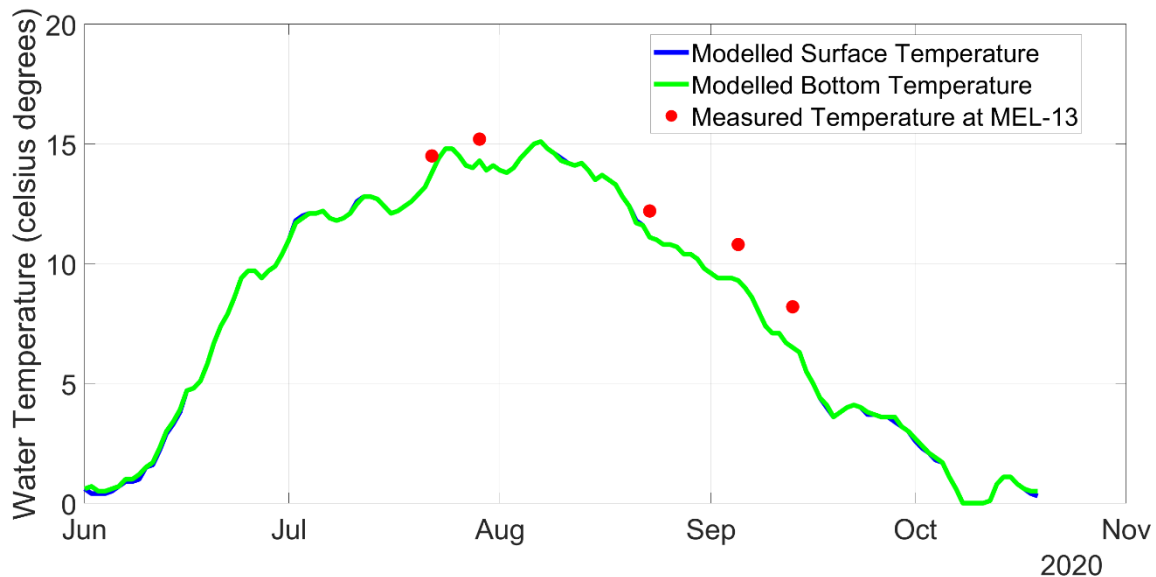


Figure 3.6: Comparison of Water Temperature of Modelled Surface and Bottom Layer Temperature with Measured Temperature at MEL-13 of Year 2020

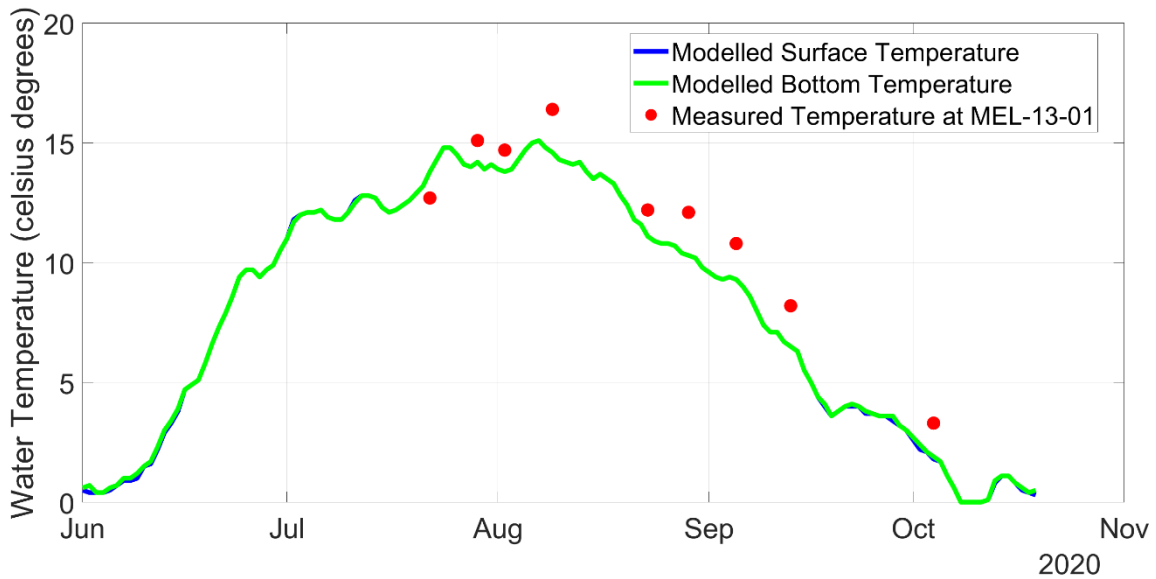


Figure 3.7: Comparison of Water Temperature of Modelled Surface and Bottom Layer Temperature with Measured Temperature at MEL-13-01 of Year 2020

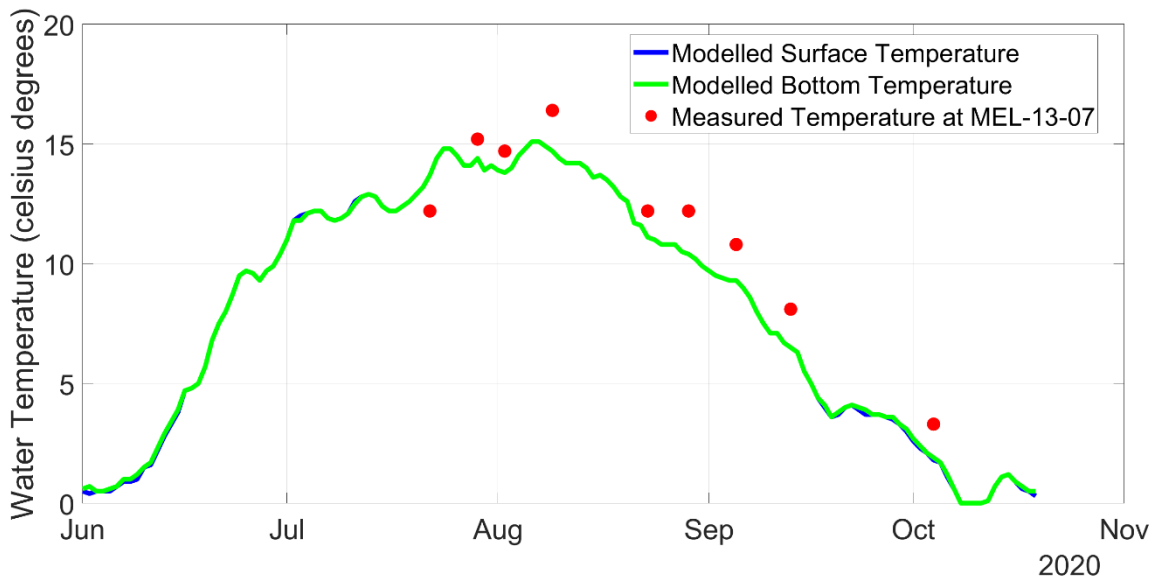


Figure 3.8: Comparison of Water Temperature of Modelled Surface and Bottom Layer Temperature with Measured Temperature at MEL-13-07 of Year 2020

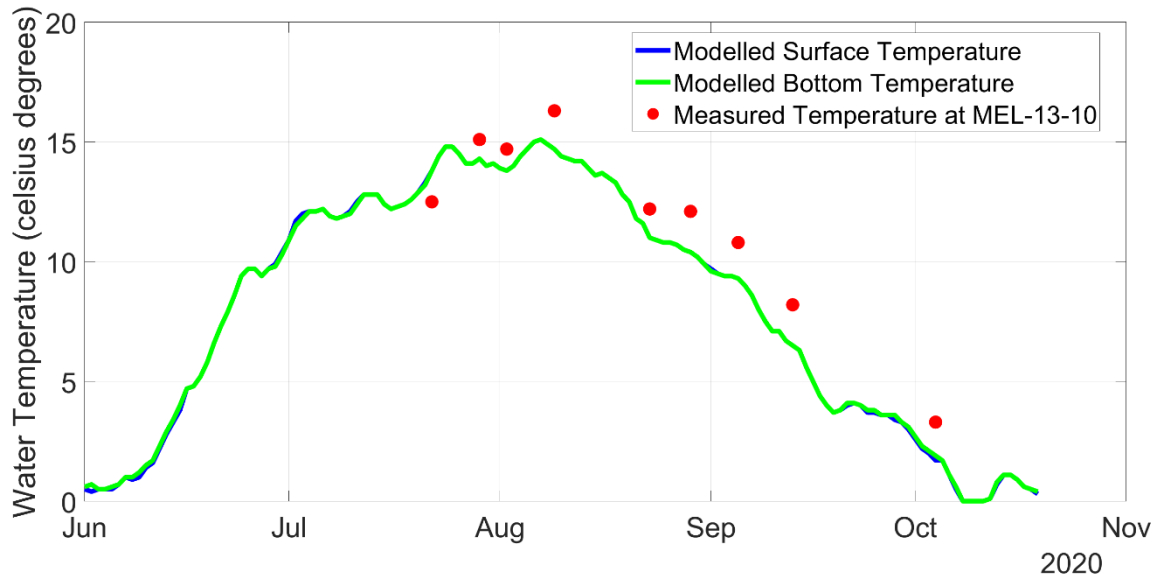


Figure 3.9: Comparison of Water Temperature of Modelled Surface and Bottom Layer Temperature with Measured Temperature at MEL-13-10 of Year 2020

3.2 Meliadine Extension Scenario Results

3.2.1 Discharged Effluent TDS

Table 3.3 provides statistics of maximum and average daily discharge volume and discharged TDS concentration for each prediction year from 2021 to 2050 during the open-water season.

