# BIMES AGM
# Water Quality Monitoring
# Annual Report
# Mossom Creek Hatchery
# April 2023

Presented by Jennifer Madoc-Jones

# Mossom Creek and Schoolhouse Creek North Water Quality

Water quality monitoring for Mossom and North Schoolhouse Creeks began in the fall of 2019.

Our WQ data continues to indicate good water quality for both creeks. In 2022 we tested Mossom Creek water 52/52 weeks and Schoolhouse Creek North 40/52 weeks.

The parameters measured are water temperature, Dissolved Oxygen, % O2 saturation, pH, Conductivity, Total Dissolved Solids, Turbidity, Nitrates, Ammonia and Phosphates. Take a look at the graphs of the data to observe trends from January 2022 to February 2023. This past year we acquired a second Oxyguard Polaris meter for measuring Oxygen levels and temperature as well as a second Hanna Spectrophotometer for measuring ammonia, nitrates and phosphates. We have been using the Oakton meter for pH, Conductivity and Total Dissolved Solids and the Apera meter for Turbidity plus PSKF Hach titration kit for Oxygen and Indicator test for pH.

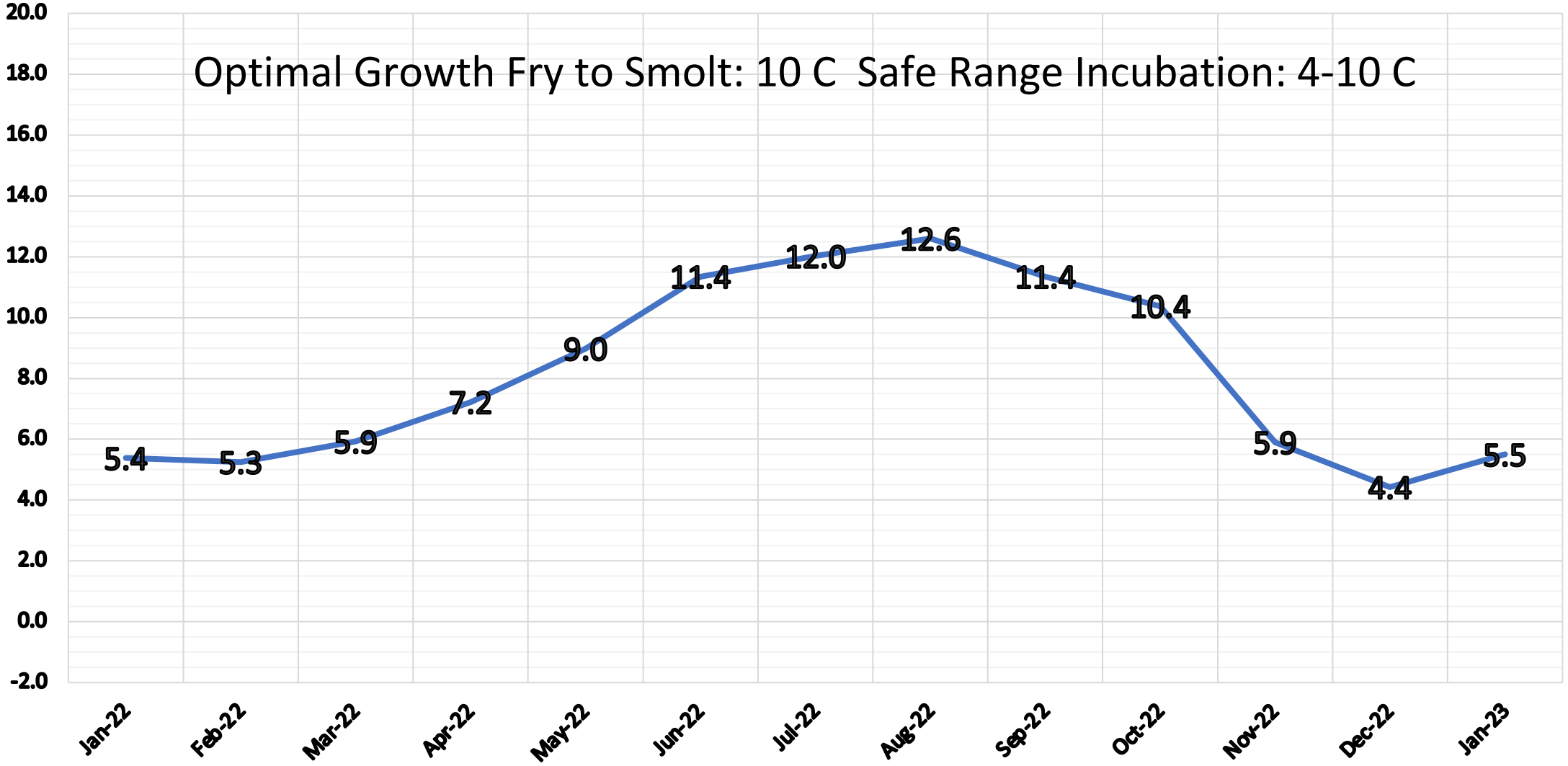
# Mossom Creek - Monthly Averages Jan 22-Feb 23

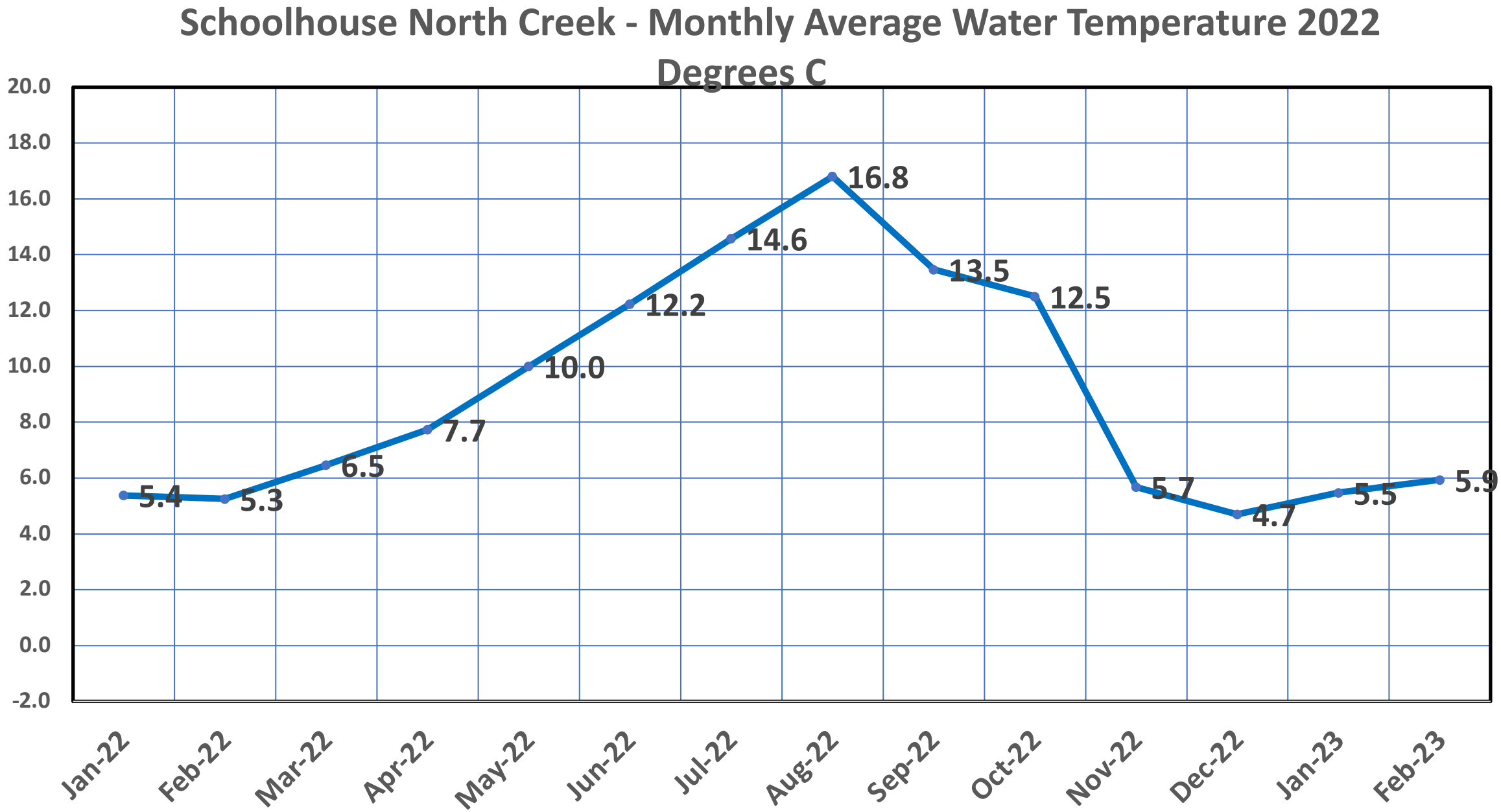
| 2022 | Dissolved Oxygen mg/L Oxyguard | Dissolved Oxygen %SAT Oxyguard | Disolved Oxygen mg/L Hach Kit | pH Hanna | pH Hach Kit | Total Dissolved Solids mg/L | Conductivity microSeimen uS/cm | Turbitity NTU | Ammonia mg/L | Nitrates mg/L | Phosphates mg/L | Water temperature Degrees C | Air Temperature C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Jan-22 | 13.2 | 104.7 | 11.4 | 6.90 | 7.0 | 98 | 123 | 7.8 | 0.06 | 0.90 | | 5.4 | 4.0 |
| Feb-22 | 13.1 | 102.4 | 12.3 | 7.38 | 7.0 | 64 | 81 | 8.6 | 0.07 | 1.20 | 0.05 | 5.3 | 7.0 |
| Mar-22 | 12.8 | 102.7 | 11.8 | 6.82 | 7.0 | 72 | 89 | 5.3 | 0.04 | 0.70 | 0.02 | 5.9 | 8.0 |
| Apr-22 | 12.4 | 103.2 | 12.3 | 7.33 | 7.3 | 93 | 115 | 5.4 | 0.01 | 0.60 | 0.06 | 7.2 | 9.3 |
| May-22 | 11.7 | 102.7 | 11.6 | 7.20 | 6.9 | 100 | 123 | 15.6 | 0.01 | 0.42 | 0.02 | 9.0 | 12.2 |
| Jun-22 | 10.9 | 101.1 | 11.8 | 7.52 | 7.1 | 102 | 137 | 19.7 | 0.03 | 0.90 | 0.10 | 11.4 | 17.3 |
| Jul-22 | 10.7 | 101.2 | 11.4 | 7.45 | 7.4 | 186 | 261 | 16.4 | 0.02 | 0.78 | 0.04 | 12.0 | 19.0 |
| Aug-22 | 10.7 | 102.7 | 11.3 | 7.30 | 7.6 | 162 | 244 | 9.8 | 0.09 | 0.50 | 0.10 | 12.6 | 22.5 |
| Sep-22 | 10.8 | 100.3 | 11.5 | 7.37 | 7.9 | 218 | 277 | 16.7 | 0.01 | 0.65 | 0.06 | 11.4 | 18.0 |
| Oct-22 | 11.3 | 101.2 | 12.2 | 7.02 | 7.7 | 206 | 291 | 17.1 | 0.07 | 1.25 | 0.23 | 10.4 | 16.0 |
| Nov-22 | 12.6 | 101.4 | 12.0 | 7.00 | 7.3 | 131 | 182 | 18.2 | 0.11 | 1.30 | 0.03 | 5.9 | 3.0 |
| Dec-22 | 13.0 | 101.2 | 13.0 | 6.86 | 7.1 | 145 | 204 | 20.1 | 0.03 | 0.98 | 0.15 | 4.4 | 0.8 |
| Jan-23 | 12.7 | 101.7 | 11.4 | 6.98 | 7.0 | 97.1 | 132 | 17.3 | 0.05 | 1.06 | 0.06 | 5.5 | 5.2 |
| Feb-23 | 12.7 | 101.8 | 11.3 | 6.91 | 7.0 | 99.7 | 141 | 20.4 | 0.05 | 1.00 | 0.04 | 5.3 | 6.3 |

