Red Dog Operations

4th Quarter Report & Annual
Waste Management Permit 2021DB0001
Reclamation Plan Approval F20219958

February 5, 2023

Teck

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Introduction

This report has been prepared to fulfill the 4th quarter and annual reporting requirements for Teck Alaska Incorporated obligations under the State of Alaska Waste Management Permit No. 2021DB0001 and the Red Dog Mine Reclamation Plan Approval F20219958.

This report addresses Biomonitoring, Permafrost and Sub-permafrost Groundwater Monitoring, Mine Water Management, Waste Rock Management, Tailings Management, Class III Municipal Solid Waste Landfill, Mining and Milling Activities, Reclamation, Risk Management Plan, Financial Assurance, Amendments and Wildlife Interactions for the reporting period which combines both the 4th quarter and annual reporting periods.

Biomonitoring Program

Annual biomonitoring report

The 2022 annual *Biomonitoring Report* is being prepared by ADF&G and will be submitted once received though normally is completed by the 2nd quarter. The 2022 biomonitoring report will be incorporated as Appendix A within this report.

Annual summary of biomonitoring water quality sampling

Analytical results of samples collected for biomonitoring water quality are included as electronic file *Red Dog Analytical Data 2022.xlsx*. Analytical data for the last five years is listed in this file.

Permafrost and Sub-permafrost Groundwater Monitoring

SEP permafrost and subsurface temperature monitoring

Supplemental Environmental Project (SEP) piezometer and thermistor monitoring well measurements were completed for the 4th quarter, no significant issues noted during the data collection process. Thermistor well T96-010 was not read after June 2022 due to a connector malfunction. New analog 24 pin connectors will be installed on both T95-004 and T96-010 thermistors.

The *Annual Long-Term Permafrost and Groundwater Monitoring Report* is included within Appendix B in this report. The report provides a summation of the quarterly activities for the 2022 year.

Significant activities in permafrost and sub-permafrost groundwater monitoring

None

Non SEP related active layer permafrost monitoring

In April 2021, six shallow thermistor and monitoring wells were installed in various locations within the Red Dog Creek and Ikalukrok Creek valleys. *Figure 1- Shallow Active Layer Thermistor Locations* depicts their locations. The installations were initially part of an internal investigation by Red Dog Operations to access changing permafrost conditions observed in the area and to help determine the source and cause of high Total Dissolved Solids (TDS) observed in Red Dog Creek and Ikalukrok Creek.

Thermistors and instrumentation were installed though most of the instrumentation failed since it was placed too low to the ground and became submerged during high stream flow. New instrumentation was ordered and will be re-installed during 2023.

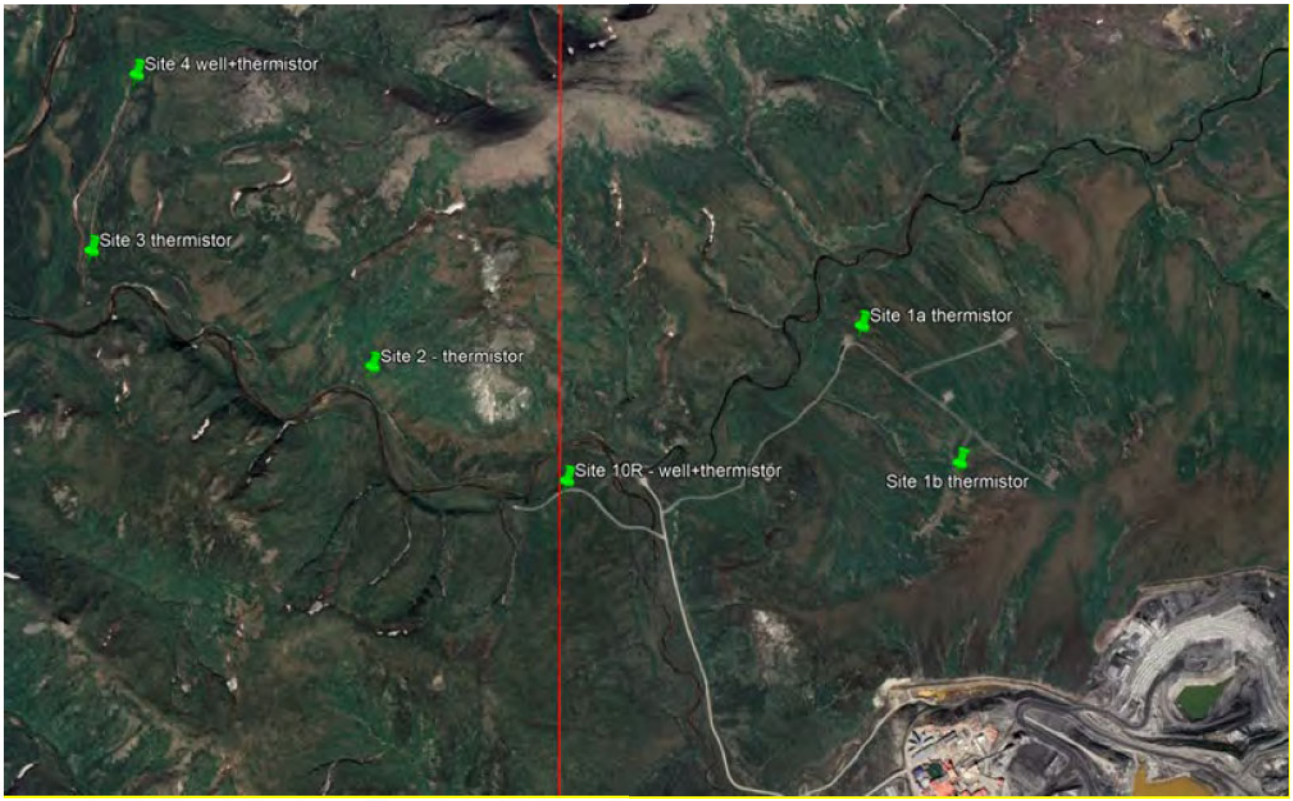


Figure 1 - Shallow Active Layer Thermistor Well Locations

Mine Water Management

Mine water flows

Table 1 below provides a summary of mine water flows for mine water monitoring stations during the reporting period. Influent process water flows to Water Treatment Plant (WTP) #3 were reduced due to the collection sumps being offline due to the road alignment project occurring near the Main Waste Dump.

Table 1 - Water Monitoring Volumes

	Volume in Gallons			
Mine Water Monitoring Stations	Oct	Nov	Dec	2022 Total
Bon's Creek Total Flow	9,731,000	8,015,000	8,360,000	114,644,000
Mine Water Sump Total Flow*	68,980,000	38,370,000	45,940,000	689,770,000
Main Dam Seepage Pump back	25,980,000	29,430,000	28,240,000	348,380,000
Reclaim Flow to Mill	131,400,000	62,260,000	51,370,000	2,324,830,000
WTP #1 Influent from Reclaim	0	23,210,000	3,518,000	348,005,000
WTP #1 Influent from Mine Sump	31,620,000	38,370,000	45,950,000	115,940,000
WTP #1 Clarifier Sludge To Tails	0	0	0	0
WTP #2 Influent from Reclaim	0	0	0	2,127,815,963
WTP #2 Sludge to Tails	0	0	0	62,446,500
Discharge to Red Dog Creek	0	0	0	1,676,700,000
WTP #3 Influent from MWD	8,265,000	8,249,000	7,194,000	34,253,560
WTP #3 Influent from Mine Sump	0	0	0	35,254,000
WTP #3 Total Effluent	8,265,000	8,249,000	7,194,000	72,143,600
East Overburden Sump	852,000	527,000	391,800	9,474,300
West Overburden Sump	2,326,200	1,797,800	1,644,500	21,272,000
Main Waste ARD to Main Pit	0		0	1,147,000
Treated Water to Main Pit	0		0	0
Tailings Water Supernatant (calc.) to TSF*	176,049,999	176,202,000	228,690,100	2,680,436,099
Mill Pad Collection	0	0	0	317,139
Sand filter Effluent - Mine Road Dust Control	0		0	6,325,000
Kaviqsaaq Diversion**	0	0	0	3,038,055

Notes: * Includes Main Pit water pumped back to Tailings Storage Facility
** Monthly total flow averaged from two measured flow readings per month

Mine water quality

An electronic spreadsheet titled *Red Dog Analytical Data 2022.xlsx* is included with this report. The spreadsheet incorporates all data used to generate the trend charts listed in the Appendixes of this report.

Mine water quality trend charts

Mine water quality trend charts are provided in Appendixes C, D, E, F, I, J and K of this report. Water quality Profile I and II (*"Monitoring Plan, November 2021"*) constituents for the Mine Water, Mine Drainage, Bons Creek, APDES stations, Mill Pad, Hilltop and the Kaviqsaaq Diversion are

illustrated for a five-year period ending with the 4th quarter. No unusual trends were noted for the any of the monitored areas during 4th quarter period.

VISUAL MONITORING OF MINE WATER MANAGEMENT SYSTEMS

Mine water collection systems were visually inspected during the quarter as required per the *Integrated Waste Management Plan – Monitoring Plan, (November 2021).* All systems operated as designed during the 4th quarter.

A replacement main tailings dam seepage monitoring well was constructed on December 9, 2022. The replacement well was placed in the same location as the previous well though drilled deeper to allow for a viable water sample to be collected.

Fish weir inspection

The fish weir fall inspection was completed on September 25th, 2022, no issues were identified and the system was operating as designed. A written report was submitted to state agencies and the US EPA Region 10 on September 27th, 2022.