Table 3.3: Statistics of Maximum and Average Daily Effluent Discharge Volume and Discharged TDS Concentration for Each Prediction Year during Open-Water Season

Year	Maximum Daily Effluent Discharge Volume (m ³ /day)	Average Daily* Effluent Discharge Volume (m ³ /day)	Maximum Daily Discharged TDS Concentration (mg/L)	Average Daily* Discharged TDS Concentration (mg/L)
2021	30,000	5,177	1,648	1,263
2022	30,000	5,737	1,490	1,186
2023	30,000	4,528	1,657	1,364
2024	30,000	2,053	2,080	1,654
2025	30,000	5,057	937	865
2026	30,000	4,335	1,135	949
2027	30,000	7,907	931	649
2028	30,000	9,471	933	574
2029	30,000	11,673	763	483

Year	Maximum Daily Effluent Discharge Volume (m ³ /day)	Average Daily* Effluent Discharge Volume (m ³ /day)	Maximum Daily Discharged TDS Concentration (mg/L)	Average Daily* Discharged TDS Concentration (mg/L)
2030	30,000	10,806	911	515
2031	30,000	6,971	868	636
2032	30,000	16,715	1,041	504
2033	30,000	14,706	875	557
2034	30,000	13,541	820	567
2035	30,000	16,356	909	532
2036	30,000	12,565	921	498
2037	30,000	12,946	885	527
2038	30,000	6,939	875	663
2039	30,000	16,102	1,024	574
2040	30,000	8,126	889	602
2041	30,000	11,261	1,017	641
2042	30,000	12,967	941	644
2043	30,000	7,135	917	715
2044	0	0	0	0
2045	0	0	0	0
2046	0	0	0	0
2047	0	0	0	0
2048	0	0	0	0
2049	0	0	0	0
2050	0	0	0	0

* *Average Daily Discharge Volume* and * *Average Daily Discharge TDS* calculated based on the entire open-water season, i.e. also taking into account days when no discharge occurs.

Since both effluent volume (i.e., upper panel of Figure 2.4) and discharged TDS concentration (i.e., lower panel of Figure 2.4) vary from day to day for each single year, an annual weighted discharged TDS was thus derived to represent the representative TDS concentration associated with the effluent discharge of each year. Table 3.4 summarizes the annual effluent discharge volume, annual average discharged TDS concentration and derived multi-annual weighted effluent TDS concentration from year 2018 to 2050.

Table 3.4: Annual Effluent Discharge Volume, Averaged Discharged TDS and Calculated Multi-Annual Weighted Effluent TDS of Each Year

Year	Annual Effluent Discharge Volume (m ³)	Annual Averaged Discharged TDS Concentration (mg/L)	Multi-Annual Weighted Effluent TDS Concentration (mg/L)
2018	715,532	1,097	1,097
2019	306,773	1,119	1,119
2020	1,031,177	1,748	1,748
2021	792,012	1,263	1,381
2022	877,760	1,186	1,335
2023	692,727	1,364	1,340
2024	314,168	1,654	1,361
2025	773,679	554	1,247
2026	663,326	864	1,206
2027	1,209,824	649	1,115
2028	1,449,009	574	1,026
2029	1,786,002	483	935
2030	1,653,275	515	878
2031	1,066,607	636	859
2032	2,557,385	504	802
2033	2,250,000	557	771
2034	2,071,750	567	750
2035	2,502,523	523	725
2036	1,922,506	532	710
2037	1,980,712	527	697
2038	1,061,654	663	695
2039	2,463,613	574	685
2040	1,243,345	602	682
2041	1,722,935	641	680
2042	1,983,929	644	678
2043	1,091,724	715	679
2044	0	0	679*
2045	0	0	679*
2046	0	0	679*
2047	0	0	679*
2048	0	0	679*
2049	0	0	679*
2050	0	0	679*

*Note that even though the effluent discharge to Meliadine Lake has stopped, the multi-annual weighted effluent TDS concentration is above 0 mg/L, as taking into account the past 24 years of active discharge. No new TDS or effluent is released into the lake from Year 2044; however there are still effluent present in the lake from the past years of discharge.

Figure 3.10 presents the time series of annual effluent discharge volume, annual average discharged TDS concentration and derived multi-annual weighted effluent TDS concentration from year 2018 to 2050.

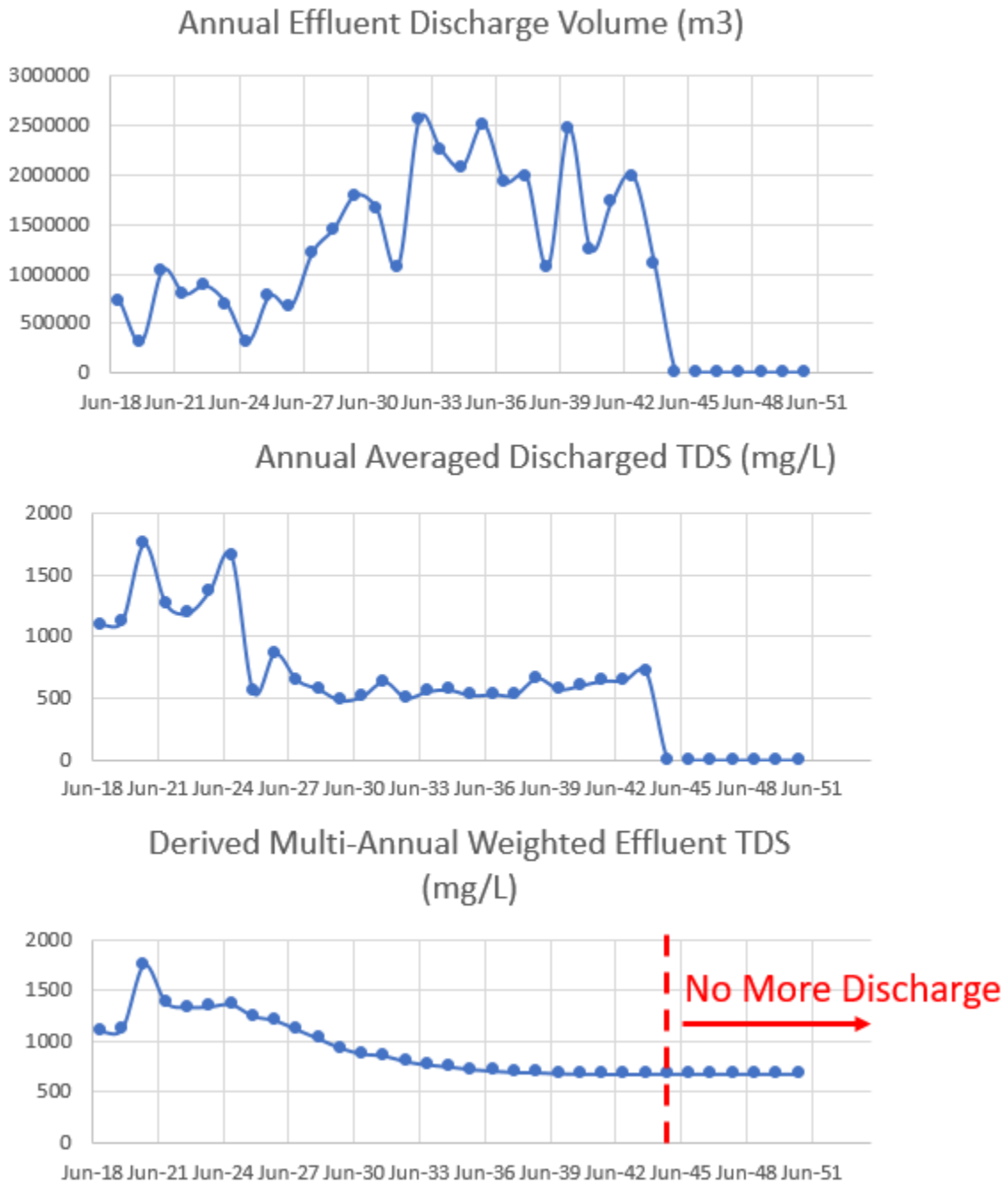


Figure 3.10: Time Series of Annual Effluent Discharge Volume (Upper Panel), Annual Average Discharged TDS (Middle Panel) and Derived Multi-Annual Weighted Effluent TDS (Lower Panel) from year 2018 to 2050.

3.2.2 Dilution

Table 3.5 summarized predicted minimum dilutions (corresponding to maximum concentrations) and average dilutions achieved at the 100-m mark characterizing the edge of the mixing zone for each prediction year from 2021 to 2050. As one can see, minimum dilution at the edge of the mixing zone ranges between 39:1 and 19:1 among the effluent discharge years from 2021 to 2043. Average dilution was obtained with higher dilution ranging between 110:1 and 29:1. It is also worth pointing out both minimum and average dilutions increase quickly (corresponding to concentration decreasing quickly) after the multi-year effluent discharge stops by end of the open-water season in year 2043. Followed by 7 years with no effluent discharge in year 2050, minimum dilution at the edge of the mixing zone is predicted to reach 1003:1, proving the adequacy of the Meliadine Lake system to recover to a near pre-discharge state after a total of 26-year continuous effluent discharge (i.e., from year 2018 to 2043).

For brevity, Figure 3.11 to Figure 3.14 present the time series of the minimum (green curve) and average dilution (blue curve) obtained at the edge of the mixing zone for only four years described as follows:

- Prediction year of 2021, corresponding to the beginning of discharge operations;
- Prediction year of 2033, corresponding to the middle of the discharge operations;
- Predictive year of 2043, corresponding to the end of the discharge operations; and
- Year 2044, corresponding to the first year following the cease of the multi-year effluent discharge.