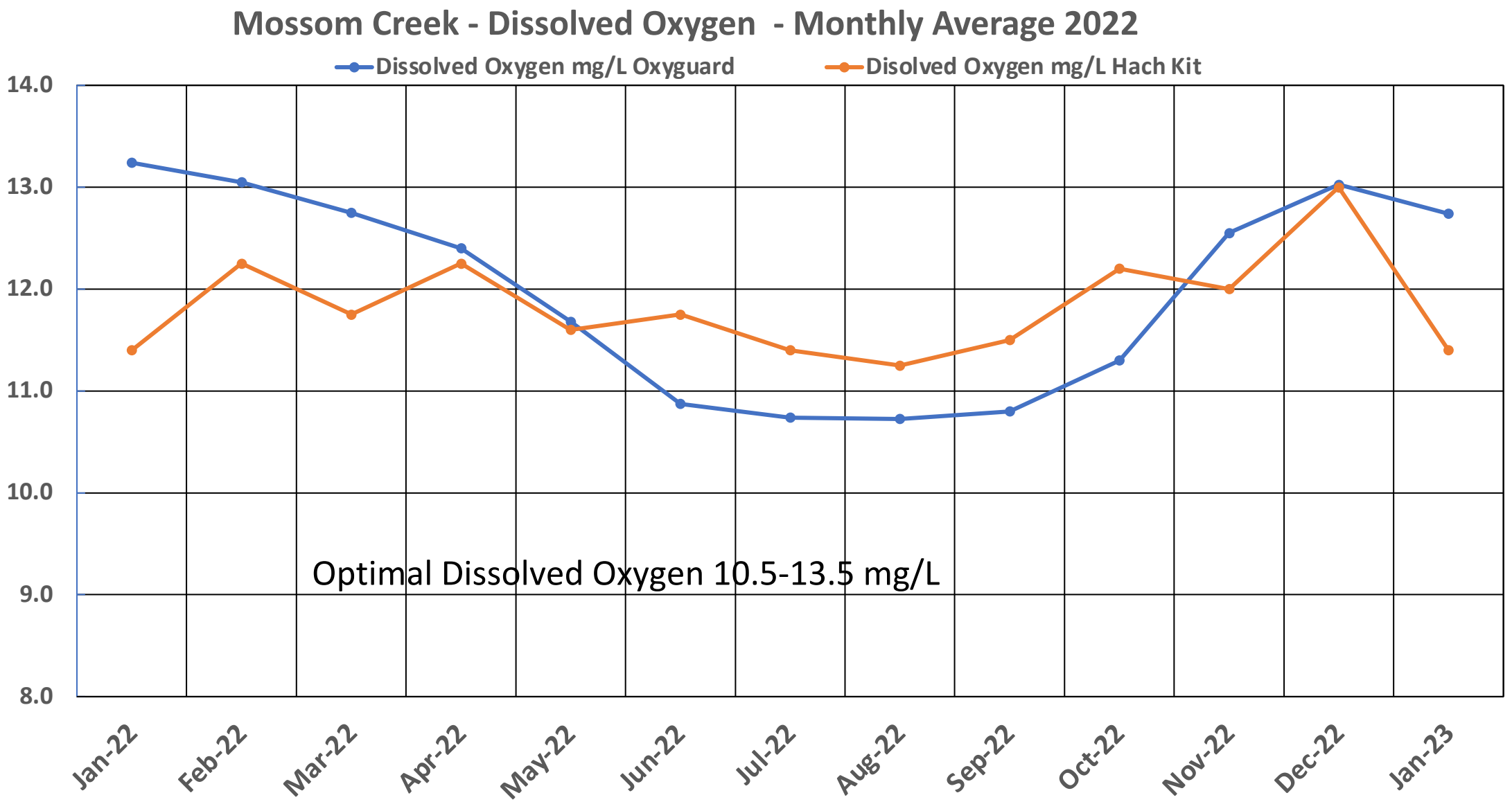
# Schoolhouse Creek North Monthly Averages Jan 22-Feb 23

| | Dissolved Oxygen mg/L Oxyguard | Dissolved Oxygen %sat Oxyguard | Disolved Oxygen mg/L Hach Kit | pH Hanna | pH Hach Kit | Total Dissolved Solids mg/l | Conductivity microSeimens | Turbitity NTU | Ammonia mg/L | Nitrates mg/L | Phosphates mg/L | Water temperature Degrees C | Air Temperature C |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Jan-22 | 13.2 | 104.7 | 11.4 | 6.90 | 7.0 | 98 | 123 | 7.8 | 0.06 | 0.9 | 0.08 | 5.4 | 4.0 |
| Feb-22 | 13.1 | 102.4 | 12.0 | 7.38 | 7.0 | 64 | 81 | 8.6 | 0.07 | 1.2 | 0.05 | 5.3 | 7.0 |
| Mar-22 | 12.6 | 102.9 | 12.7 | 6.91 | 7.0 | 80 | 93 | 5.1 | 0.04 | 1.4 | 0.01 | 6.5 | 8.0 |
| Apr-22 | 12.3 | 103.7 | 12.3 | 7.54 | 7.0 | 82 | 99 | 7.8 | 0.04 | 1.3 | 0.01 | 7.7 | 10.3 |
| May-22 | 11.4 | 102.6 | 11.3 | 7.56 | 7.2 | 77 | 94 | 11.3 | 0.03 | 0.7 | 0.07 | 10.0 | 13.7 |
| Jun-22 | 10.8 | 101.5 | 11.3 | 7.41 | 7.0 | 126 | 129 | 19.9 | 0.02 | 1.9 | 0.13 | 12.2 | 14.3 |
| Jul-22 | 10.0 | 98.0 | 11.0 | 7.36 | 7.0 | 173 | 240 | 12.5 | 0.00 | 1.1 | 0.05 | 14.6 | 19.3 |
| Aug-22 | 9.4 | 96.4 | 10.3 | 7.57 | 7.7 | 185 | 268 | 12.9 | 0.00 | 1.2 | 0.17 | 16.8 | 21.3 |
| Sep-22 | 10.0 | 95.2 | 12.0 | 7.56 | 7.7 | 212 | 276 | 18.9 | 0.05 | 1.0 | 0.09 | 13.5 | 18.3 |
| Oct-22 | 10.5 | 97.9 | 11.8 | 7.17 | 7.0 | 159 | 248 | 23.1 | 0.11 | 1.1 | 0.08 | 12.5 | 16.5 |
| Nov-22 | 12.4 | 99.7 | 13.0 | 7.08 | 7.0 | 143 | 202 | 20.4 | 0.14 | 1.2 | 0.05 | 5.7 | 3.0 |
| Dec-22 | 13.1 | 102.0 | 12.5 | 6.91 | 7.0 | 136 | 184 | 20.1 | 0.10 | 1.2 | 0.09 | 4.7 | 3.5 |
| Jan-23 | 12.5 | 100.8 | 11.7 | 6.83 | 7.0 | 119 | 168 | 20.8 | 0.02 | 1.3 | 0.01 | 5.5 | 4.3 |
| Feb-23 | 11.7 | 100.8 | 11.0 | 6.76 | 7.1 | 132 | 188 | 20.5 | 0.06 | 1.2 | 0.04 | 5.9 | 6.3 |