Water balance

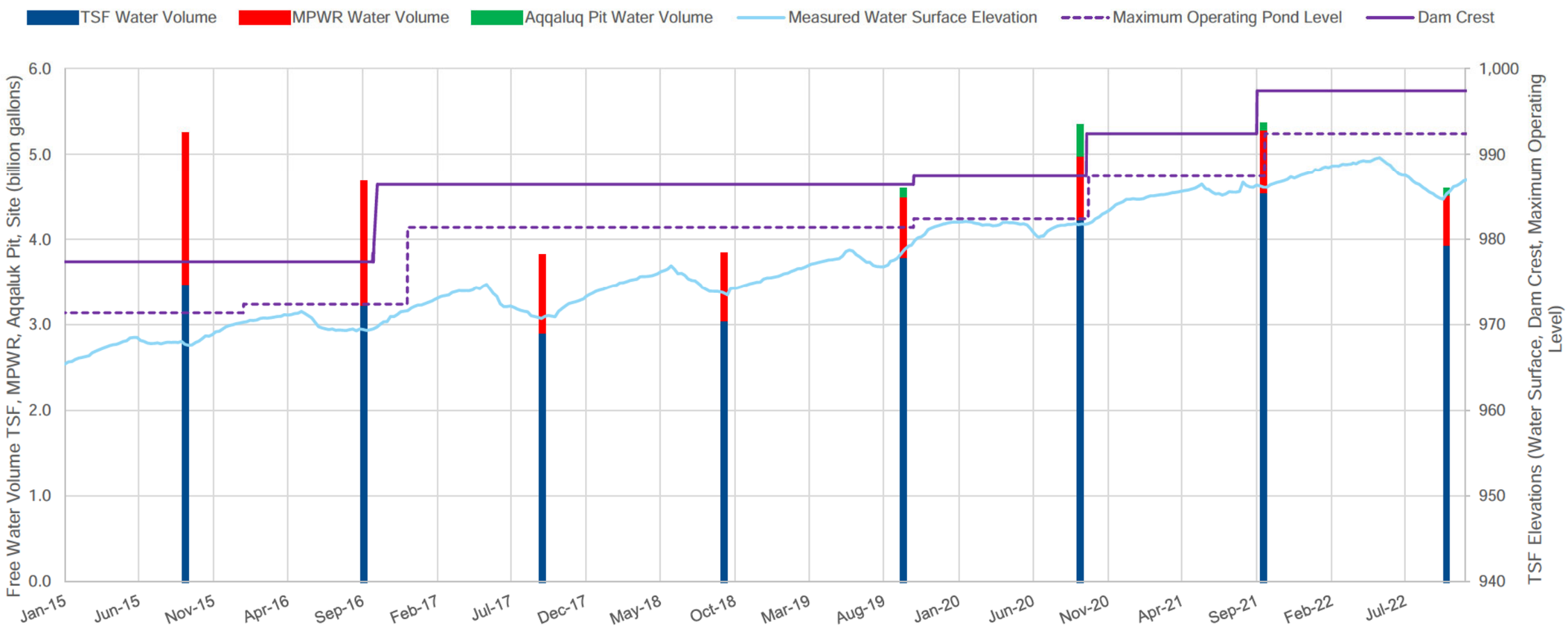
A mine water balance computer simulation program is maintained using GoldSim software. The GoldSim simulation generated a water balance projection for Life of Mine (LOM) by predicting surface water elevation in the Tailings Storage Facility. Figure 2 depicts simulated Tailings Storage Facility elevation based on current operations. A free water inventory chart is provided in Figure 3 which represents historic trends through 2022 and includes water volumes for the Tailings Storage Facility, Main Pit Water Reservoir and Aqqaluk Pit.

Waste water treatment reagent consumption

Significant reagents consumed for wastewater treatment during 2022:

- Total quantity of flocculant used in Water Treatment Plant 2 (WTP2) and WTP1 was 102 metric tonnes, the majority being used in WTP2.
- Total quantity of lime used in WTP2 is not tracked individually, though the total lime used in WTP1, WTP2 and WTP3 was 8,919 metric dry tonnes.
- Total quantity of sodium sulfide used in WPT1 and WTP2 was 498 metric tonnes, utilized to precipitate cadmium.
- Total quantity of flocculants used in WTP3; - None
- Quantity of any other chemicals used in significant quantities in WTP2; - Gypsum 10,196 metric tonnes (a lot more gypsum than previous years as a result of the change in discharge strategy due to new permit).

RDO Water Balance & TSF Water Surface Elevation



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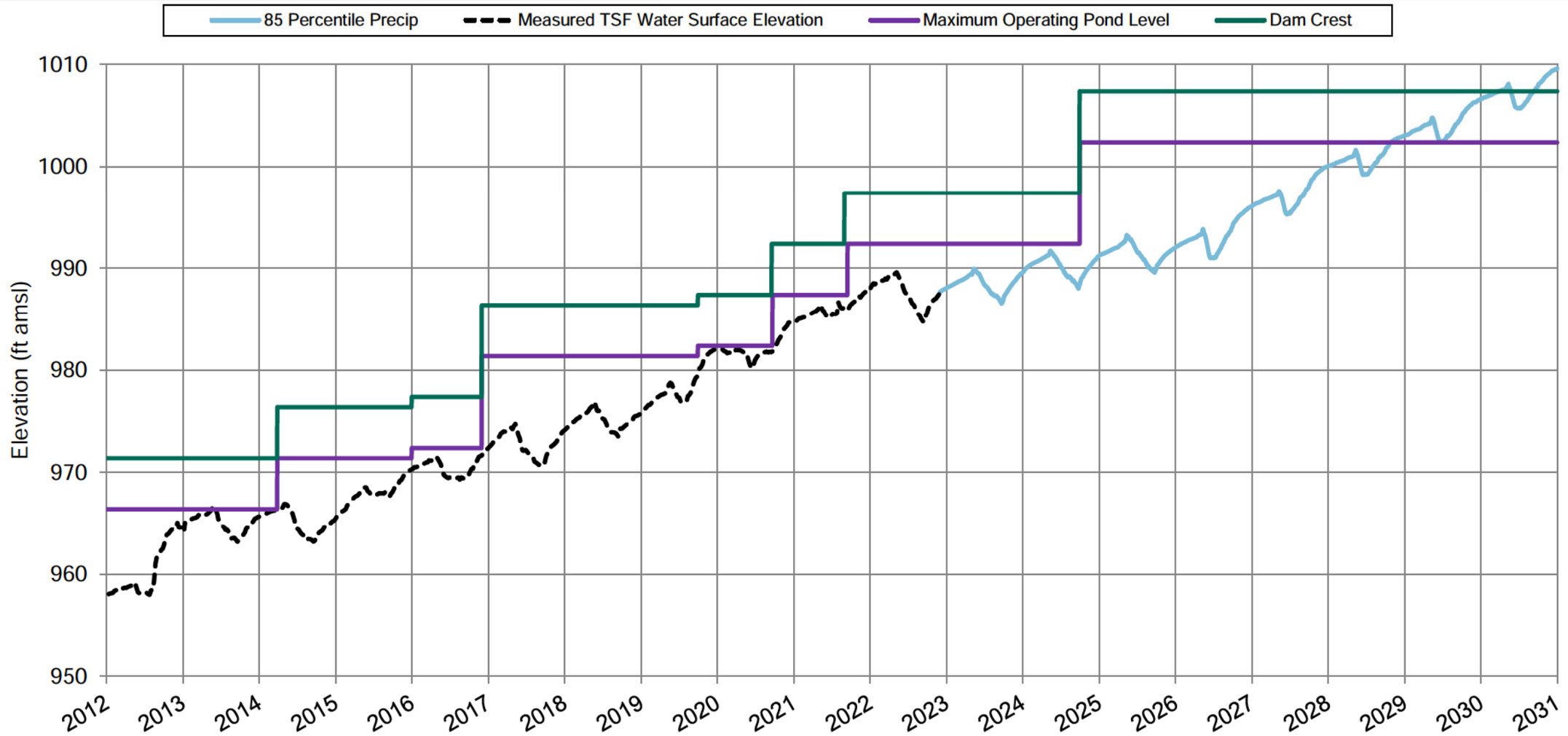
RDO 5YR Water Balance & TSF Surface Elv. Forecast

TSF final 1,007.4 ft Elv construction to be completed by end of YR2024, option to complete 5ft lift in YR2023 pending water balance performance.



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Significant activities in mine water management

The Tailings Storage Facility contained an estimated 4.624 billion gallons of free water (Dec 2022) compared to 5.011 billion gallons same time for the previous year. The decrease in water volume was attributable to a successful discharge season and lower precipitation than in 2021. However, the 2022 precipitation was still higher than average for the area at more than 23" of precipitation recorded.

A total of 1.724 billion gallons of water was discharged from outfall 001 during 2022 compared to 1.716 million gallons discharged in 2021. Red Dog commenced water discharge from Outfall 001 on May 9th and ceased discharging on September 23rd, 2022.

The Kaviqsaaq seep water quality sampling ended on September 9th due to diminished flow and freezing conditions. The last flow measurement was observed on September 30th with the seep flow becoming completely frozen in early October. Kaviqsaaq flow measurements for 2022 were notably lower when compared to the 2021 year and total flow as compared to 2021 was down by 62%, Kaviqsaaq trend charts are located in Appendix I : *Kaviqsaaq Diversion Profile I Trend Charts*. Decreased concentrations for most monitored parameters are noted and most likely attributable to high flow rates and dilution.

Waste Rock Management

Quantities, placement locations and analysis of waste rock

Dig face inspections of waste shots and weekly waste dump inspections were completed to confirm waste characteristics and suitability for stockpile locations. There were no exceptions to the Waste Rock Management Plan (Sept 2021) for this reporting period and all waste was managed in accordance with the plan. *Figure 4 – Site Map* shows all waste rock, stockpile and diversion locations.

The primary waste storage sites were:

- Main Pit Dump (Cover Dump 2 [north of MPD4], MPD3, MPD4, MPD5 and West Spur Dump [WSD])
- Oxide / Main Waste Dumps (COV1, LAN [Landfill], OXO, MWD, QPD1)
- Projects & Construction Areas (PCP [Portable Crusher Pad], Roads and CPAD [Crusher Pad])

During Q4 2022, a total of 1,270,532 tonnes of Aqqaluk waste rock and 975,068 tonnes of Qanniyaq waste rock were hauled to the waste stockpile areas.

Table 2 - Waste Rock Haulage, Location and Lithology

Tonnes			Type			
Dump Area	**Location**	**Lithology**	**Construction**	**Cover**	**Most Reactive**	**Other**
Main Pit Dump	MPD3	Ikalukrok				327
		Okpikruak				44,476
		Siksikpuk				107,503
	MPD3 Total					**152,306**
	MPD4	Ikalukrok			1,498	241,478
		Kivalina				100,878
		Okpikruak				52,725
		Siksikpuk				343,939
	MPD4 Total				**1,498**	**739,020**
	MPD5	Ikalukrok				3,660
		Okpikruak				74,498
		Siksikpuk				110,445
	MPD5 Total					**188,603**
	WSD	Siksikpuk	4,007			
	WSD Total		**4,007**			
Main Pit Dump Total			**4,007**		**1,498**	**1,079,929**
Oxide/Main Waste Dump	COV	Kivalina		45,288		
	COV Total			**45,288**		
	LAN	Siksikpuk				2,813
	LAN Total					**2,813**
	QPD1	Ikalukrok				469,608
		Siksikpuk				533,806
	QPD1 Total					**1,003,414**
Oxide/Main Waste Dump Total				**45,288**		**1,006,227**
Projects & Construction	CPAD	Ikalukrok	154			
	CPAD Total		**154**			
	PCP	Ikalukrok	106,822			
	PCP Total		**106,822**			
	ROADS	Ikalukrok	929			
		Siksikpuk	663			83
	ROADS Total		**1,592**			**83**
Projects & Construction Total			**108,568**			**83**

** For current reporting period, "Most Reactive Waste" tonnages use the original self-heating capacity risk calculations which over-assigned Other Waste rock as Most Reactive in quarterly reporting totals. All reactive waste rock was hauled and managed as per the Waste Rock Management Plan (Sept 2021). Starting Q1 2022, Most Reactive waste tonnages will be reported using the self-heating capacity calculation and classification as per the plan.*

Table 3 lists the volume of cover rock used to date of reclamation projects as well as the total material stockpiled for closure cover.