In Figure 3.11, 3.12 and 3.13 during effluent active discharge years, dilutions show immediate response to the effluent discharge as a function of time. For example, in year 2021 (Figure 3.11), a trend of decrease and fluctuation in dilution by late June is mostly driven by the high volume of effluent discharge during this period, reflecting an accumulation of effluent over time. Right after late June, dilution curves bounce up quickly and dilutions start increasing to over 90:1 and keep rising to about 126:1 by end of August. This trend of increase in dilution from late June to end of August is linked with the absence of discharge during this period, leading to an efficient mixing process with ambient water which increases the dilution (or reduces the concentration). A significant decrease and fluctuation in dilutions starting from September to late October is caused by the resume of discharge and then a stagnation of dilution curve in November due to the cease of discharge for this year.

It should also be noted the trend of increase in dilutions in Figure 3.12 (year 2033) and Figure 3.13 (year 2043) is not as significantly as in Figure 3.11 of year 2021, which is the beginning of the multi-year discharge simulation. This can be explained as an equilibrium state that is reached after several years of continuous effluent discharge (i.e., from year 2033 and onward), which stabilizes the dilution and concentration to some extent.

As multi-year discharge stops by year 2043, increase in dilutions is shown in Figure 3.14 of year 2044 from about 50:1 in early June to 85:1 by November, once again indicating Meliadine Lake has effective mixing and transport processes.

Table 3.5: Minimum and Average Dilution Reached at the Edge of the Mixing Zone for Each Prediction Year

Year	Minimum Dilution	Average Dilution
2021	32:1	98:1
2022	38:1	79:1
2023	36:1	84:1
2024	31:1	110:1
2025	39:1	100:1
2026	39:1	89:1
2027	30:1	70:1
2028	31:1	62:1
2029	27:1	47:1
2030	23:1	39:1
2031	26:1	47:1
2032	23:1	36:1
2033	21:1	34:1
2034	21:1	29:1
2035	20:1	29:1
2036	20:1	31:1
2037	21:1	31:1
2038	19:1	34:1
2039	21:1	33:1
2040	22:1	38:1
2041	24:1	38:1
2042	22:1	33:1
2043	24:1	41:1
2044	50:1	71:1
2045	84:1	123:1
2046	147:1	182:1
2047	213:1	320:1
2048	381:1	553:1
2049	628:1	908:1
2050	1003:1	1243:1

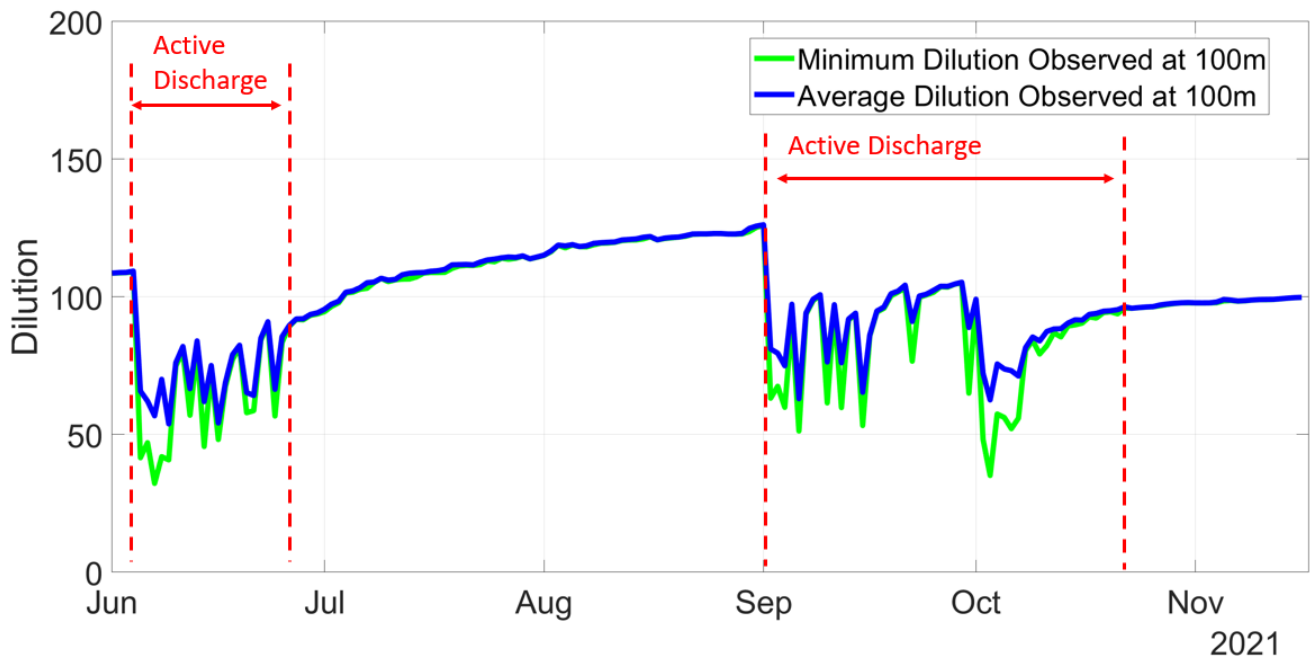


Figure 3.11: Minimum and Average Dilutions Achieved at the Edge of the Mixing Zone of Year 2021

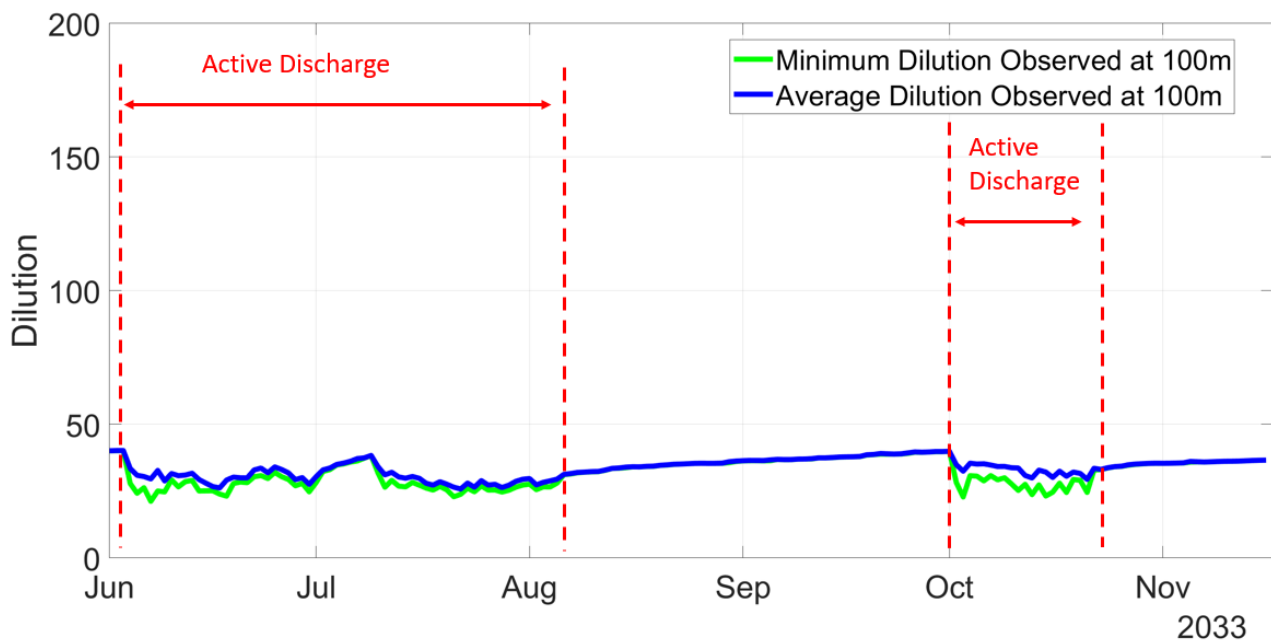


Figure 3.12: Minimum and Average Dilutions Achieved at the Edge of the Mixing Zone of Year 2033

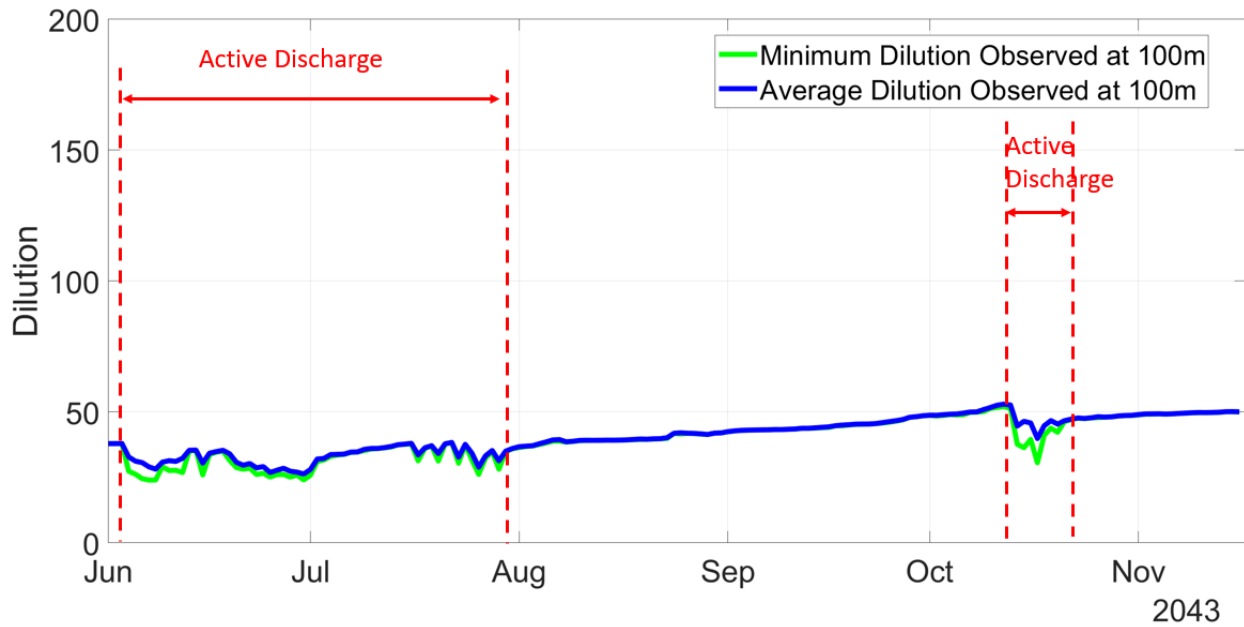


Figure 3.13: Minimum and Average Dilutions Achieved at the Edge of the Mixing Zone of Year 2043