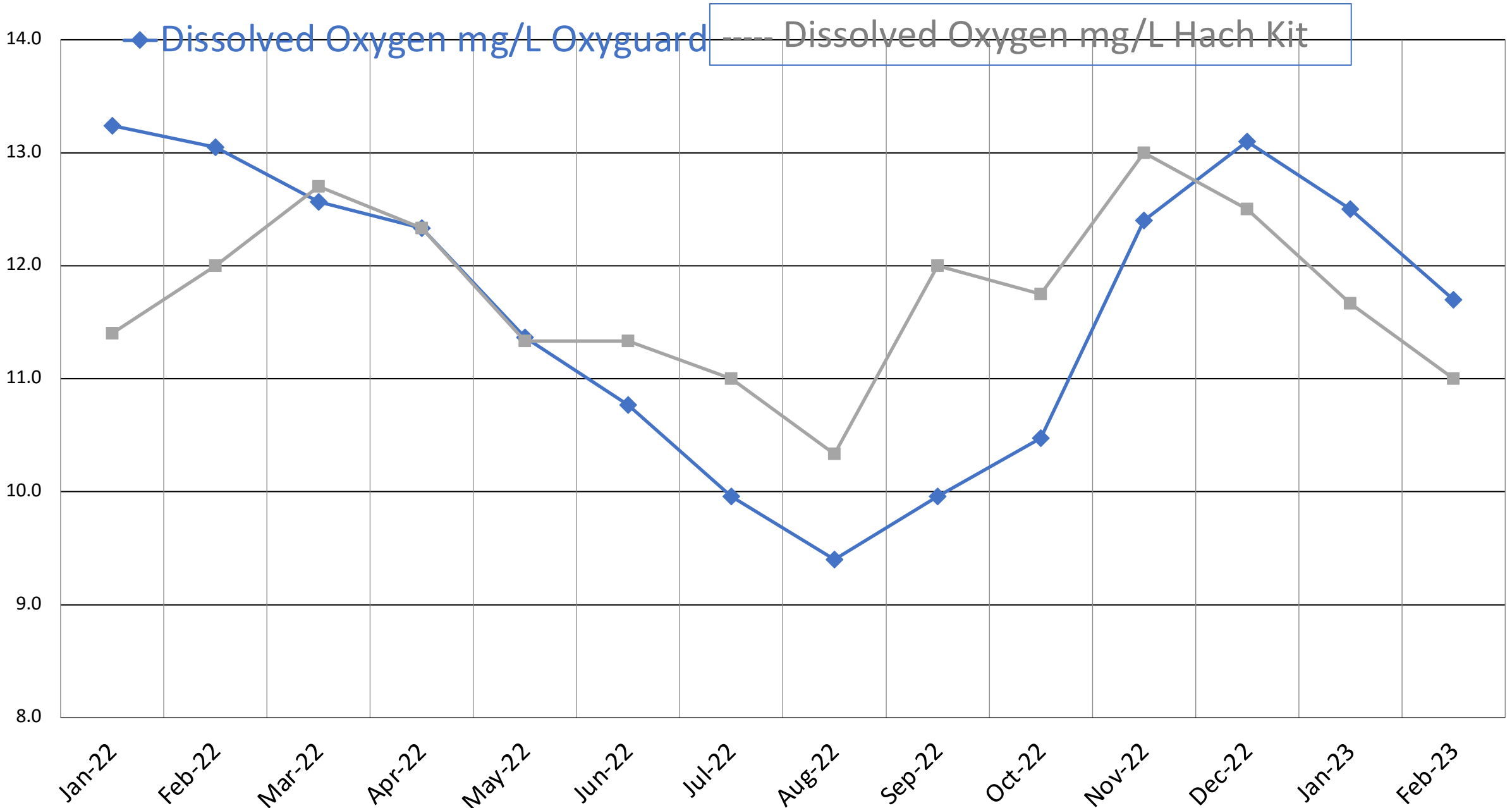
# Mossom Creek - Monthly Average Water Temperature 2022 - Degrees C



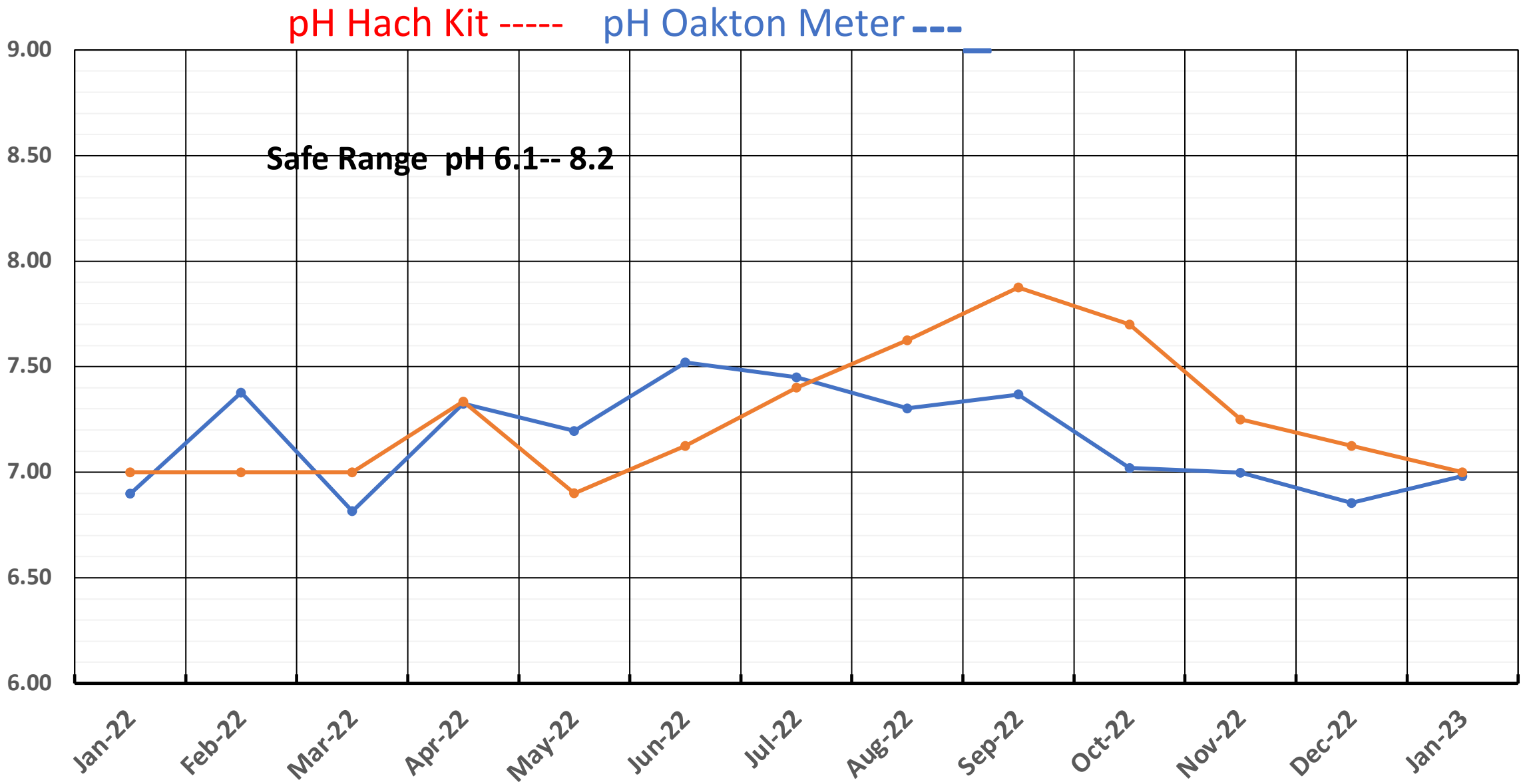

Schoolhouse North Creek - Monthly Average Water Temperature 2022
Degrees C
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
-2.0
5.4
5.3
6.5
7.7
10.0
12.2
14.6
16.8
13.5
12.5
5.7
4.7
5.5
5.9
Jan-22
Feb-22
Mar-22
Apr-22
May-22
Jun-22
Jul-22
Aug-22
Sep-22
Oct-22
Nov-22
Dec-22
Jan-23
Feb-23


Mossom Creek - Dissolved Oxygen - Monthly Average 2022
Dissolved Oxygen mg/L Oxyguard
Disolved Oxygen mg/L Hach Kit
14.0
13.0
12.0
11.0
10.0
9.0
8.0
Optimal Dissolved Oxygen 10.5-13.5 mg/L
Jan-22
Feb-22
Mar-22
Apr-22
May-22
Jun-22
Jul-22
Aug-22
Sep-22
Oct-22
Nov-22
Dec-22
Jan-23