Table 3 - Cover Material

Cover Stockpile Location	Total Tonnes
Ramp to Nowhere (RNC)	1,271,891
North Oxide (COV)	2,910,226
South Oxide Top Soil (SOT)	81,094
Kivalina Overburden Top Soil (KOB)	70,913
North Oxide (COV2)	3,201,766
Total collected to date	7,535,890
Cover utilized to date	167,400
Amount stockpiled	7,368,490

Results of waste rock geochemical monitoring

Other than blasthole analyses, no additional geochemical testing was conducted on waste rock during the reporting period. Geochemical waste rock test results are included in the *Waste Rock and Cover Rock Summary Report* listed in Appendix G of this report. The report addresses quantity, location placement and geochemical analysis for waste rock managed during this reporting period. All waste rock was managed in accordance with the *Integrated Waste Management Plan - Waste Rock Management (Sept 2021)*. A detailed Cover Rock report is included within Appendix G.

Visual monitoring of waste rock dumps

Weekly visual inspections of active waste rock dumps were conducted by the Senior Geotechnical Engineer or their designee if offsite. No significant incidents were observed during the inspections.

Significant activities in waste rock management

No significant activities in waste rock management for the quarter.

Connie Creek
Red Dog Creek Diversion
Shelly Creek
PMB
Rachel Creek
Kaviqsaaq Collection
Kaviqsaaq Drainage
COV2
MPD4
SCD
Hill Top Creek
Aqqaluk Pit Sump Pump
MPD2
MPD5
Main Pit
MPD3
COV
SOT
QPD2
Qannayaq Pit
QPD1
Aqqaluk Pit
WSD
OXO
RNC
Red Dog Creek Diversion
SOS
AWRS
SCS
WHH
CWD
NSP
Sulfur Creek
NMET
SMET
PH3
MWD
INC
CSN
PAC
Mine Water Diversion Dam
Mill Facility
Pipe to TSF
Tailings Storage Facility (TSF)
Main Dam
2023 Landfill Use Plan
Back Dam
KYOB
Top soil
WTA
DD2 Material Site

Legend

- 2022 Landfill Use Area
- 2023 Landfill Use Area
- Active Landfill Perimeter
- Ore Stockpiles
- Active Waste Rock Dumps
- Inactive Waste Rock Dump
- Other Stockpiles
- Red Dog Creek Diversion
- Mine Water Collection System
- MWD Geosynthetic Cover

Dump & Stockpile List

Active Waste Rock Dumps

CWD	Copper Waste Dump
MPD2	Main Pit Dump
MPD3	Main Pit Dump
MPD4	Main Pit Dump
MPD5	Main Pit Dump
QPD1	Qannayaq Pit Dump
QPD2	Qannayaq Pit Dump

Active Ore Stockpiles

PH3	Phase 3 (baritic ore)
NMET	North Methanol Pad
SMET	South Methanol Pad
NSP	Low Grade Stockpile
SCS	Sulfure Creek Stockpile
AWRS	Aqq. West Ramp Ore
PMB	Powder Mag Boulders
SOS	Snowy Ore Stockpile

Inactive Waste Rock Dumps

PAC	PAC Dump
WHH	West Hobbit Hut
OXO	Oxide Ore Stockpile
SCD	Shelly Creek Dump
WSD	West Spur Dump
MWD	Main Waste Dump
INC	Incinerator Pad
WTA	West Tails Access
CSN	Cold Storage North

Cover Material Stockpiles

T. Soil	Top Soil
KYOB	Kivalina Overburden
COV2	Cover Material
COV	Cover Material
SOT	South Oxide Topsoil
RNC	Cover Material

N E S W

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Site Map - Red Dog Operations
* Waste rock, stockpile & diversion locations
* 2023 Landfill Use Plan
Aerial acquired July 9, 2019

Red Dog Mine

0 250 500 1,000 1,500 2,000
Feet
1" = 1,000 FT

Figure	4	G:\GIS server\Enviro\FEB\WMP Reports\2022 WMP Report Map\2022 WMP Report Map Fig 2.aprx	Drawn: FEB	Date: 01/26/2023

Tailings Management

Quantities and analysis of tailings

Table 4 depicts the dry tonnes of tailings generated and the average lead, zinc and iron concentrations in the tailings solids discharged to the Tailings Storage Facility for the quarter. No tailings were placed into DD2 this quarter.

Table 4 - Tailings Produced

		Analysis		
Month	Dry Tonnes Tailings	% Pb	% Zn	% Fe
Oct	187,954	1.8	2.1	10.8
Nov	188,117	1.4	4.0	6.8
Dec	246,554	1.3	2.8	11.0

Tailings Storage Facility and Main Pit water elevations

Table 5 lists surveyed Aqqaluk, Main Pit and the Tailings Storage Facility water elevation levels during the reporting period. The Tailings Storage Facility was maintained within the permitted level. The Main Pit was maintained below a water elevation of 850 feet amsl.

Table 5 - Tailings Storage Facility, Elevations

Survey Date	TSF
10/21/2022	986.49
10/28/2022	986.82
11/18/2022	985.83
12/16/2022	986.68
12/23/22	986.93
12/31/22	987.10

Visual monitoring of tailings facilities

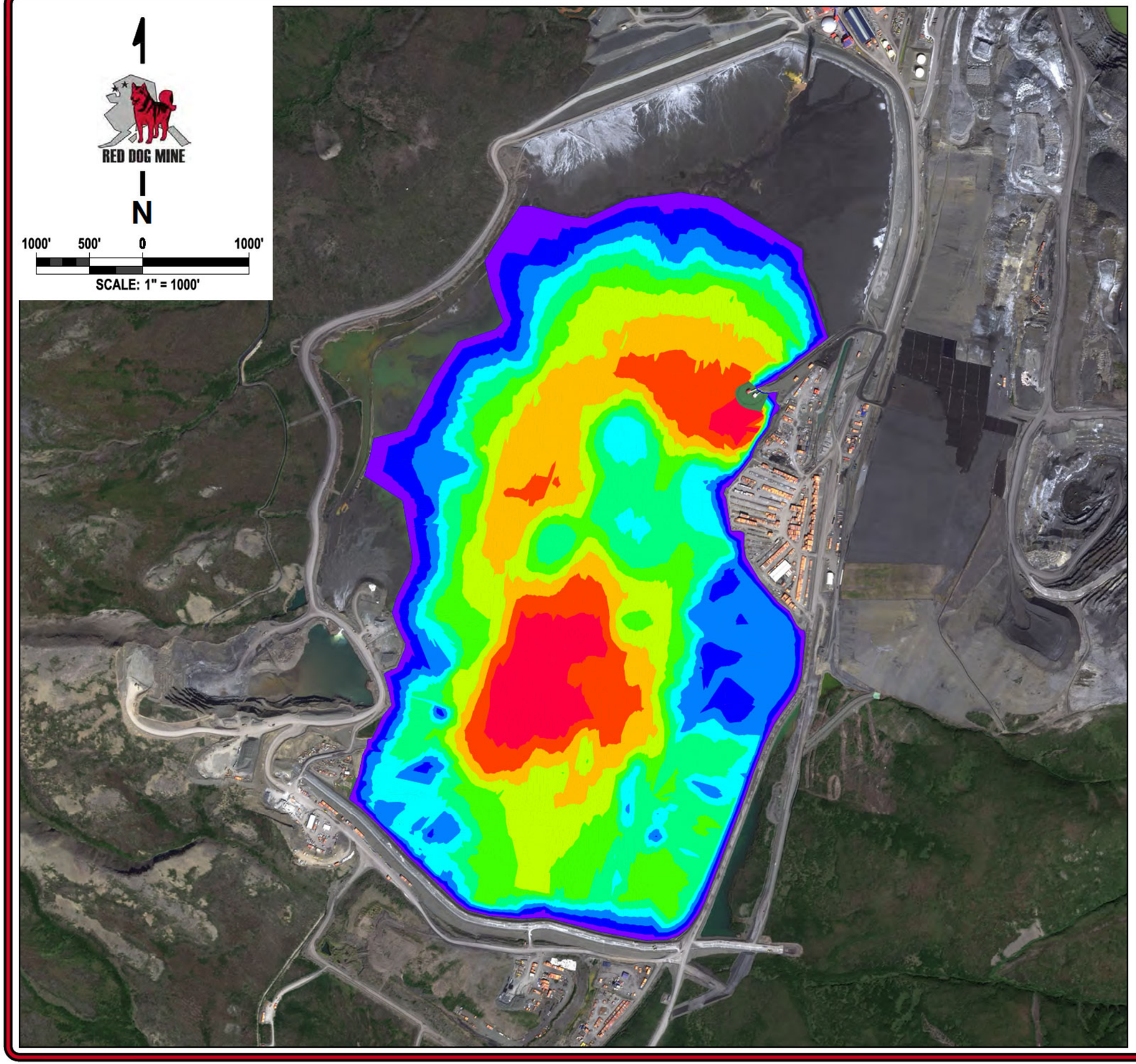
Visual monitoring inspections of the Tailings Storage Facility were completed as required. All systems operated as designed with no findings noted for the quarter. Monitoring of the dams per the requirements specified by each dams Operation and Maintenance Manual was completed for the period.

Significant activities in tailings management

A Tailings Storage Facility bathymetry survey was completed for the 2022 year, the Main Pit bathymetry was completed though a map not generated. The bathymetry map for the TSF is listed in Figure 6 of this report.

Tailings deposition occurred in the SW are of the Tailings Storage Facility, Figure 5 depicts the area of deposition.