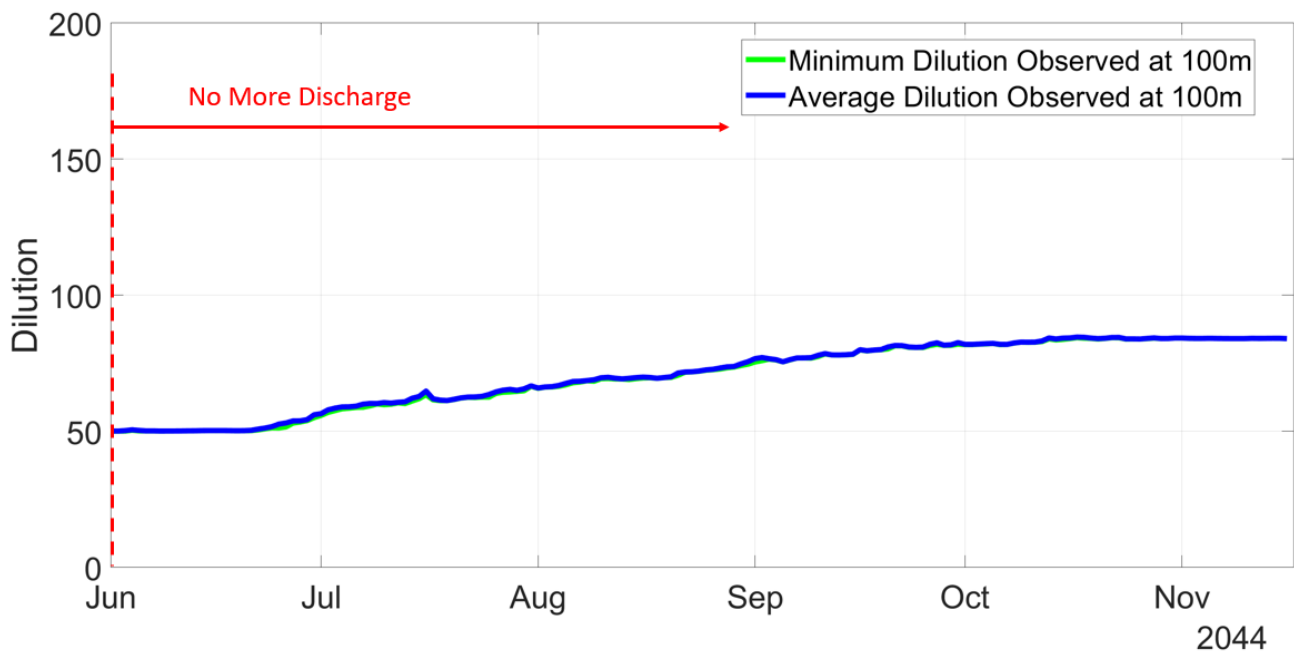


Figure 3.14: Minimum and Average Dilutions Achieved at the Edge of the Mixing Zone of Year 2044

As a summary, Figure 3.15 ensembles the range of minimum dilutions obtained at the edge of the mixing zone for each prediction year from 2021 to 2050 in the form of box and whisker, including statistics of median, average, range of 25th-75th percentile and range of 9th-91th percentile of minimum dilutions of each year.

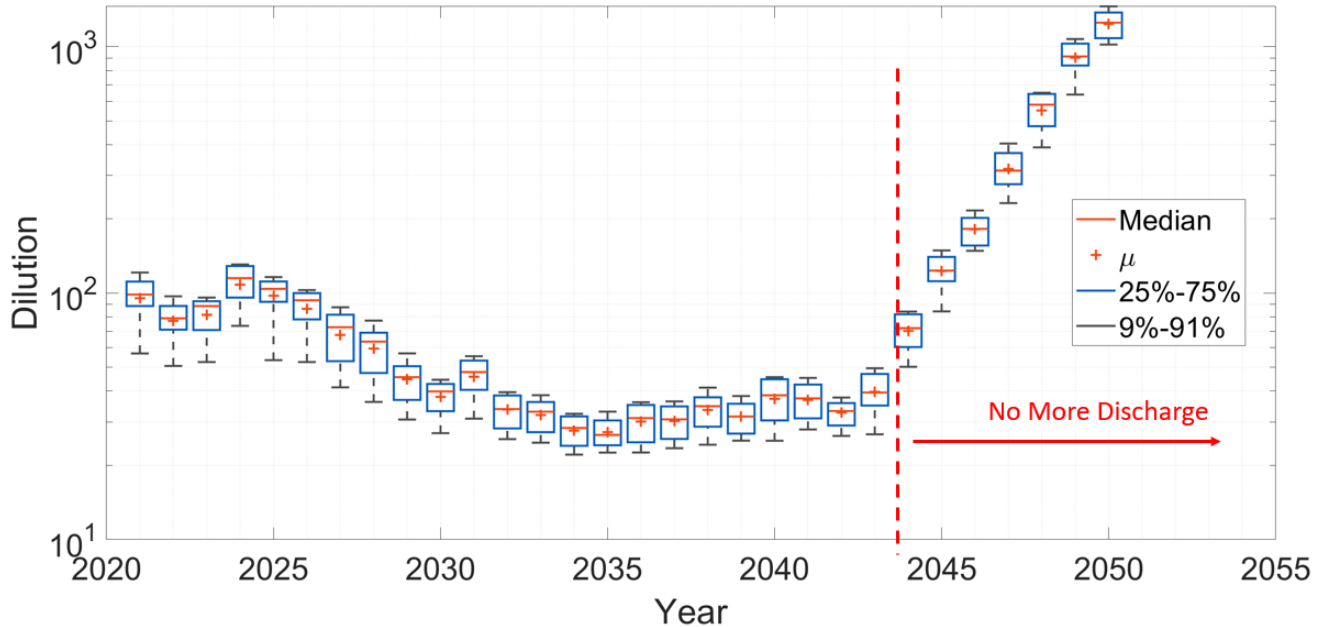


Figure 3.15: Box and Whisker Plot of Range of Minimum Dilutions Achieved at the Edge of the Mixing Zone for Each Prediction Year. Median, Average, range of 25th -75th percentile and range of 9th - 91th percentile are Shown.

3.2.3 TDS Concentration

Figure 3.16 presents a plan-view map of the surface layer tracer concentration in the entire southeast sub-basin in late July 2043, the last year of active effluent discharge, therefore including the accumulative multi-year discharge. Note that the tracer is released with a concentration of 1 (m³/m³). For example, a tracer concentration value of 0.1 corresponding to approximately a 10:1 dilution. Since the maximum tracer concentration of the surface layer in late July 2043 is 0.052 in the vicinity of the diffuser location, it corresponds to a dilution of roughly 19:1. As one can observe, the majority of the southeast sub-basin shows in quasi-uniformly light brown color, with the tracer concentration ranging between 0.020 and 0.030, corresponding to dilutions obtained between 50:1 and 33:1. This result indicates an adequate mixing-capacity of the southeast sub-basin system where a form of equilibrium is reached.