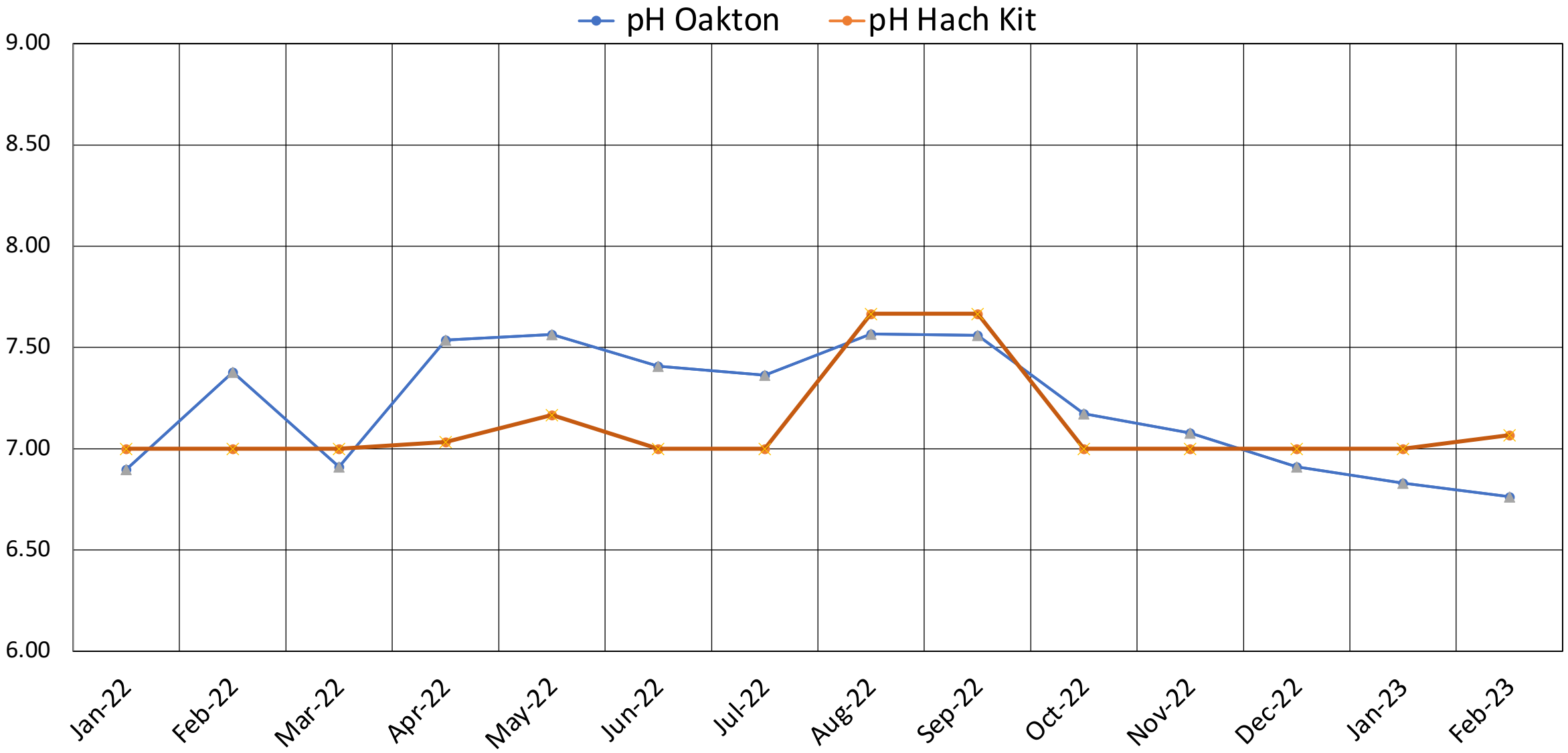
# Schoolhouse N. Creek - Dissolved Oxygen 2022