Figure 5 - Tailing deposition from 9/9/22 thru 12/31/23



Elevations Table			
Number	Minimum Elevation	Maximum Elevation	Color
1	937	942	
2	942	947	
3	947	952	
4	952	957	
5	957	962	
6	962	967	
7	967	972	
8	972	977	
9	977	982	
10	982	987	

BATHYMETRY DATE: SEPTEMBER 9, 2022
IMAGERY DATE: JULY 2022
TSF WATER ELEVATION: 985.1'
TSF AREA: 22,073,818.05 Sq. Ft. 506.745 Acres
FREE WATER VOLUME: 3,799.4885 M Gal
COORDINATE SYSTEM: RED DOG MINE LDP

2022 TSF BATHYMETRIC MAP

PROJECT #	E7750
DRAWN BY:	JM
CHECKED BY:	TO
DATE:	09/16/2022
SCALE:	1"=1000'
SHEET:	1 OF 1

RED DOG MINE

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Class III Municipal Solid Waste Landfill

Monthly visual landfill inspections were completed as required, one incident was noted on a random inspection, (a dumpster containing unauthorized waste) the waste removed from the dumpster.

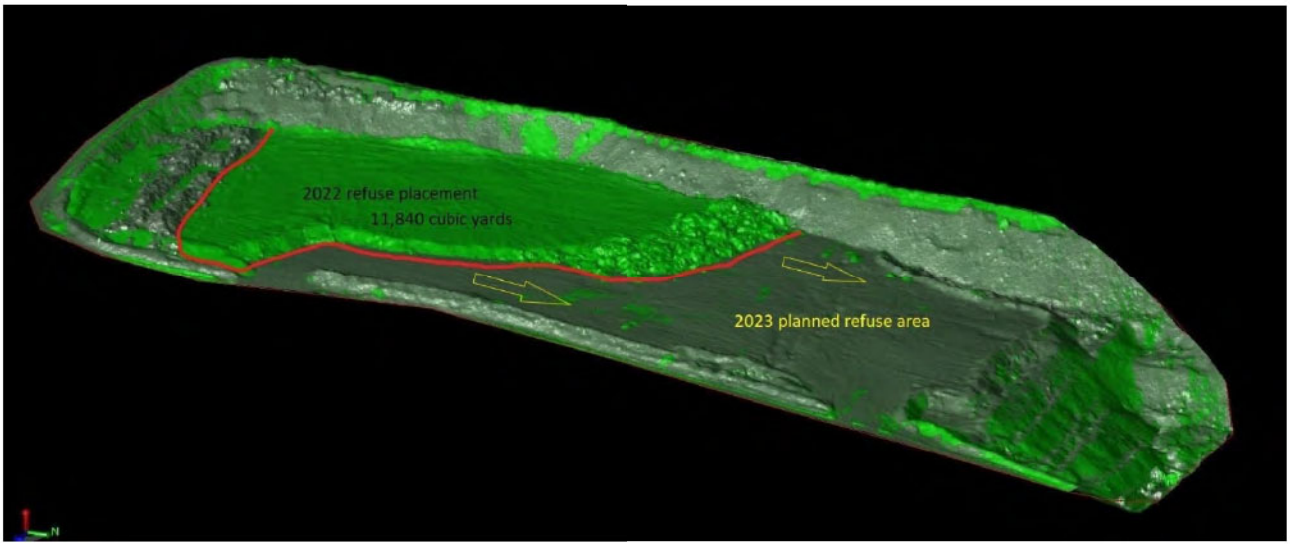
The annual mine incinerator composite (3-week) ash sample was collected during November and analyzed for metals using EPA method 1311 - Toxicity Characteristics Leaching Procedure (TCLP). TCLP results indicate the ash is considered non-hazardous waste under the EPA Resource Conservation Recovery Act (RCRA). A copy of the analytical lab report was submitted in January to Neil Lehner with ADEC.

Quantities of inert solid waste

The Red Dog survey department performed a LiDAR scan of the landfill surface on October 2022 and calculated a total volume 11,840 cubic yards of refuse and waste rock cover placed for 2022. Approximately 3,620 cubic yards of waste rock was used as cover material, leaving a total amount of non-municipal refuse placed in the landfill at 8,220 cy for the 2022 reporting year.

Figure 7 – *2021 Landfill LiDAR image looking south* depicts the difference between the operating years 2021 and 2022. The difference in volumes was taken as a volumetric calculation between surfaces utilizing MineSight.

Figure 7 – Class III Landfill LiDAR image looking southwest



Significant activities in solid waste landfill and waste management

Red Dog Operations continued with the recycling program for the year. Opportunities to enhance recyclables will continue into 2022. The bullet list below represents the amount of waste which was sent off site for recycling from all of Red Dog Operations (mine and port) for the 2022 reporting year.

- Recycled 144760, lbs of cardboard
- Returned to generator 193,540 lbs of cardboard boxes for reuse
- Recycled 1,460 lbs. of plastic
- Recycled 7,820 lbs. paper
- Recycled 396,875 lbs. of scrap steel
- Recycled 78,200 lbs. of used tires
- Sent 126,720 lbs of tires for retreading
- Recycled 10,800 lbs. of electronic waste
- Recycled 797,180 lbs. of sag mill liners
- Recycled 351,700 wooden pallets
- Recycled 676,400 lbs of used oil for reprocessing offsite

Landfill Use Plan

For the 2023 year, non-municipal refuse will continue to be placed within the existing cell with refuse placement progressing to the north. *Figure 4 – Site Map* depicts the 2022 use area planned for 2023.

Significant activities in Class III municipal solid waste landfill

No significant activities were noted for the 2022 year.

Mining and Milling Activities

Mining quantities

Table 6 lists the total tonnes of ore hauled to the mill stockpile each month during the reporting period. The total includes both Aqqaluk and Qanaiyaq ore and does not include any marginal ore placed within the Marginal Ore Stockpile.

Table 6 - Ore Mined and Stockpiled

Month	Ore Mined, tonnes
Oct	340,203
Nov	209,906
Dec	305,128

Milling Quantities

Table 7 lists the total tonnes of ore processed through the mill facilities each month during the reporting period.

Table 7 - Ore Processed through Mill

Month	Ore Milled, tonnes
Oct	264,132
Nov	251,809
Dec	344,544

Significant activities in mining and milling

Qanaiyaq ore continued to be mixed with Aqqaluk ore at a mill feed blend of approximately 20% to 30% for the 4th quarter.

Reclamation

Significant activities associated with reclamation

The following update lists the reclamation work accomplished for the 2022 year:

- Installed 36 acres of geosynthetic material and cover material
- Installed three 36” culverts at the north and south ends of the MWD
- Completed drainage bench construction for Phases II, III and IV.

- Installed three 36” culverts at the north and south ends of the MWD
- Completed drainage bench construction for Phases II, III and IV.

The MWD cover dump reclamation construction is expected to be completed during the 2023 season with the exception of Phase V which will be completed once the low grade ore stockpile has been processed sometime in 2030-31. Construction activities planned for next season are listed below:

- Deploy and cover remaining geosynthetic material, 44 more acres
- Complete re-grading activities in the Phase III area
- Aerial seed approximately 80 acres

Disturbance

A map of the new land disturbance for the mine site for the year is shown in Figure 8 – *Red Dog Operations 2022 Land Disturbance Map*. (labeled Fig 1). Table 8 lists the areas or projects contributing to the disturbance for 2022. Top soil recovered from newly disturbed areas was stockpiled for future use.

Table 8 - Area Disturbed in 2022

2022 New Disturbance Area	Acres
Transportation Corridor - Phase 2	1.2
Qanniyaq Pit Development	3.9
Total 2022 Disturbance	5.1

Red Dog Operations

Figure 1 - 2022 Land Disturbance Map

Drawn by: MRH Date: 01/12/2023

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Reclamation research

No reclamation research was completed for the reporting year.

Reclamation monitoring

No reclamation monitoring was completed for the reporting year.

Amendments to the WMP and RPA

No amendments occurred during the 2022 reporting year.

Risk Management Plan

The 2021 Risk Management Plan (RMP) Annual report was submitted to applicable agencies during December 2022, no notable fugitive dust changes were noted in the report. The 2022 RMP report will be submitted to agencies as Appendix H - 2022 Risk Management Plan Annual Report during the 4th quarter of 2023.

Dust monitoring activities

Dust monitoring activities for the reporting year will be presented in the 2022 Risk Management Plan Annual Report anticipated to be submitted December 2023.

Financial Assurance

Financial assurance increased $43,339,000 based on the annual CPI adjustment. ADNR accepted the adjusted amount on November 22, 2022. The current mine reclamation bond amount after the adjustment is $629,001,000.

Wildlife

Wildlife interactions and casualties

There were two recorded wildlife interactions noted for this reporting period. Table 9 provides details for each recorded event.

Table 9 - Wildlife Interactions

SIR ID	Date	Incident Comments
12945	11/03/2022	Environmental Department received a call of ptarmigan near the North end of runway. The Anchorage Charter was scheduled for 16:50. Environmental personnel was able to scare the 300 ptarmigan away from the runway.

12557	11/13/2022	Report of three foxes staying near the Emulsion Plant and approaching employees. Sprayed at fox with dog spray but it was a small, short stream. Changed to bear spray and sprayed foxes to deter them from the area.

Closing

Please accept this report as required under the State of Alaska Waste Management Permit No. 2021DB0001 and Reclamation Plan Approval F20219958. If there are any questions, please contact Frank Bendrick at (907) 754-5138 or myself at (907) 754-5700.

Based on information and belief formed after reasonable inquiry, I certify that the statements and information in and attached to this document are true, accurate and complete.