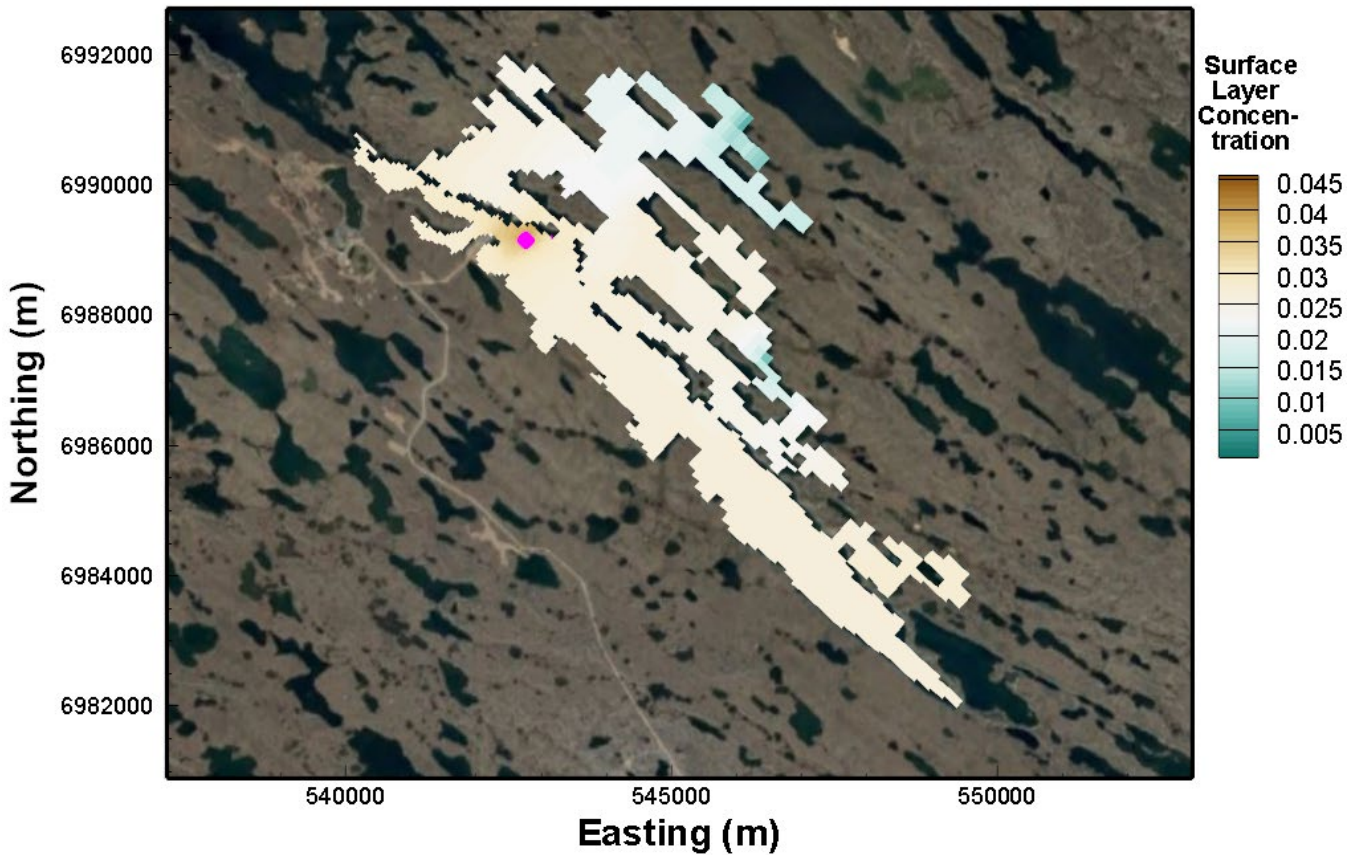


Figure 3.16: Tracer Concentration Map of Surface Layer in Late July of Year 2043 of Meliadine Extension Run. Pink point Represents Location of the Diffuser.

Table 3.6 summarizes the maximum and average TDS concentration achieved at the edge of the mixing zone for each prediction year from 2021 to 2050, incorporating the multi-annual weighted effluent discharge TDS levels as provided in Table 3.4 combined with the observed background TDS concentration pre-discharge of 41 mg/L based on samplings in year 2018.

As shown in Table 3.6, maximum TDS level at the edge of the mixing zone ranges between 67 mg/L and 82 mg/L during active discharge years. Average TDS level is relatively lower varying between 54 mg/L and 62 mg/L. After the effluent discharge stops in year 2043, the maximum and average TDS concentration starts to drop down and recovers back to near pre-discharge background lake level by year 2049-2050.

Similar to dilution results, Figure 3.17 to Figure 3.120 presents the time series of maximum (green curve) and average TDS concentration (blue curve) at the edge of the mixing zone only for year 2021, 2033, 2043 and 2044. A TDS peak concentration of 82 mg/L was reached in year 2024 throughout the entire multi-year discharge.

Table 3.6: Maximum and Average TDS Concentration Obtained at the Edge of the Mixing Zone for Each Prediction Year

Year	Maximum TDS Concentration (mg/L)	Average TDS Concentration (mg/L)
2021	81	55
2022	74	58
2023	76	57
2024	82	54
2025	71	54
2026	70	54
2027	76	57
2028	71	57
2029	73	60
2030	76	62
2031	71	59
2032	72	62
2033	74	62
2034	74	65
2035	74	64
2036	73	62
2037	71	62
2038	73	60
2039	70	60
2040	69	58
2041	67	58
2042	69	59
2043	67	57
2044	54	50
2045	49	46
2046	45	45
2047	44	43
2048	43	42
2049	42	42
2050	42	42

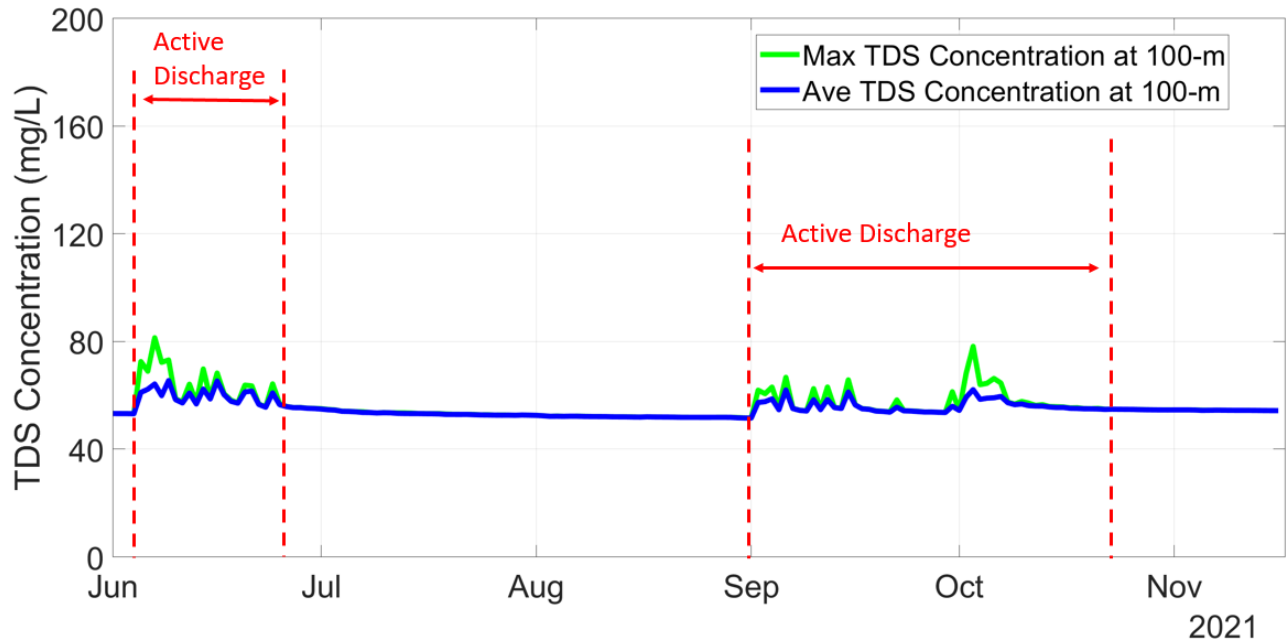


Figure 3.17: Maximum and Average TDS Concentrations Achieved at the Edge of the Mixing Zone of Year 2021

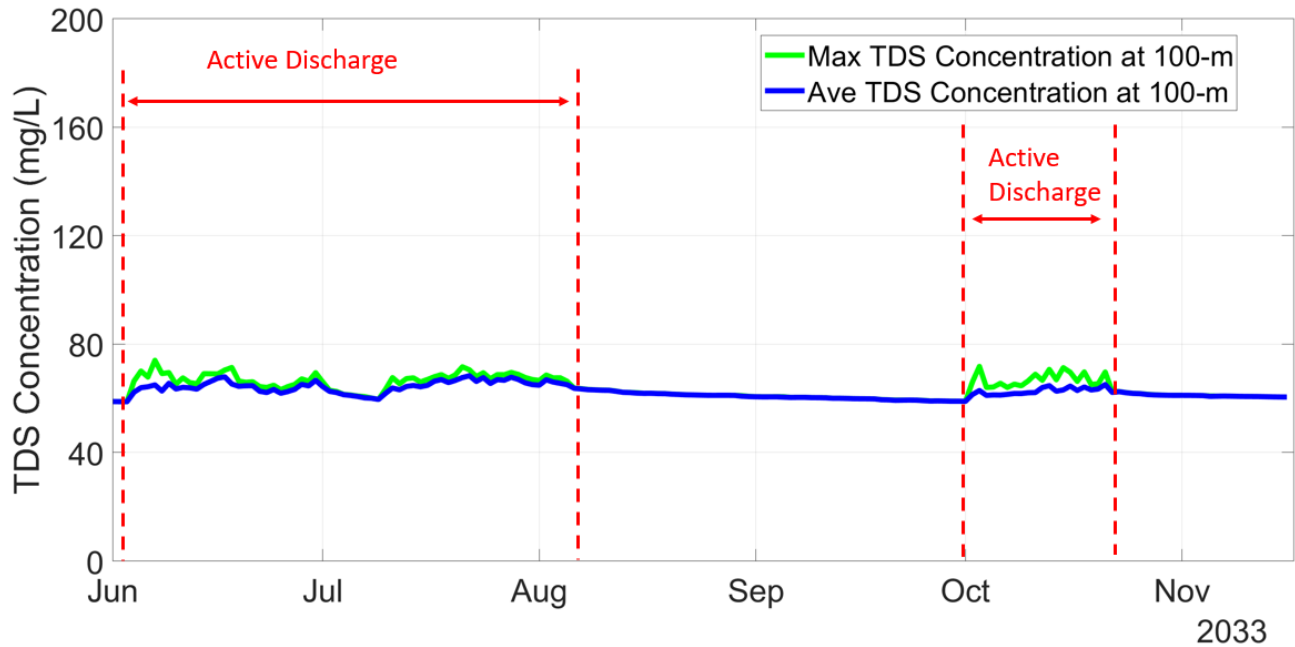


Figure 3.18: Maximum and Average TDS Concentrations Achieved at the Edge of the Mixing Zone of Year 2023