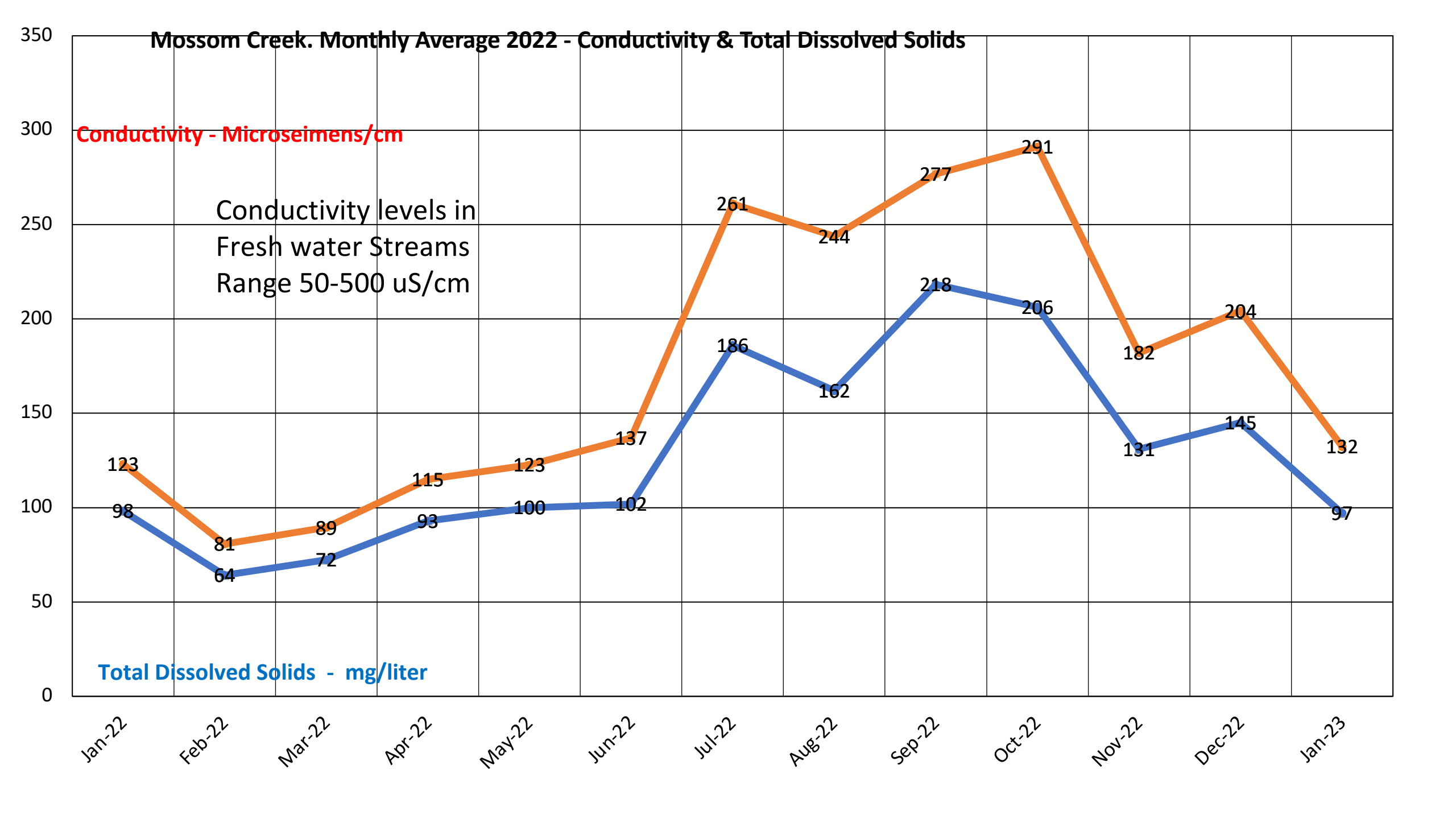


# Mossom Creek - pH Monthly Averages 2022

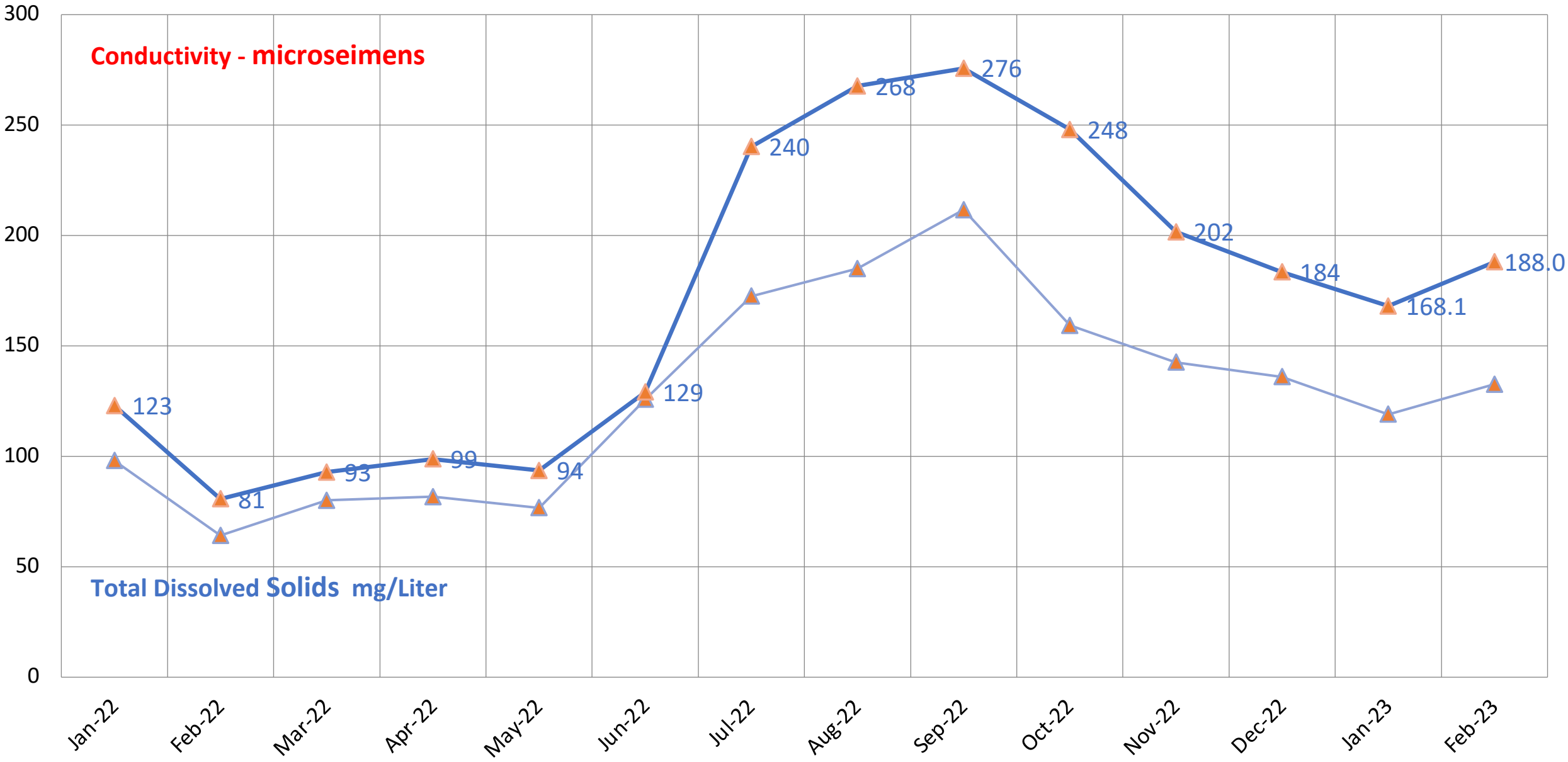


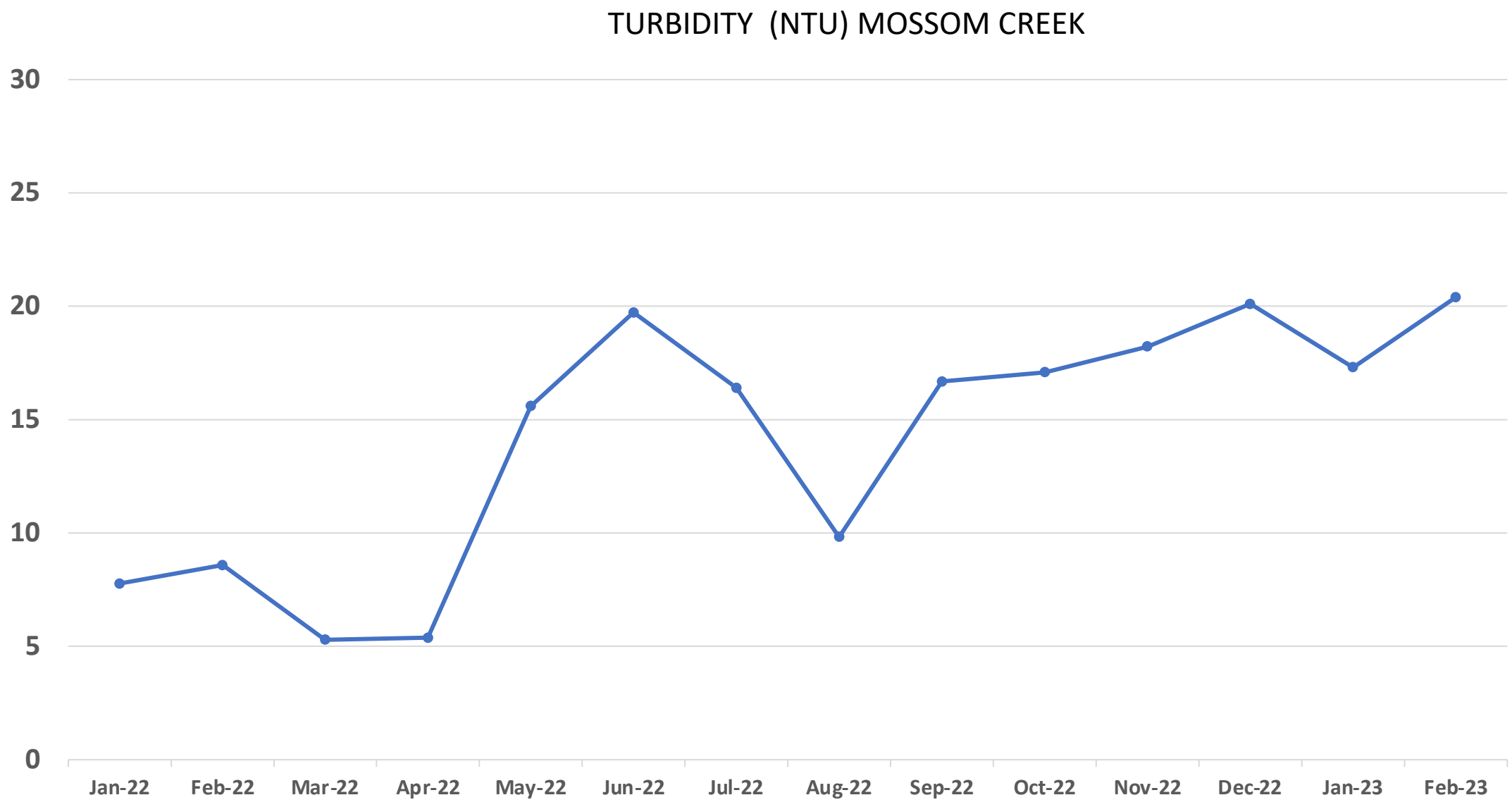
# Schoolhouse N. Creek - Monthly Average pH values 2022