Sincerely,

Yesnik Leslie
RDOG

Digitally signed by Yesnik Leslie
RDOG
Date: 2023.02.02 17:12:33 -09'00'

Les Yesnik
General Manager
Red Dog Operations

cc: Tim Pilon, ADEC, Fairbanks
William Groom, ADNR, Fairbanks
Adam Daniels, ADNR, Fairbanks
DNR.Water.Reports
Audra Brase, ADF&G, Fairbanks
Lance Miller , NANA
Mike Gonzales, Red Dog Operations
Richard Hudson, Red Dog Operations

Appendix A: Biomonitoring Report (pending 2nd quarter)

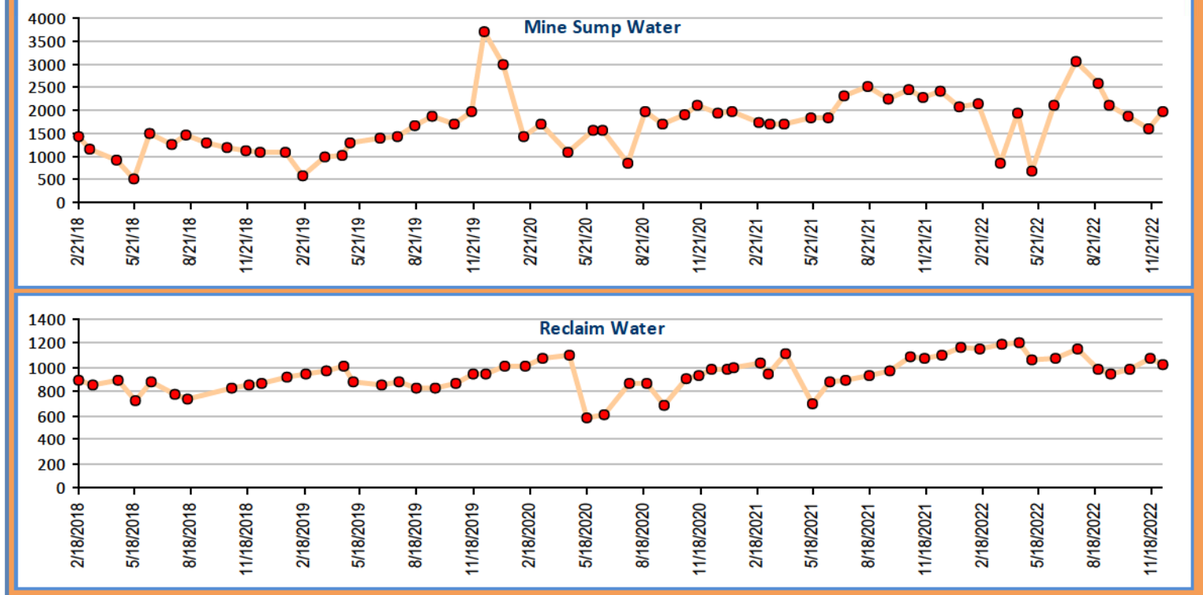
Appendix B: Annual Long-Term Permafrost and Groundwater Monitoring

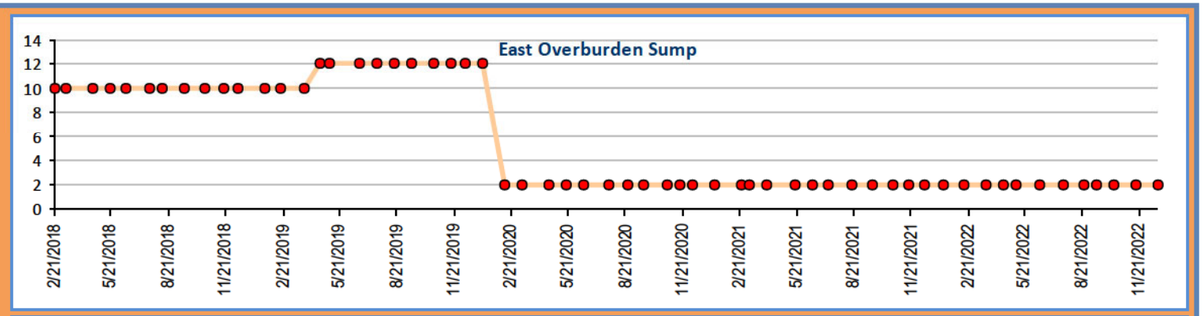
Appendix C: Water Quality Profile II Charts – Mine Water Monitoring Stations

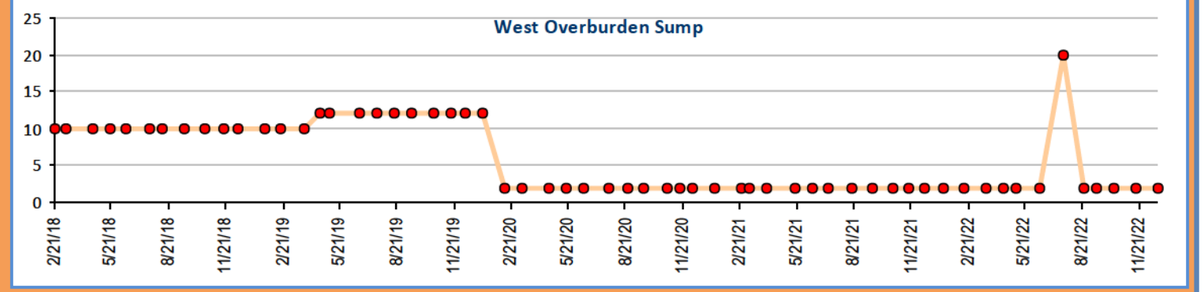
RED DOG MINE

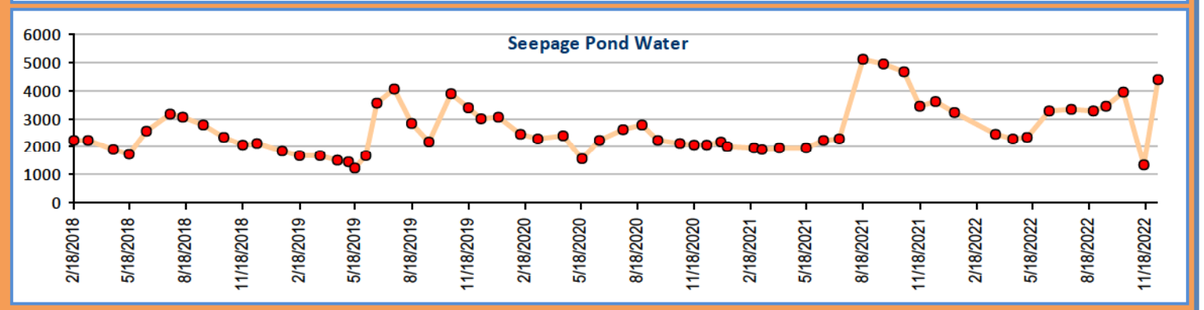
Mine Water Monitoring - Water Quality Profile II, Trend Charts