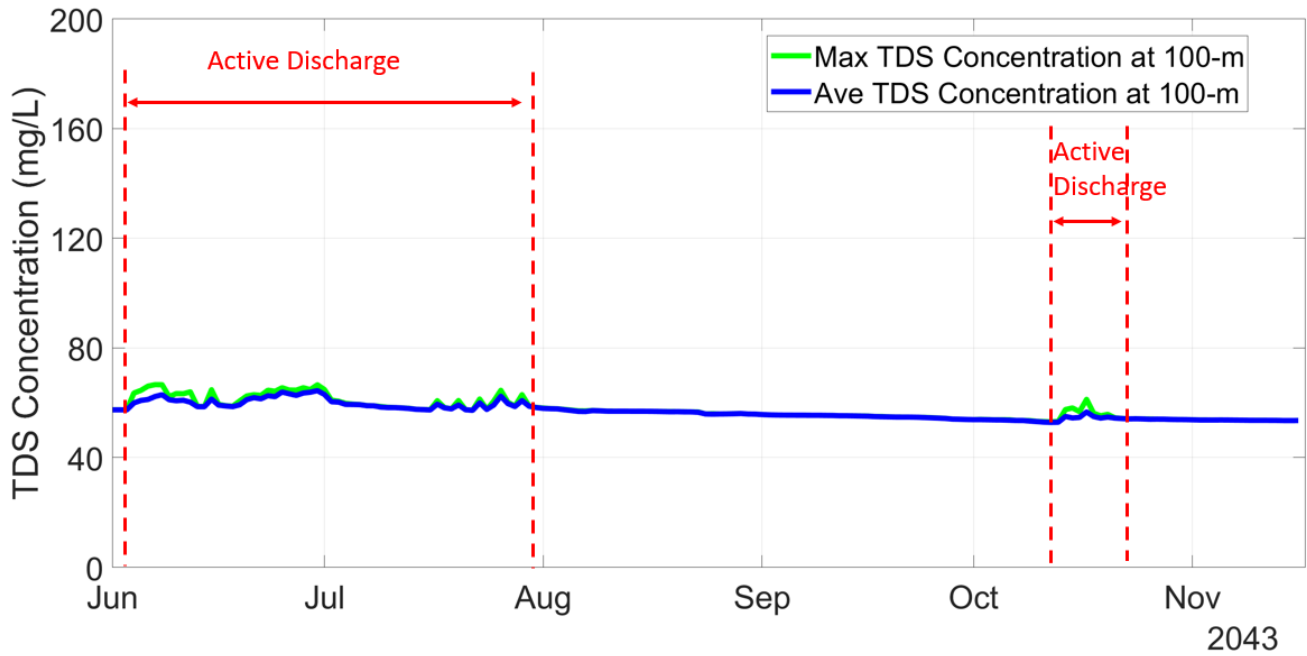


Figure 3.19: Maximum and Average TDS Concentrations Achieved at the Edge of the Mixing Zone of Year 2043

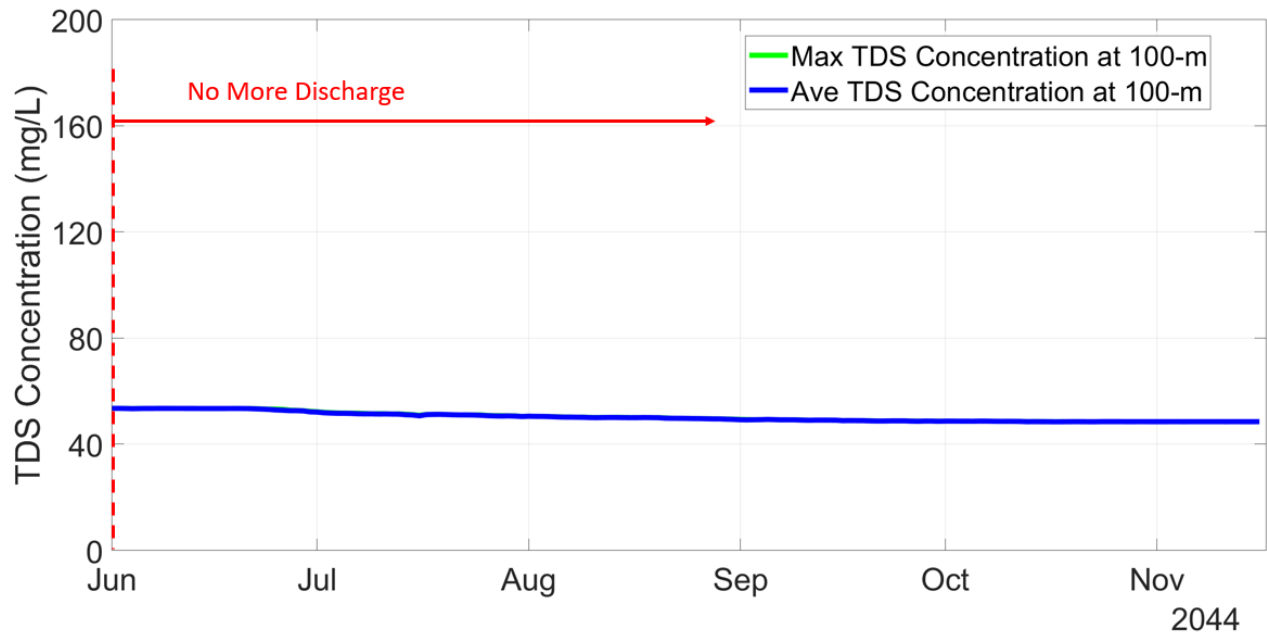


Figure 3.20: Maximum and Average TDS Concentrations Achieved at the Edge of the Mixing Zone of Year 2044

Similarly, Figure 3.21 ensembles the range of maximum TDS concentrations obtained at the edge of the mixing zone for each prediction year from 2021 to 2050 in the form of box and whisker, including statistics of median, average, range of 25th-75th percentile and range of 9th-91th percentile of maximum TDS concentrations for each year.

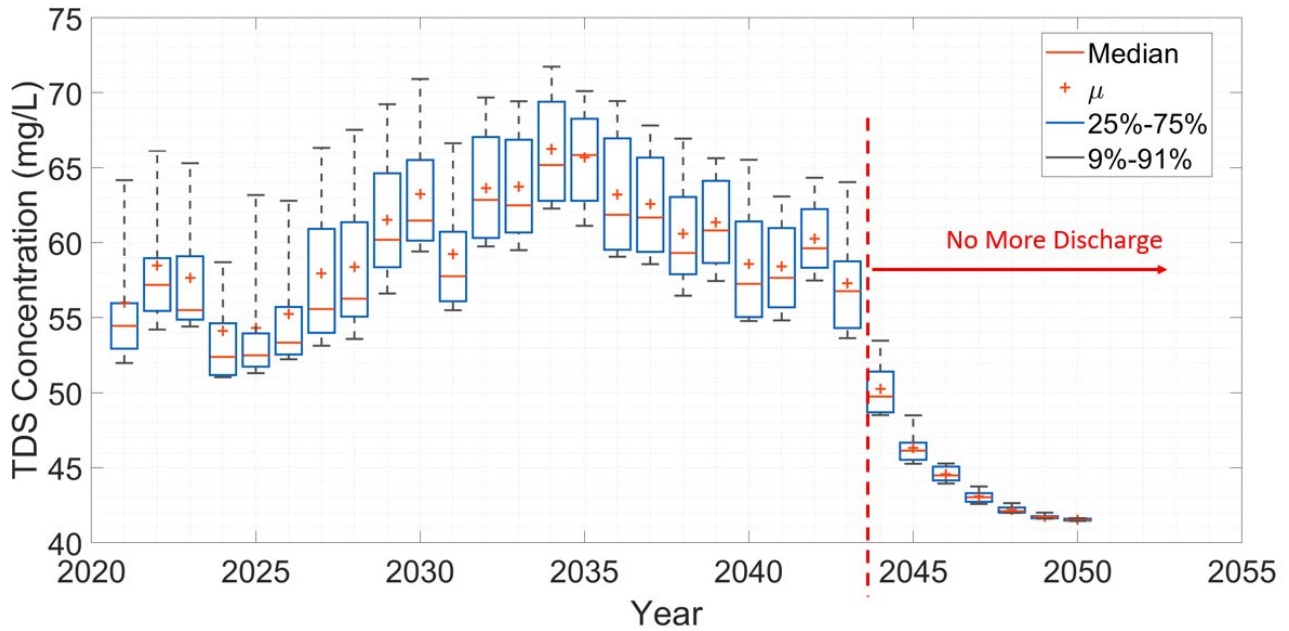


Figure 3.21: Box and Whisker Plot of Range of Maximum TDS Concentrations Achieved at the Edge of the Mixing Zone for Each Prediction Year. Median, Average, range of 25th -75th percentile and range of 9th -91th percentile are Shown.