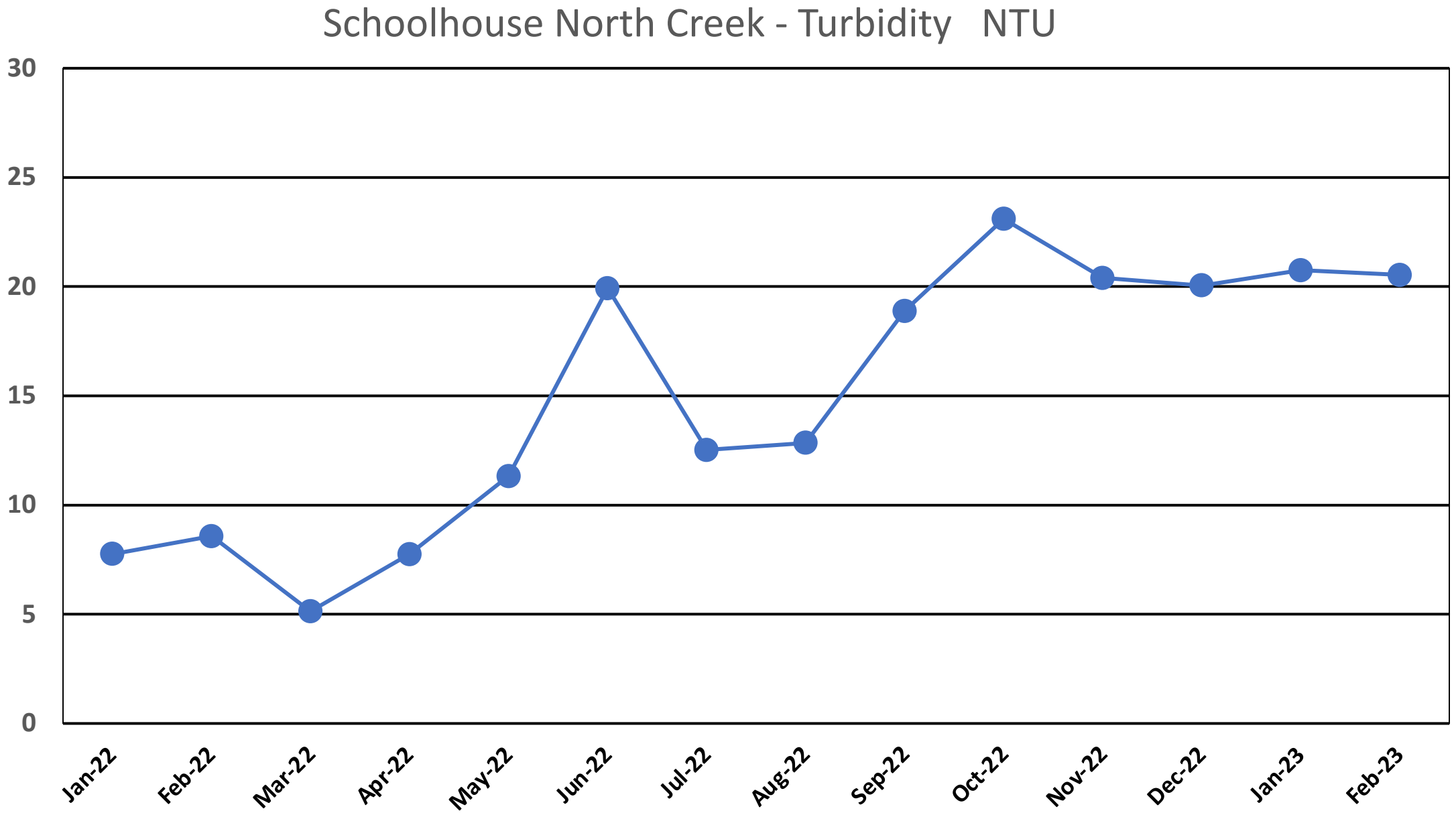


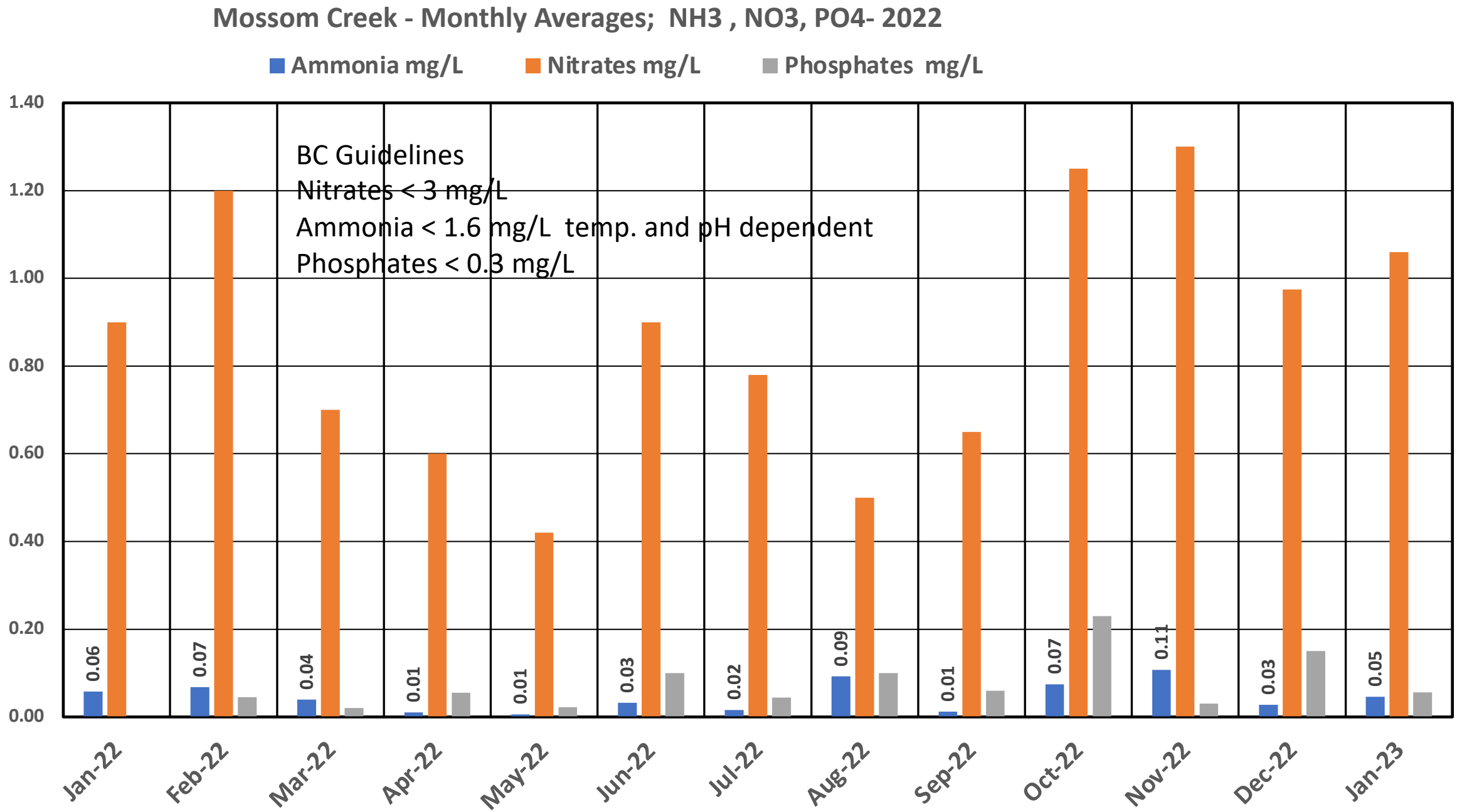

Mossom Creek. Monthly Average 2022 - Conductivity & Total Dissolved Solids
Conductivity - Microseimens/cm
Conductivity levels in
Fresh water Streams
Range 50-500 uS/cm
Total Dissolved Solids - mg/liter
350
300
250
200
150
100
50
0
123
81
89
115
123
137
261
244
277
291
182
204
132
98
64
72
93
100
102
186
162
218
206
131
145
97
Jan-22
Feb-22
Mar-22
Apr-22
May-22
Jun-22
Jul-22
Aug-22
Sep-22
Oct-22
Nov-22
Dec-22
Jan-23

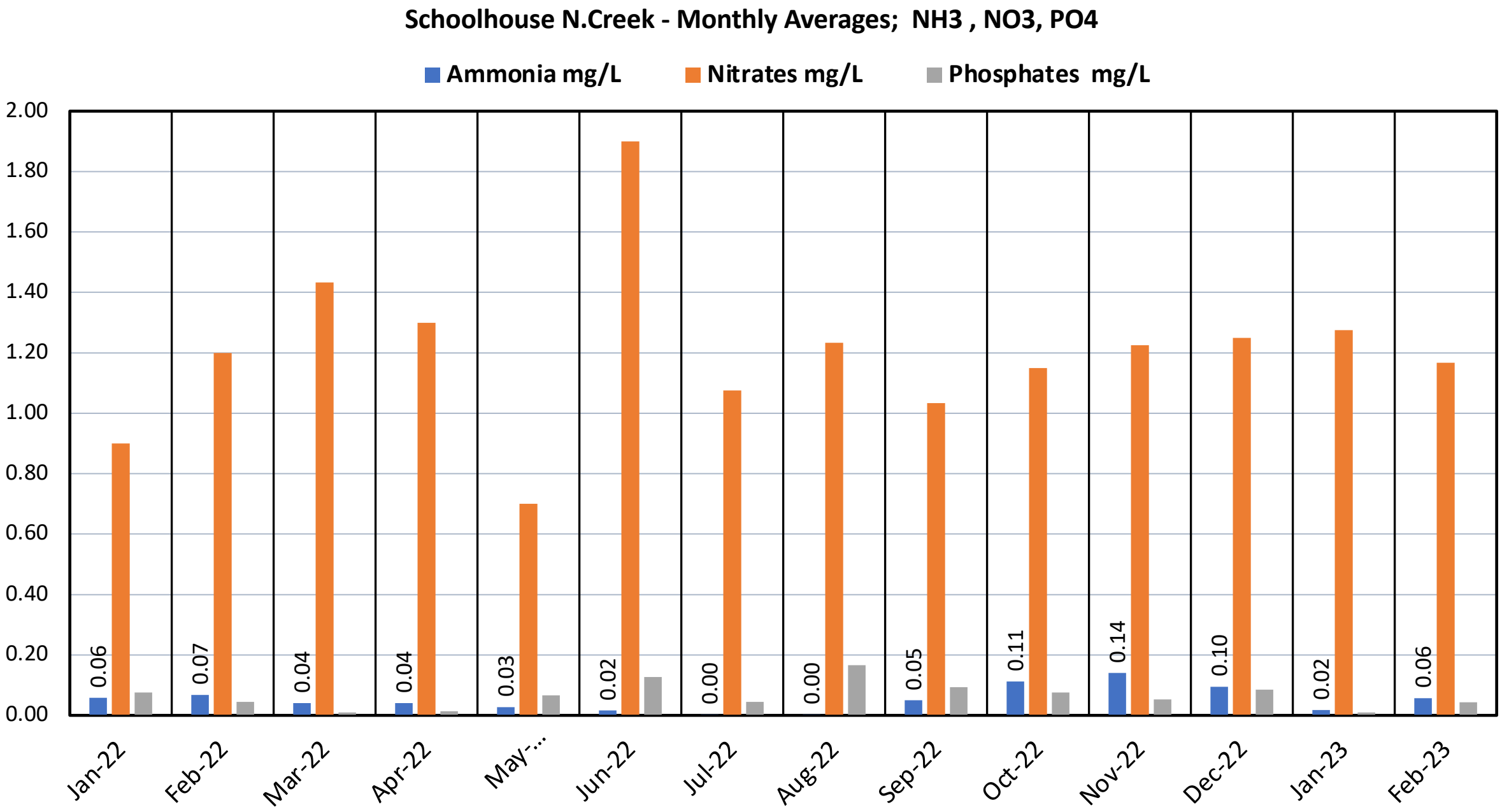
# Schoolhouse N. Creek Monthly Average 2022 - Conductivity & Total Dissolved Solids




TURBIDITY (NTU) MOSSOM CREEK
30
25
20
15
10
5
0
Jan-22
Feb-22
Mar-22
Apr-22
May-22
Jun-22
Jul-22
Aug-22
Sep-22
Oct-22
Nov-22
Dec-22
Jan-23
Feb-23


Schoolhouse North Creek - Turbidity NTU
30
25
20
15
10
5
0
Jan-22
Feb-22
Mar-22
Apr-22
May-22
Jun-22
Jul-22
Aug-22
Sep-22
Oct-22
Nov-22
Dec-22
Jan-23
Feb-23


Mossom Creek - Monthly Averages;  NH3 , NO3, PO4- 2022
Ammonia mg/L
Nitrates mg/L
Phosphates  mg/L
BC Guidelines
Nitrates < 3 mg/L
Ammonia < 1.6 mg/L  temp. and pH dependent
Phosphates < 0.3 mg/L
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
0.06
0.07
0.04
0.01
0.01
0.03
0.02
0.09
0.01
0.07
0.11
0.03
0.05
Jan-22
Feb-22
Mar-22
Apr-22
May-22
Jun-22
Jul-22
Aug-22
Sep-22
Oct-22
Nov-22
Dec-22
Jan-23