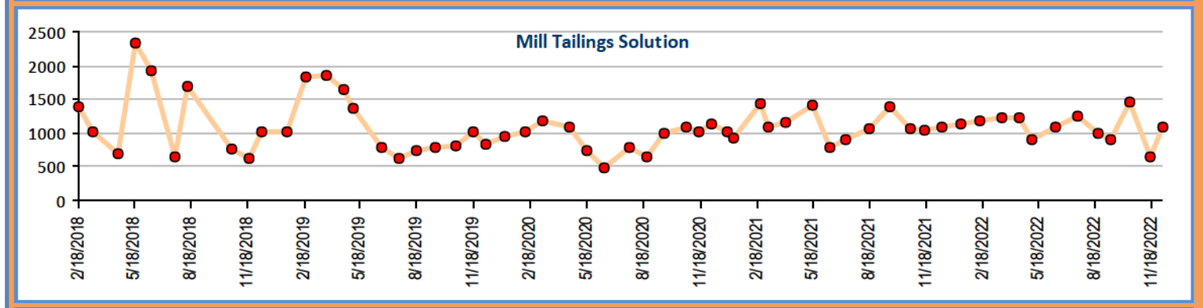
Acidity as CaCO3, units mg/L

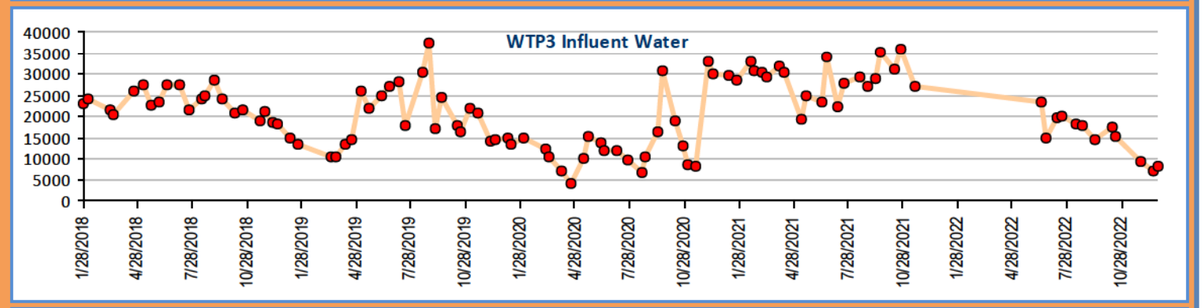


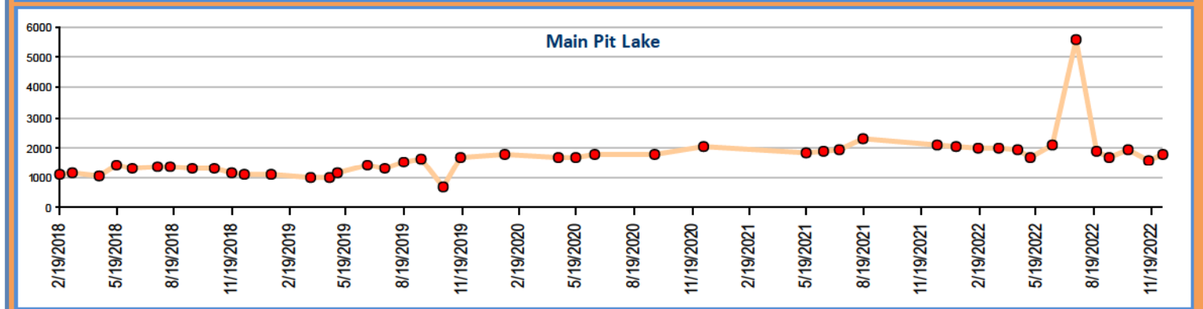


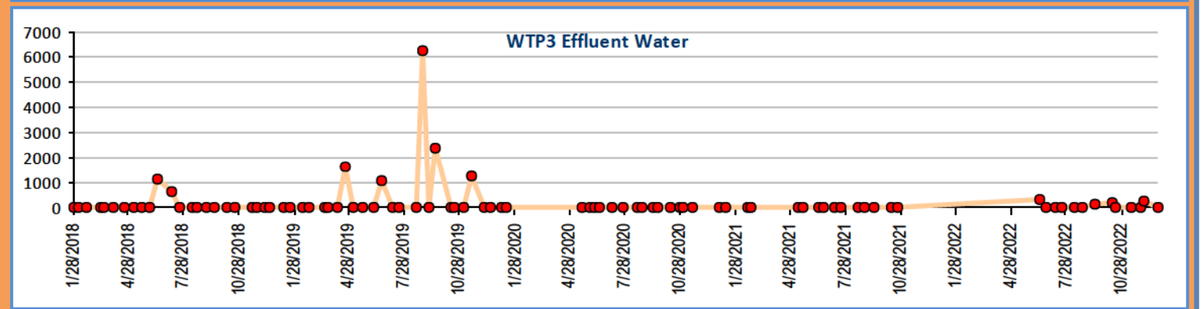








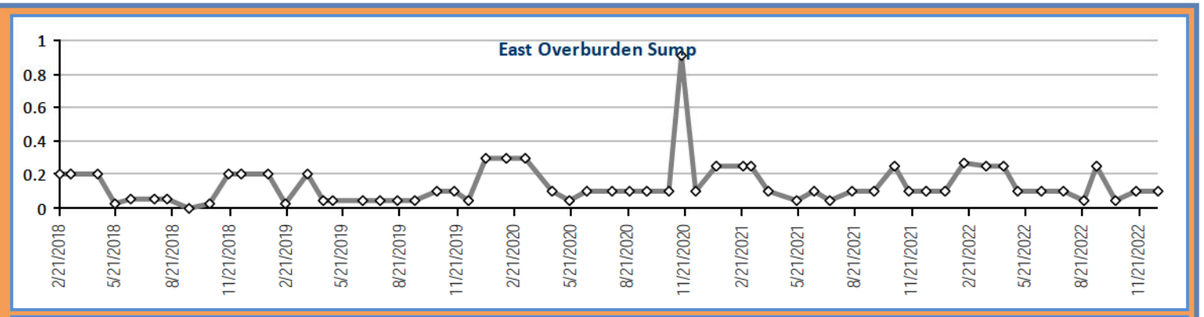


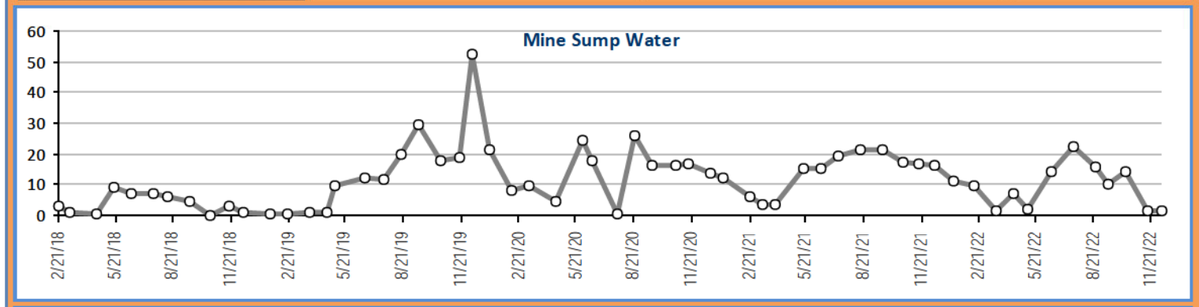


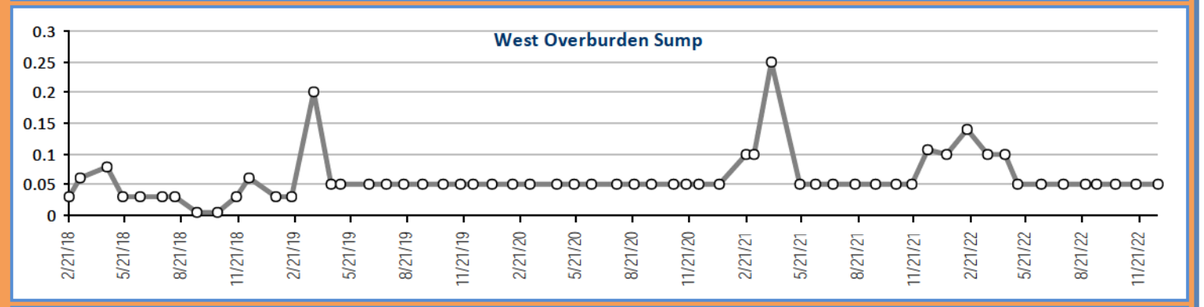
RED DOG MINE

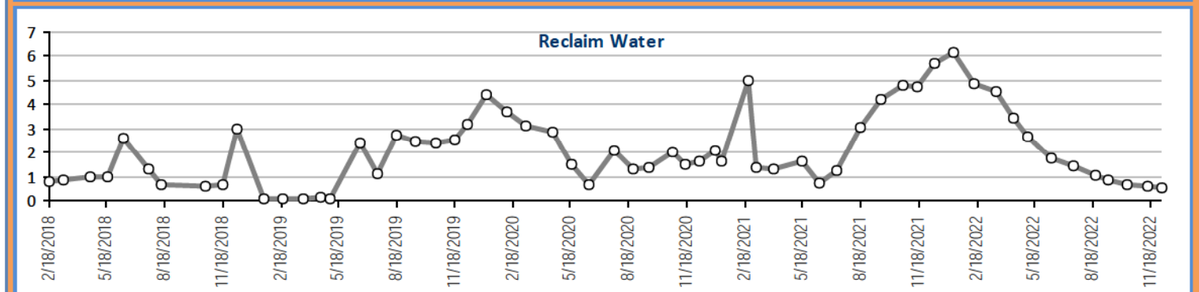
Mine Water Monitoring - Water Quality Profile II, Trend Charts