3.2.4 Other Constituents

Through the 3-D model for Meliadine Lake, predictions were developed for TDS (Section 3.2.3) but also for the full suite of constituents expected in the effluent. Results for the other constituents are evaluated in the Meliadine Extension Addendum (Agnico Eagle 2021) in Section 7.4 (Water Quality Assessment) and Section 10 (Human Health and Ecological Risk Assessment). These evaluations were completed to determine if changes in water quality may influence the ability to drink the water, the continued opportunity for use of surface water for traditional and non-traditional uses, and continued healthy aquatic life.

4.0 CONCLUSION

This 3-D hydrodynamics modelling investigates the fate and behavior of the effluent discharge in the Meliadine Lake, as part of the Meliadine Mine Extension. Effluent is discharged through the existing diffuser and at a depth of about 11.4 m.

Based on the existing modelling framework submitted in 2017 and 2020, the model extent expands from the south sub-basin to the entire southeast sub-basin of the Meliadine Lake system, allowing water exchange to occur across channels connecting south and east sub-basin. This update to the model domain contributes to producing more realistic mixing and transport processes taking into account the physics of the entire sub-basin.

Model calibration was conducted for this updated 3-D model with an extension in the model domain. Validation simulation contains a multi-year discharge starting from year 2018 to 2020 with the existing effluent discharge schedule. Modelled results are compared with the available observations in terms of dilutions, TDS concentrations and water temperature. The main conclusions are as follows:

- Comparable modelled dilutions with observed dilutions measured in 2020;
- Good match on modelled TDS concentrations with observations measured in 2018, 2019 and 2020; and
- Good modelled water temperatures compared with observations taken in 2020.

Therefore, augmented with validation results obtained in year 2020, this updated 3-D model is then used over a multi-year simulation period ranging from year 2021 up to year 2050, known as the Meliadine Extension Scenario, to assess the dilutions and TDS concentrations in the lake. The discharge period spans over five months from June to October for year 2021 and onward and stops by end of October 2043. The highlight of the Meliadine Extension scenario conclusions are the followings:

- Dilutions results are aligned with past simulations conducted in Meliadine Lake;
- Minimum dilution achieved at the edge of the mixing zone varies between 19:1 and 39:1 throughout the multi-year discharge period from year 2021 to 2043. 19:1 is obtained as the minimum dilution over the entire multi-year discharge period;
- Maximum TDS concentration achieved at the edge of the mixing zone ranges between 67 mg/L and 82 mg/L. 82 mg/L is the peak TDS level considered as the maximum TDS concentration reached over the entire multi-year discharge period; and
- The Meliadine Lake system shows adequate capability in mixing and diluting the effluent. Ultimately, Meliadine Lake appears to recover back to pre-discharge condition within about 6-7 years following the end of the 26 years of open-water season discharge (year 2018 - 2043).

Table 4.1 summarizes the comparisons for the three modelling studies conducted in 2017, 2020 and current Meliadine Extension scenario on the minimum dilution achieved at the edge of the mixing zone. Results are very consistent.

Table 4.1: Comparison of Minimum Dilution Achieved at the Edge of the Mixing Zone Over a Multi-Year Simulation of Modelling Studies in 2007, 2020 and 2021

	Tetra Tech 2007 Modelling Study – Detailed Design	Tetra Tech 2020 Modelling Study – Water Licence Amendment	Tetra Tech 2021 Modelling Study - Meliadine Extension
Simulation Duration	Open-water season discharge over 14 years	Open-water season discharge over 8 years	Open-water season discharge over 23 years
Minimum Dilution at the Edge of Mixing Zone	23:1	26:1 (Base Case Scenario) 23:1 (Wet Year Scenario)	19:1

Results from this updated model to reflect the Meliadine Extension do not change from those presented in the Water Licence Amendment (Agnico Eagle 2020) and thus the conclusions for the assessment of changes to Meliadine Lake do not change.

5.0 CLOSURE

We trust this document meets your present requirements. If you have any questions or comments, please contact the undersigned.

Respectfully submitted,
 Tetra Tech Canada Inc.

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Prepared by:
 Jie Liu, M.Sc., EPt.
 Oceanographer – Air, Coastal and Lake Engineering
 Direct Line: 777.945.5888
 Jie.Liu@tetrattech.com

Reviewed by:
 Aurelien Hospital, M.Eng., M.Sc.
 Manager – Air, Coastal and Lake Engineering
 Direct Line: 777.945.5747
 Aurelien.Hospital@tetrattech.com

JL/AH/cy

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APPENDIX A

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LIMITATIONS ON USE OF THIS DOCUMENT

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If any error or omission is detected by the Client or an Authorized Party, the error or omission must be immediately brought to the attention of TETRA TECH.

1.4 DISCLOSURE OF INFORMATION BY CLIENT

The Client acknowledges that it has fully cooperated with TETRA TECH with respect to the provision of all available information on the past, present, and proposed conditions on the site, including historical information respecting the use of the site. The Client further acknowledges that in order for TETRA TECH to properly provide the services contracted for in the Contract, TETRA TECH has relied upon the Client with respect to both the full disclosure and accuracy of any such information.

1.5 INFORMATION PROVIDED TO TETRA TECH BY OTHERS

During the performance of the work and the preparation of this Professional Document, TETRA TECH may have relied on information provided by third parties other than the Client.

While TETRA TECH endeavours to verify the accuracy of such information, TETRA TECH accepts no responsibility for the accuracy or the reliability of such information even where inaccurate or unreliable information impacts any recommendations, design or other deliverables and causes the Client or an Authorized Party loss or damage.

1.6 GENERAL LIMITATIONS OF DOCUMENT

This Professional Document is based solely on the conditions presented and the data available to TETRA TECH at the time the data were collected in the field or gathered from available databases.

The Client, and any Authorized Party, acknowledges that the Professional Document is based on limited data and that the conclusions, opinions, and recommendations contained in the Professional Document are the result of the application of professional judgment to such limited data.

The Professional Document is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site conditions present, or variation in assumed conditions which might form the basis of design or recommendations as outlined in this report, at or on the development proposed as of the date of the Professional Document requires a supplementary exploration, investigation, and assessment.

TETRA TECH is neither qualified to, nor is it making, any recommendations with respect to the purchase, sale, investment or development of the property, the decisions on which are the sole responsibility of the Client.

1.7 ENVIRONMENTAL AND REGULATORY ISSUES

Unless expressly agreed to in the Services Agreement, TETRA TECH was not retained to explore, address or consider, and has not explored, addressed or considered any environmental or regulatory issues associated with the project.

1.8 LEVEL OF RISK

It is incumbent upon the Client and any Authorized Party, to be knowledgeable of the level of risk that has been incorporated into the project design, in consideration of the level of the hydrotechnical information that was reasonably acquired to facilitate completion of the design.