Schoolhouse N.Creek - Monthly Averages;  NH3 , NO3, PO4
Ammonia mg/L
Nitrates mg/L
Phosphates  mg/L
2.00
1.80
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
0.06
0.07
0.04
0.04
0.03
0.02
0.00
0.00
0.05
0.11
0.14
0.10
0.02
0.06
Jan-22
Feb-22
Mar-22
Apr-22
May-…
Jun-22
Jul-22
Aug-22
Sep-22
Oct-22
Nov-22
Dec-22
Jan-23
Feb-23

# DataStream(Canada wide Platform for Water Quality Data)

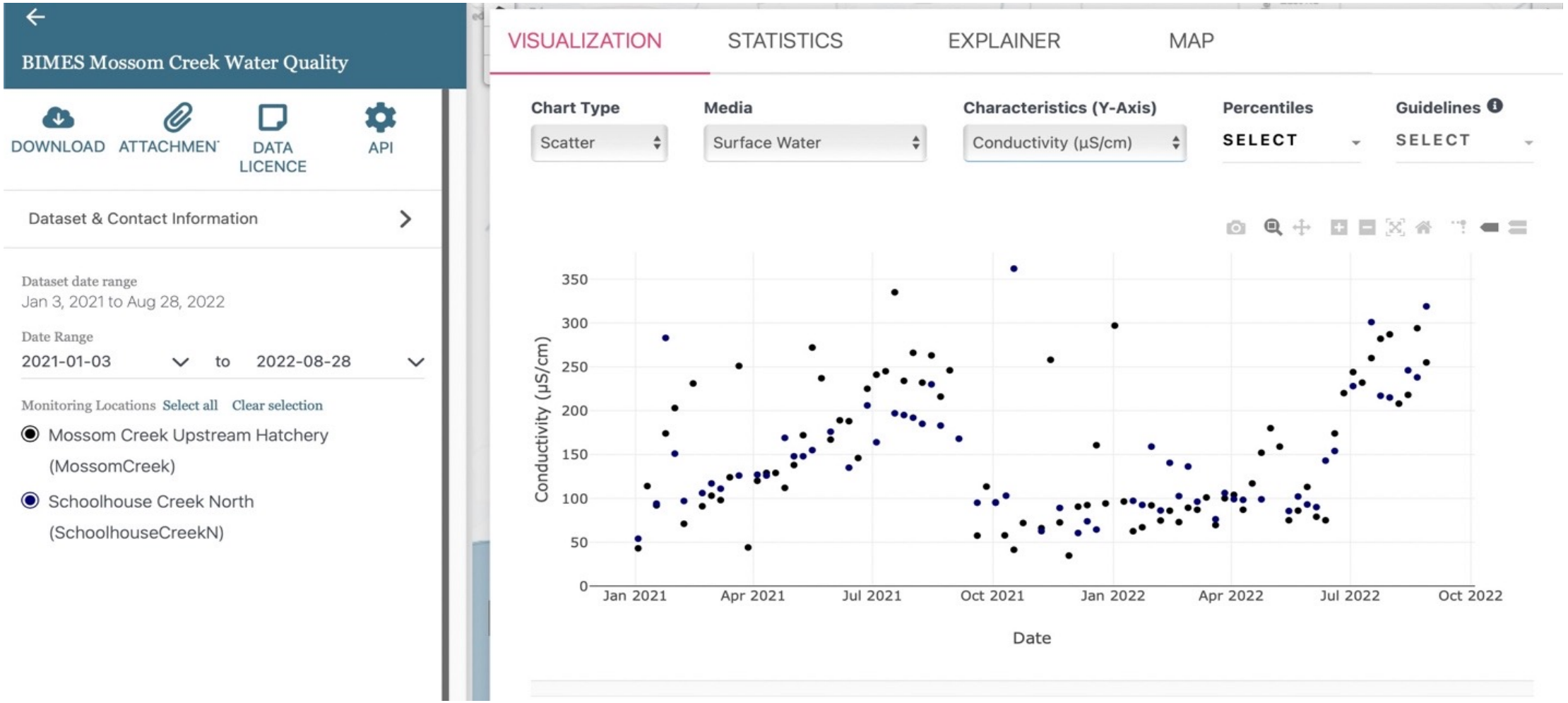
Since May 3, 2022 our Water Quality Data 2021-22 has been uploaded to the DataStream Platform for Water Quality data across Canada https://doi.org/10.25976/yerz-pz92.

Approximately every six months we upload our new data. A special thanks to Neil Laffra who has spent many hours preparing our data for upload and sharing the start up issues with our DataStream advisor, Nell Libera.

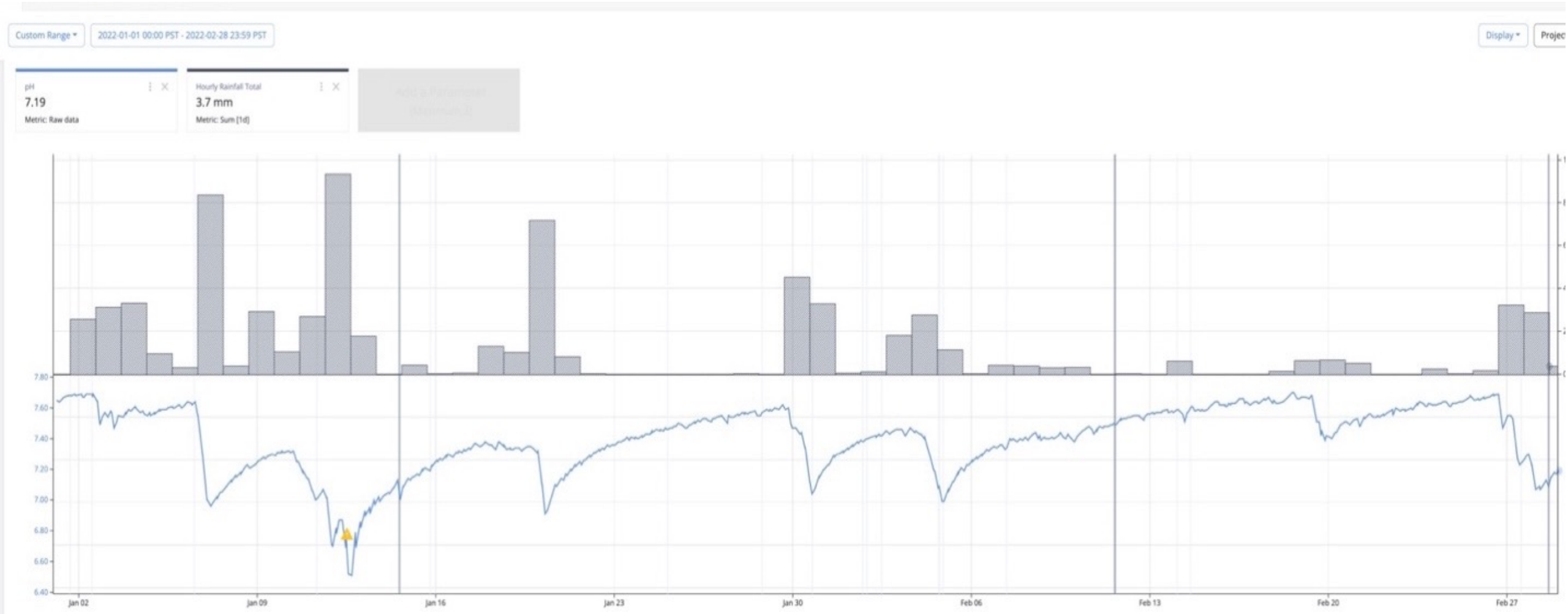
This open data sharing platform advances scientific knowledge and supports collaboration. It also connects communities to their watersheds and is best placed to see changes over time.

Knowledge can be translated into action to protect the health of the watersheds on which our salmon and all living systems depend.

# Conductivity data Pacific Datastream January 2021-September 2022
# Mossom Creek and Schoolhouse Creek North



We were very privileged to have Flowlink Environmental monitor Mossom in real time from August 2021 to August 2022.
Flowlink Data Mossom Creek Rainfall and pH same timeline
Jan 2, 2022-Feb 20, 2022.  Note: Increased in rainfall lowers pH



# Our Water Quality Volunteers

- A big thanks to all our Water Quality Volunteers. We couldn't do this without you!
- Calvin's brother Harrison and Daniel Han both Grade 10 students started volunteering last May and have been regulars most Sundays. Calvin, Aislyn, Rebecca and Chloe come to help on occasion but since last September are pursuing post Secondary education. Paulette and Diane have come to the rescue if extra help is needed.
- Vicki and Aniela have been on our WQ team since we started in 2019 and a big thank you to them for all their help throughout the year and stepping up to download the DFO Temperature and Conductivity loggers as well as the Invertebrate and Salmon surveys for the five year Road Salt and Salmon Project we are participating in beginning this year.

Daniel Calvin and Harrison


Daniel, Vicki, Chloe and Rebecca out on the patio testing


Aniela demonstrating Oxygen Hach Test to Howard’s Grandkids.

Diane K-M and Paulette lending a hand on occasion

# Road Salt and Effects on Pacific Salmon

Mossom Creek has begun participating in a five year study headed by Dr. Chris Wood of UBC with the assistance of Nikki Kroestch of DFO , students and Faculty of UBC, SFU, BCIT and about twelve other Lower Mainland stream keeper groups like ours.