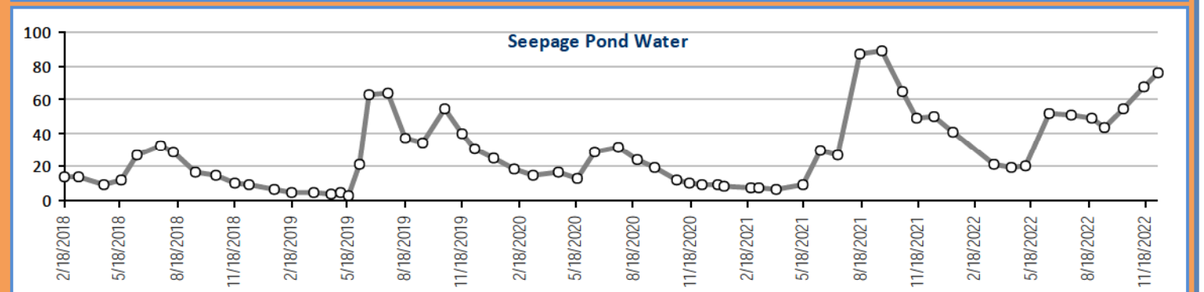
Aluminum, dissolved, units mg/L

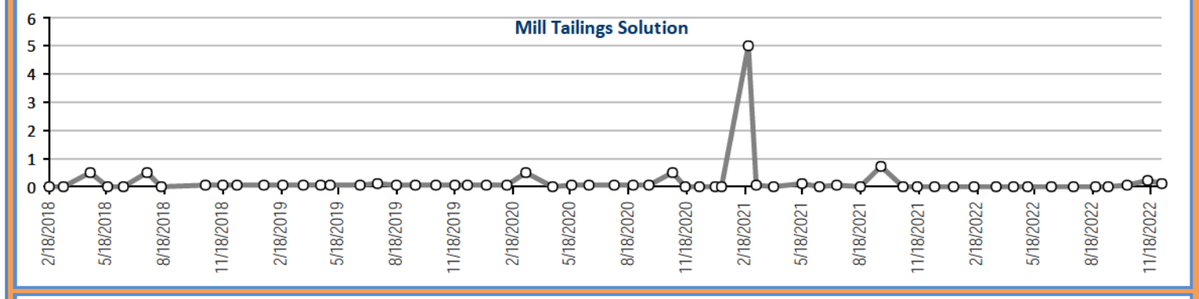


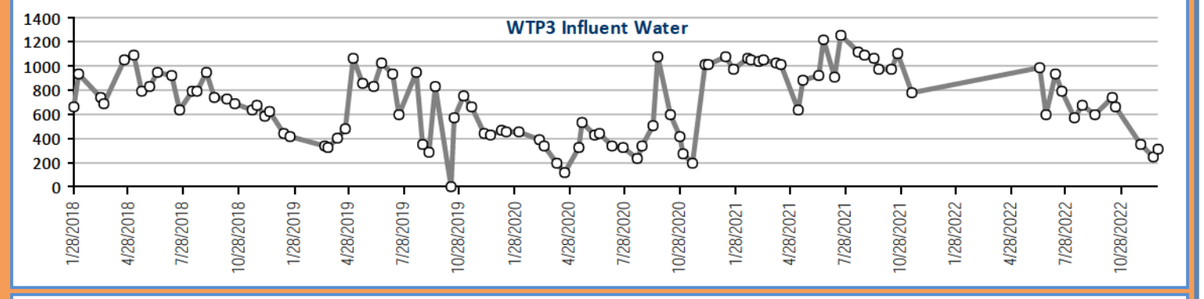


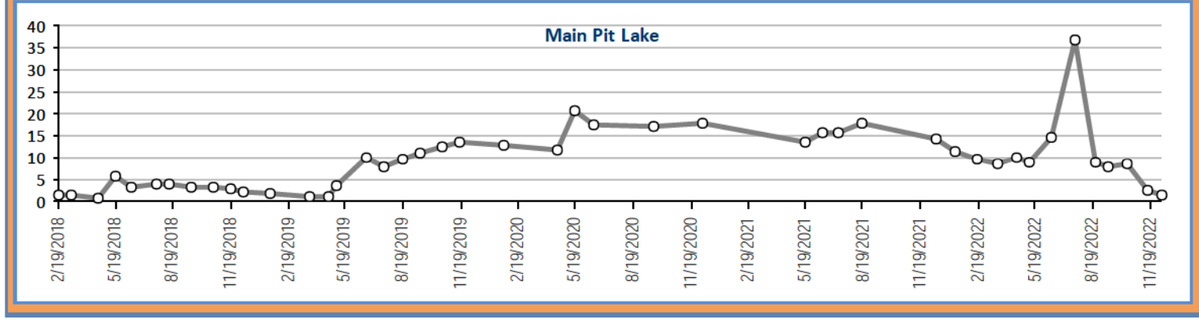


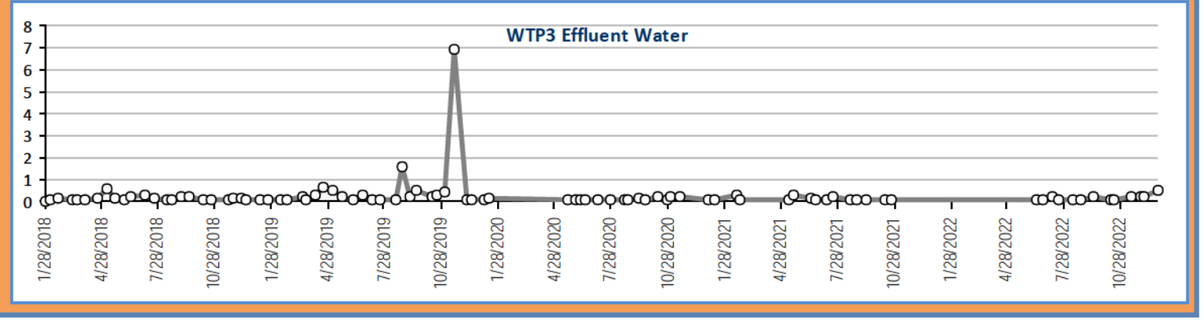








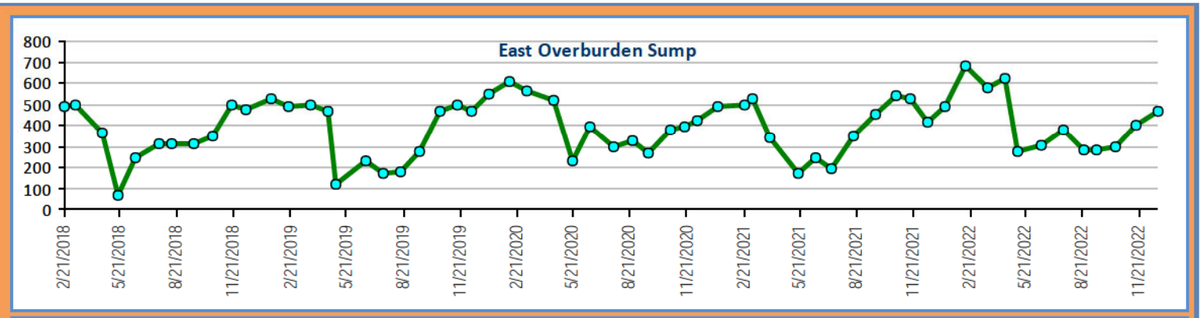


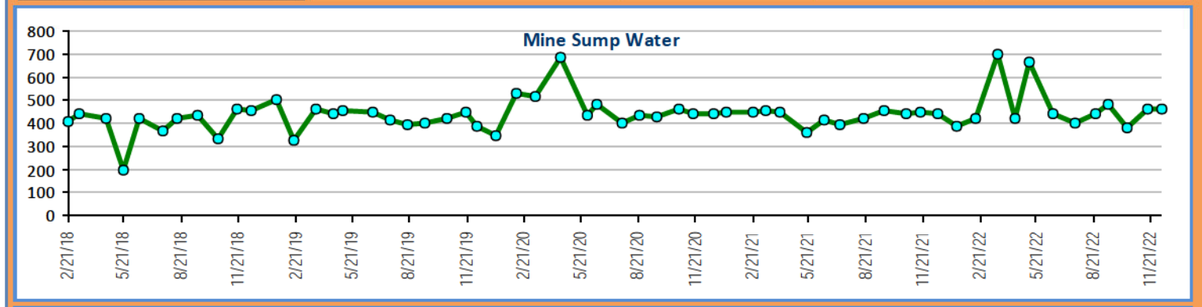


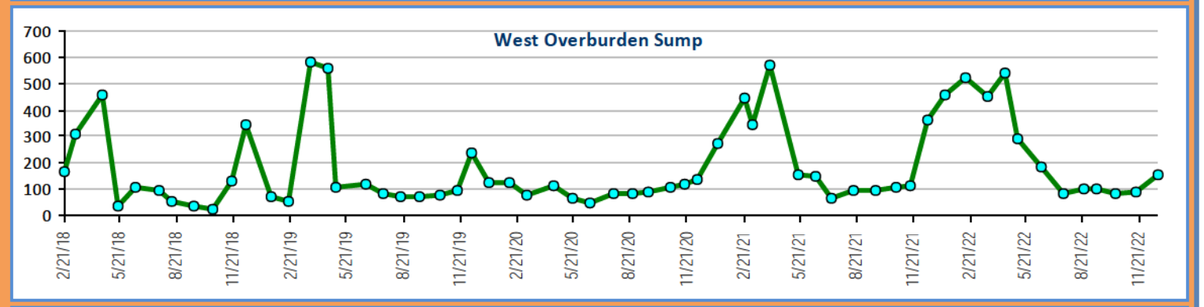
RED DOG MINE

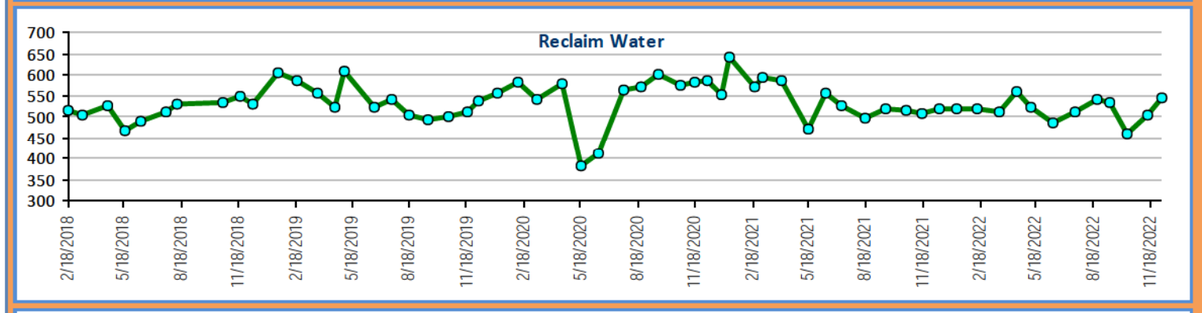
Mine Water Monitoring - Water Quality Profile II, Trend Charts