APPENDIX B

HHERA MELIADINE SPREADSHEET

Other Constituents Predictions for Total Concentration		Unit:	Background Lake Concentration	Year 2041					Year 2042					Year 2043				
				Jun	Jul	Aug	Sep	Oct	Jun	Jul	Aug	Sep	Oct	Jun	Jul	Aug	Sep	Oct
Monthly Average of Minimum Dilution (ratio)				34:1	31:1	35:1	39:1	42:1	34:1	32:1	30:1	31:1	34:1	29:1	34:1	39:1	45:1	47:1
EWTP[TDS]	mg/L	4.100E+01	5.754E+01	5.901E+01	5.697E+01	5.537E+01	5.437E+01	5.738E+01	5.834E+01	5.944E+01	5.887E+01	5.732E+01	6.008E+01	5.734E+01	5.530E+01	5.343E+01	5.290E+01	
EWTP[NH3_N]	mg/L	6.079E-03	9.802E-02	1.055E-01	9.401E-02	8.514E-02	7.962E-02	9.756E-02	1.024E-01	1.077E-01	1.043E-01	9.586E-02	1.114E-01	9.611E-02	8.486E-02	7.458E-02	7.178E-02	
EWTP[NO3_N]	mg/L	2.215E-02	1.858E-01	1.994E-01	1.788E-01	1.630E-01	1.532E-01	1.845E-01	1.933E-01	2.029E-01	1.969E-01	1.818E-01	2.099E-01	1.826E-01	1.626E-01	1.443E-01	1.391E-01	
EWTP[NO2_N]	mg/L	3.280E-03	5.940E-03	6.169E-03	5.835E-03	5.576E-03	5.415E-03	5.915E-03	6.063E-03	6.224E-03	6.125E-03	5.876E-03	6.345E-03	5.901E-03	5.574E-03	5.274E-03	5.186E-03	
EWTP[Cl]	mg/L	9.200E+00	1.655E+01	1.720E+01	1.630E+01	1.559E+01	1.514E+01	1.649E+01	1.692E+01	1.742E+01	1.717E+01	1.648E+01	1.773E+01	1.650E+01	1.559E+01	1.475E+01	1.452E+01	
EWTP[F]	mg/L	2.000E-02	2.280E-02	2.306E-02	2.271E-02	2.244E-02	2.227E-02	2.280E-02	2.297E-02	2.316E-02	2.306E-02	2.279E-02	2.329E-02	2.282E-02	2.247E-02	2.215E-02	2.205E-02	
EWTP[S04]	mg/L	3.800E+00	6.219E+00	6.448E+00	6.156E+00	5.922E+00	5.774E+00	6.227E+00	6.380E+00	6.562E+00	6.483E+00	6.253E+00	6.676E+00	6.266E+00	5.958E+00	5.677E+00	5.599E+00	
EWTP[T_CN]	mg/L	2.000E-03	1.972E-03	1.969E-03	1.973E-03	1.975E-03	1.977E-03	1.972E-03	1.970E-03	1.972E-03	1.968E-03	1.972E-03	1.972E-03	1.972E-03	1.975E-03	1.979E-03	1.979E-03	
EWTP[WAD_CN]	mg/L	2.000E-03	1.963E-03	1.959E-03	1.964E-03	1.967E-03	1.970E-03	1.963E-03	1.960E-03	1.958E-03	1.959E-03	1.963E-03	1.957E-03	1.963E-03	1.967E-03	1.972E-03	1.973E-03	
EWTP[Ag]	mg/L	5.000E-06	5.070E-06	5.076E-06	5.068E-06	5.061E-06	5.056E-06	5.069E-06	5.073E-06	5.078E-06	5.076E-06	5.069E-06	5.081E-06	5.069E-06	5.061E-06	5.053E-06	5.050E-06	
EWTP[Al]	mg/L	1.090E-03	2.814E-02	3.067E-02	2.739E-02	2.476E-02	2.311E-02	2.814E-02	2.978E-02	3.163E-02	3.068E-02	2.814E-02	3.265E-02	2.814E-02	2.476E-02	2.167E-02	2.082E-02	
EWTP[As]	mg/L	3.400E-04	5.101E-04	5.252E-04	5.044E-04	4.880E-04	4.777E-04	5.085E-04	5.185E-04	5.304E-04	5.248E-04	5.091E-04	5.371E-04	5.088E-04	4.877E-04	4.684E-04	4.632E-04	
EWTP[B]	mg/L	6.100E-03	9.450E-03	9.767E-03	9.361E-03	9.038E-03	8.833E-03	9.463E-03	9.675E-03	9.924E-03	9.813E-03	9.493E-03	1.008E-02	9.514E-03	9.087E-03	8.698E-03	8.589E-03	
EWTP[Ba]	mg/L	7.000E-03	7.588E-03	7.641E-03	7.568E-03	7.511E-03	7.475E-03	7.582E-03	7.616E-03	7.655E-03	7.634E-03	7.579E-03	7.679E-03	7.582E-03	7.509E-03	7.443E-03	7.424E-03	
EWTP[Be]	mg/L	1.000E-05	1.023E-05	1.025E-05	1.022E-05	1.020E-05	1.019E-05	1.023E-05	1.024E-05	1.026E-05	1.025E-05	1.023E-05	1.027E-05	1.023E-05	1.020E-05	1.017E-05	1.017E-05	
EWTP[Ca]	mg/L	6.700E+00	7.451E+00	7.521E+00	7.430E+00	7.358E+00	7.312E+00	7.449E+00	7.495E+00	7.549E+00	7.524E+00	7.454E+00	7.582E+00	7.457E+00	7.362E+00	7.276E+00	7.252E+00	
EWTP[Cd]	mg/L	5.000E-06	6.051E-06	6.151E-06	6.024E-06	5.923E-06	5.858E-06	6.055E-06	6.121E-06	6.197E-06	6.161E-06	6.061E-06	6.243E-06	6.066E-06	5.933E-06	5.811E-06	5.777E-06	
EWTP[Co]	mg/L	1.000E-05	6.411E-05	6.891E-05	6.222E-05	5.699E-05	5.371E-05	6.366E-05	6.678E-05	7.036E-05	6.849E-05	6.348E-05	7.260E-05	6.360E-05	5.690E-05	5.078E-05	4.909E-05	
EWTP[Cr]	mg/L	6.000E-05	1.262E-04	1.324E-04	1.244E-04	1.179E-04	1.139E-04	1.262E-04	1.302E-04	1.348E-04	1.325E-04	1.263E-04	1.373E-04	1.263E-04	1.180E-04	1.104E-04	1.083E-04	
EWTP[Cu]	mg/L	7.000E-04	7.541E-04	7.594E-04	7.530E-04	7.478E-04	7.444E-04	7.545E-04	7.581E-04	7.623E-04	7.606E-04	7.554E-04	7.647E-04	7.555E-04	7.486E-04	7.423E-04	7.405E-04	
EWTP[Fe]	mg/L	5.800E-03	3.911E-02	4.223E-02	3.819E-02	3.495E-02	3.292E-02	3.910E-02	4.112E-02	4.340E-02	4.223E-02	3.910E-02	4.466E-02	3.911E-02	3.495E-02	3.114E-02	3.009E-02	
EWTP[Hg]	mg/L	5.000E-07	8.291E-07	8.627E-07	8.241E-07	7.923E-07	7.719E-07	8.336E-07	8.561E-07	8.831E-07	8.727E-07	8.407E-07	8.977E-07	8.417E-07	7.990E-07	7.600E-07	7.492E-07	
EWTP[K]	mg/L	8.500E-01	1.076E+00	1.096E+00	1.068E+00	1.046E+00	1.032E+00	1.074E+00	1.087E+00	1.102E+00	1.094E+00	1.073E+00	1.112E+00	1.074E+00	1.046E+00	1.021E+00	1.014E+00	
EWTP[Mg]	mg/L	1.200E+00	1.496E+00	1.523E+00	1.488E+00	1.459E+00	1.441E+00	1.495E+00	1.514E+00	1.537E+00	1.527E+00	1.500E+00	1.550E+00	1.500E+00	1.463E+00	1.428E+00	1.419E+00	
EWTP[Mn]	mg/L	9.500E-04	7.606E-03	8.192E-03	7.364E-03	6.720E-03	6.316E-03	7.549E-03	7.927E-03	8.357E-03	8.120E-03	7.501E-03	8.649E-03	7.540E-03	6.717E-03	5.964E-03	5.751E-03	
EWTP[Mo]	mg/L	6.400E-05	1.030E-04	1.067E-04	1.020E-04	9.829E-05	9.590E-05	1.031E-04	1.056E-04	1.086E-04	1.073E-04	1.036E-04	1.103E-04	1.037E-04	9.876E-05	9.422E-05	9.298E-05	
EWTP[Na]	mg/L	4.700E+00	8.902E+00	9.269E+00	8.748E+00	8.341E+00	8.086E+00	8.861E+00	9.100E+00	9.372E+00	9.225E+00	8.834E+00	9.553E+00	8.853E+00	8.334E+00	7.860E+00	7.725E+00	
EWTP[Ni]	mg/L	5.500E-04	7.765E-04	7.985E-04	7.714E-04	7.497E-04	7.358E-04	7.782E-04	7.930E-04	8.105E-04	8.033E-04	7.817E-04	8.210E-04	7.825E-04	7.535E-04	7.269E-04	7.197E-04	
EWTP[P]	mg/L	1.809E-02	2.560E-02	2.619E-02	2.524E-02	2.451E-02	2.406E-02	2.558E-02	2.596E-02	2.634E-02	2.604E-02	2.535E-02	2.663E-02	2.539E-02	2.447E-02	2.364E-02	2.341E-02	
EWTP[Pb]	mg/L	1.000E-05	1.732E-05	1.801E-05	1.712E-05	1.640E-05	1.595E-05	1.728E-05	1.770E-05	1.818E-05	1.791E-05	1.722E-05	1.845E-05	1.725E-05	1.635E-05	1.552E-05	1.529E-05	
EWTP[Sb]	mg/L	2.000E-05	3.824E-05	4.018E-05	3.809E-05	3.634E-05	3.521E-05	3.867E-05	4.001E-05	4.167E-05	4.114E-05	3.935E-05	4.256E-05	3.940E-05	3.698E-05	3.476E-05	3.418E-05	
EWTP[Se]	mg/L	4.000E-05	4.680E-05	4.750E-05	4.671E-05	4.606E-05	4.564E-05	4.692E-05	4.741E-05	4.801E-05	4.782E-05	4.716E-05	4.835E-05	4.718E-05	4.628E-05	4.546E-05	4.525E-05	
EWTP[Sr]	mg/L	3.100E-02	6.150E-02	6.415E-02	6.033E-02	5.736E-02	5.550E-02	6.122E-02	6.293E-02	6.480E-02	6.368E-02	6.082E-02	6.618E-02	6.110E-02	5.733E-02	5.390E-02	5.289E-02	
EWTP[Ti]	mg/L	5.000E-06	6.537E-06	6.667E-06	6.472E-06	6.322E-06	6.229E-06	6.518E-06	6.600E-06	6.688E-06	6.630E-06	6.487E-06	6.758E-06	6.503E-06	6.315E-06	6.144E-06	6.092E-06	
EWTP[U]	mg/L	1.300E-05	4.768E-05	5.079E-05	4.652E-05	4.317E-05	4.106E-05	4.750E-05	4.955E-05	5.191E-05	5.072E-05	4.746E-05	5.344E-05	4.764E-05	4.331E-05	3.935E-05	3.824E-05	
EWTP[V]	mg/L	5.000E-05	1.237E-04	1.308E-04	1.219E-04	1.147E-04	1.102E-04	1.239E-04	1.284E-04	1.337E-04	1.311E-04	1.242E-04	1.365E-04	1.242E-04	1.149E-04	1.064E-04	1.041E-04	
EWTP[Zn]	mg/L	8.000E-04	8.772E-04	8.846E-04	8.752E-04	8.677E-04	8.630E-04	8.774E-04	8.822E-04	8.876E-04	8.850E-04	8.776E-04	8.908E-04	8.778E-04	8.681E-04	8.592E-04	8.567E-04	
EWTP[Ra226]	Bq/L	Unavailable	5.152E-05	5.659E-05	5.047E-05	4.551E-05	4.234E-05	5.208E-05	5.552E-05	5.968E-05	5.805E-05	5.306E-05	6.216E-05	5.335E-05	4.669E-05	4.060E-05	3.891E-05	