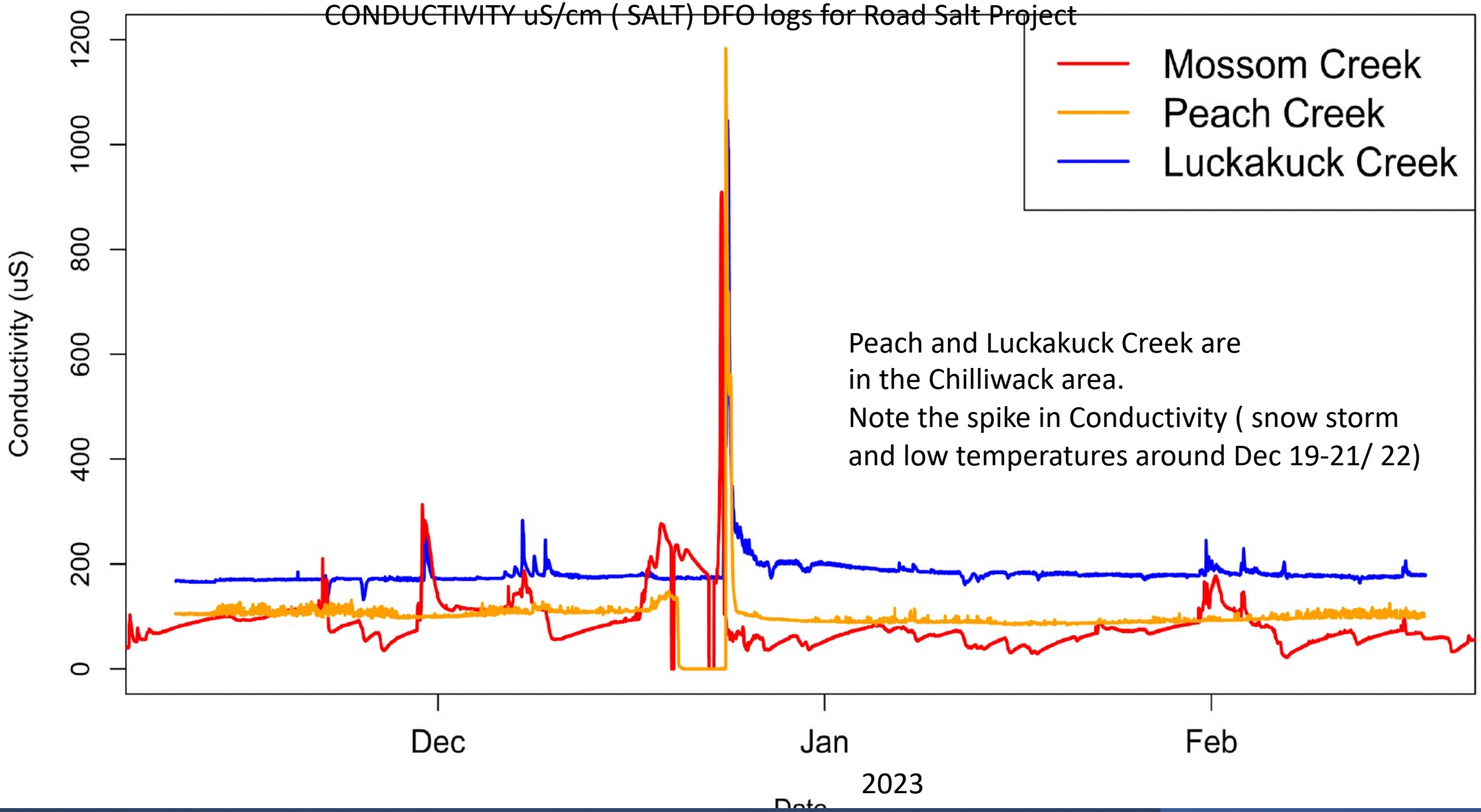
A Solinist logger which measures Conductivity for Salt levels every ten minutes was installed last November. Vicki and Aniela Guzikowski are carrying out the two to four data downloads from the temperature and conductivity meters loggers required per year. Under Nikki's guidance, the first was done on February 23 and Vicki reported that Mossom shows much lower conductivity readings compared to many other creeks in the Lower Mainland.

Vicki, Aniela and Kevin R. took the invertebrate training session with ZoAnn Morton of PSKF at SFU and Stoney Creek on March 18 to prepare for the Benthic invertebrate sampling and juvenile fry trapping in April and August which are requirements of this study. Jonathan, a graduate student from SFU working on this project has volunteered to help with the sampling.

In late November Dr. Chris Wood leading this study and Alan James of Burnaby's Stoney Creek Stream keepers came to visit Mossom along with a crew from CBC National TV to do a story on this Road Salt study. It aired on Christmas Day!

Link to view the CBC story: http://www.cbc.ca/player/play/2155253315979

CONDUCTIVITY uS/cm ( SALT) DFO logs for Road Salt Project




Peach and Luckakuck Creek are in the Chilliwack area.

Note the spike in Conductivity ( snow storm and low temperatures around Dec 19-21/ 22)

DFO PSEC Community Stream Monitoring (CoSMo)

- Mosquito Creek, rearing channel in Mosquito Creek Park (MOSQ04)
- Mosquito Creek, upstream of 17th St. W (MOSQ03)
- Mossom Creek, downstream of Ioco Rd. (MOSS01)
- Mossom Creek, near Birch Wynde (MOSS04)
- Mossom Creek, near Mossom Creek hatchery (MOSS03)
- Nelson Creek, near Cranley Dr. (NELS02)
- Nelson Creek, near Marine Dr. (NELS01)
- Noons Creek, near Deerwood Pl. (NOON03)
- Noons Creek, near river mouth (NOON01)
- Noons Creek, upstream of Ioco Rd. (NOON01B)
- Noons Creek, upstream of Panarama Drive

VISUALIZATION STATISTICS EXPLAINER MAP

**Chart Type** Scatter

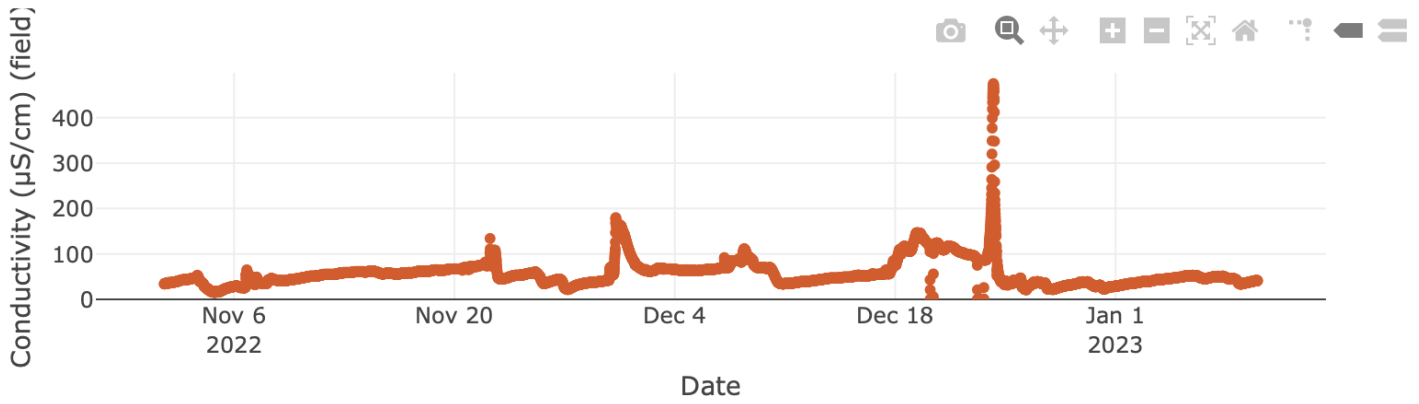
**Media** Surface Water

**Characteristics (Y-Axis)** Conductivity (µS/cm)

**Percentiles** SELECT

**Guidelines** SELECT

**Note**
Data point limit reached. Date range has been reduced to display data.




# CBC films Road Salt and Salmon Story at Mossom with Dr. Chris Wood from UBC.

# Community Outreach

- Last May 24th we had a few environmental students from Gleneagle Secondary attend a day workshop with Shelley. I gave them an hour presentation on water quality monitoring here at Mossom where they were able to do some testing themselves.
- July 27 some of us met with with Katrina Connors, Director of Salmon Watersheds Program at Pacific Salmon Foundation plus two of her colleagues. They were interested in learning about our water quality monitoring program and infrastructure in place. In turn, Katrina introduced us to the Pacific Salmon Explorer, an online visualization tool www.salmonexplorer.ca

# Thank you!

- A big thank you to the generosity of all our donors as well as the Pacific Salmon Foundation, PSKF and our DFO team for their help in funding equipment, supplies as well as supporting our Water Quality Quality Monitoring Program.
- Thanks to Flowlink Environmental for donating their time and state of the art equipment monitoring Mossom Creek for pH, conductivity, temperature and other parameters in real time from August 2021-August 2022.
- Thanks to all the volunteers on our water quality team, to Neil who spent hours sorting out the challenges in uploading our data  for Datastream and to Vicki and Aniela for taking the lead on the field work required for the Road Salt and Effects on Salmon Study.
- Thank you, Paul Steeves for being our awesome photographer and to our Board members who have given amazing support for the Water Quality Monitoring Team.