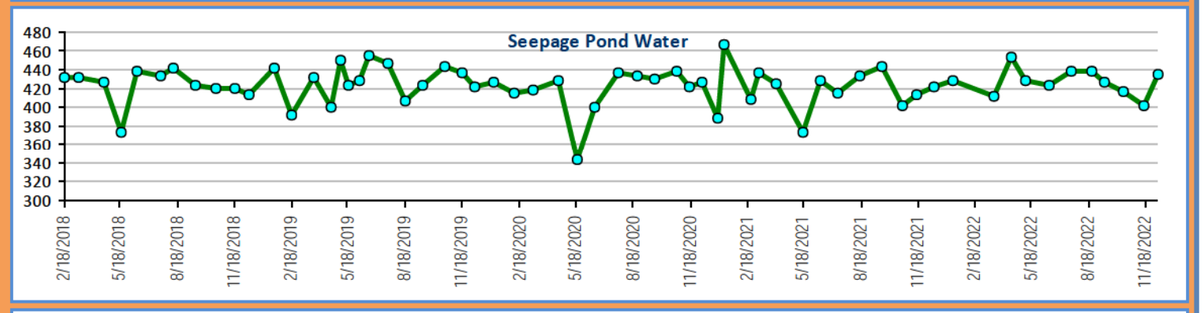
Calcium, dissolved, units mg/L

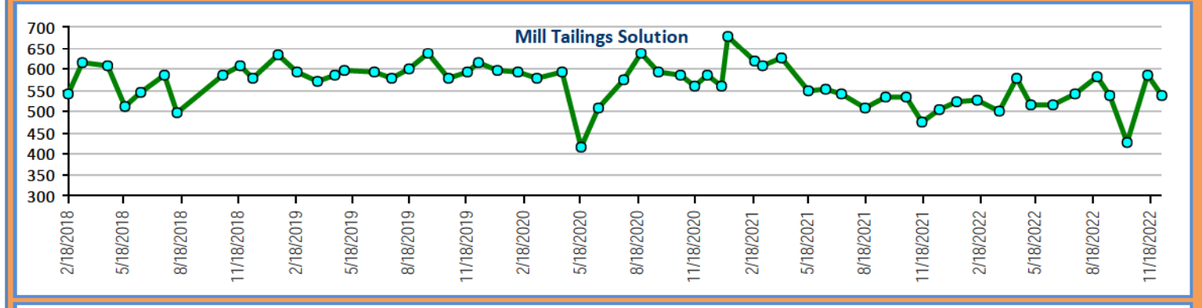


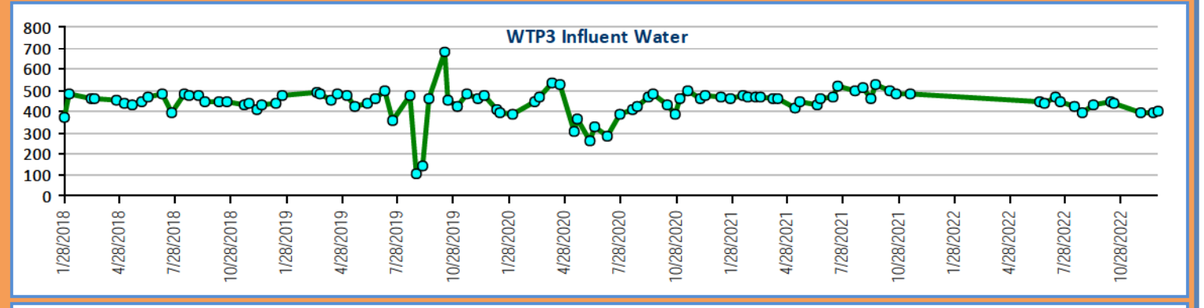


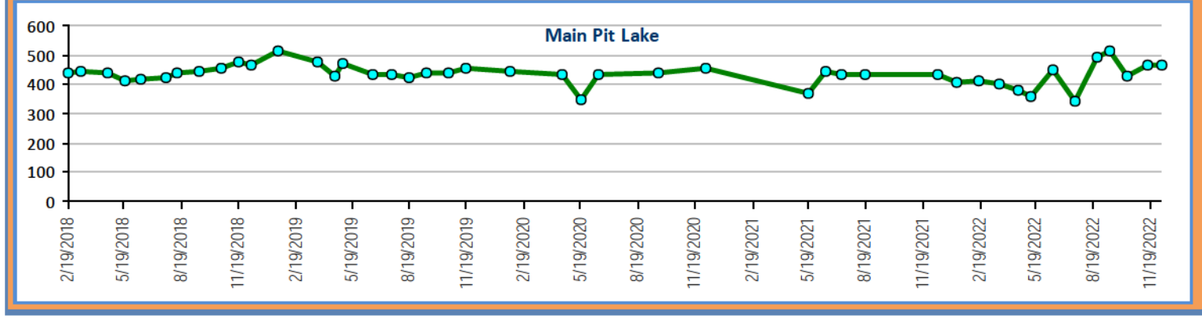


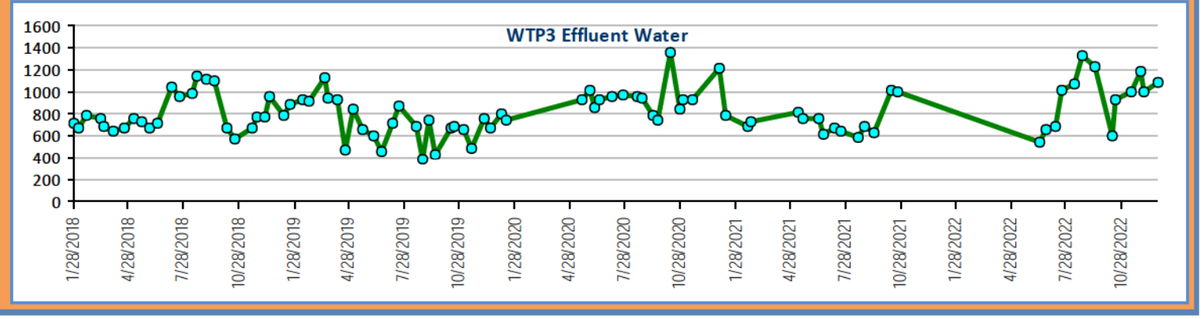








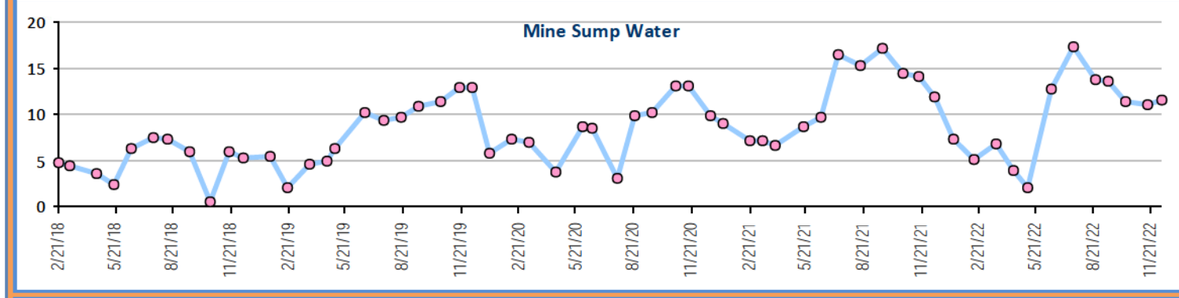


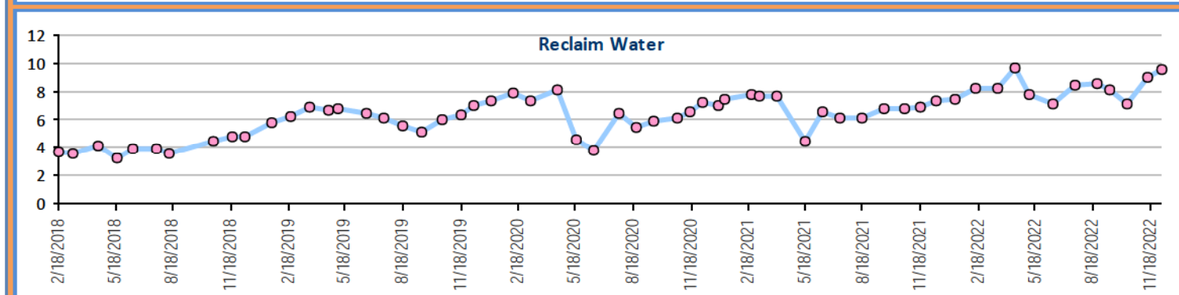


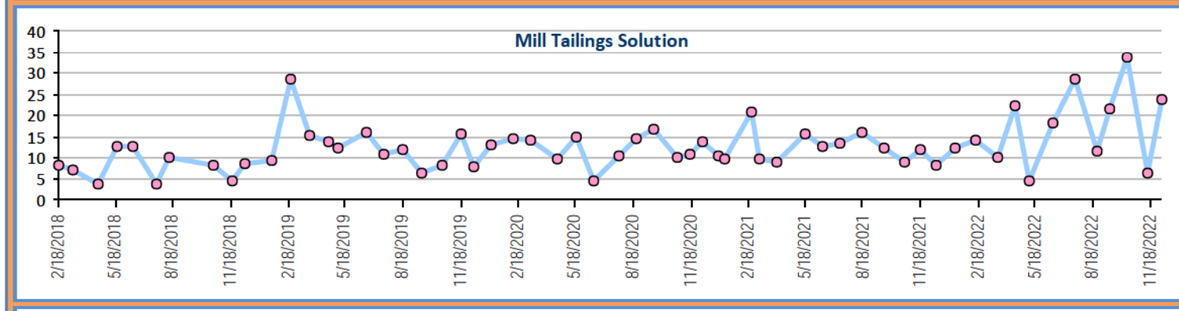
RED DOG MINE

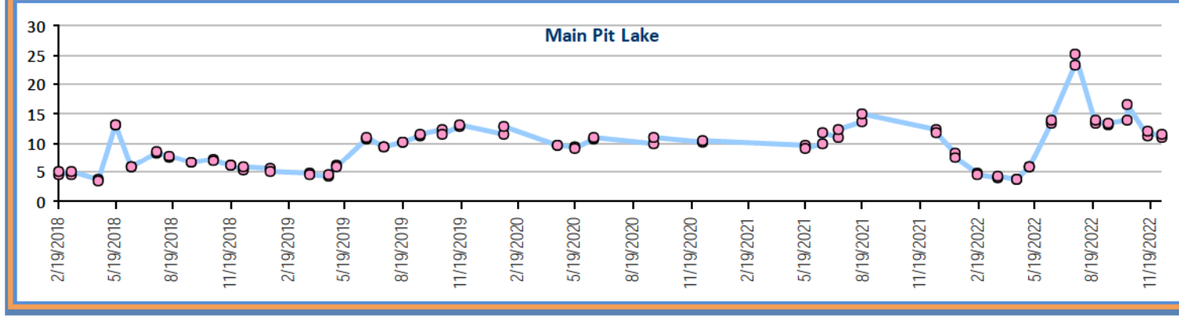
Mine Water Monitoring - Water Quality Profile II, Trend Charts

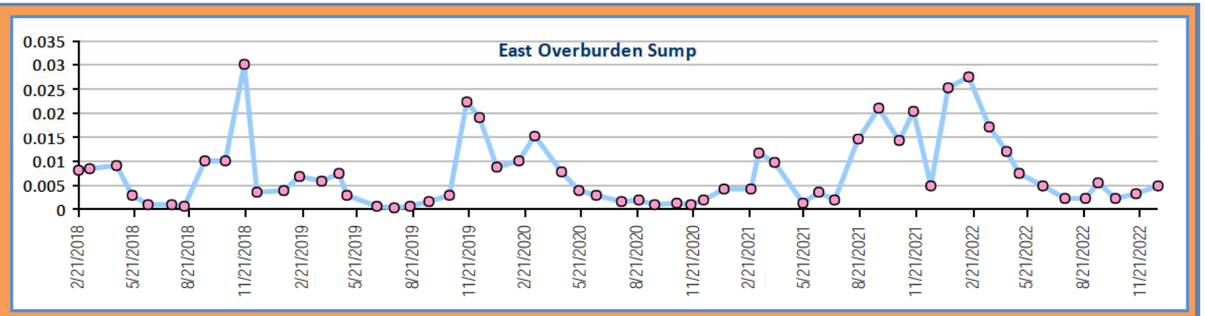
Cadmium, dissolved, units mg/L

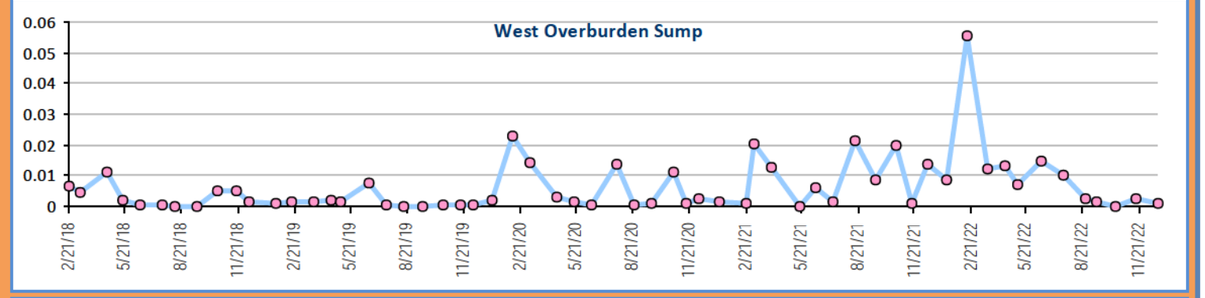


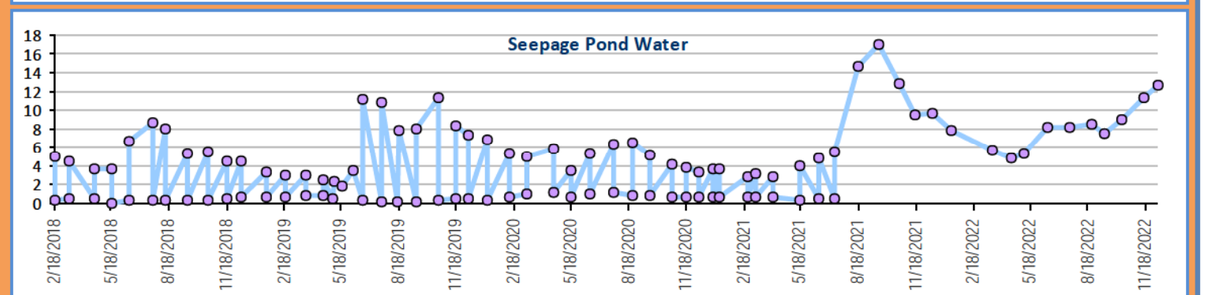


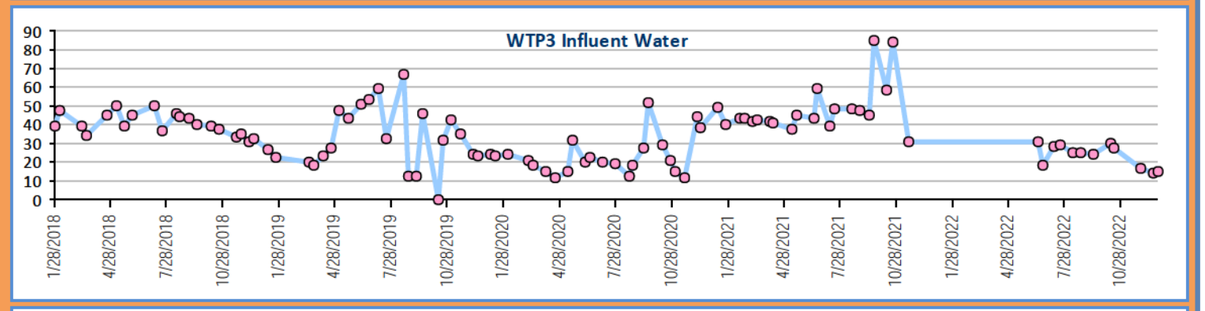


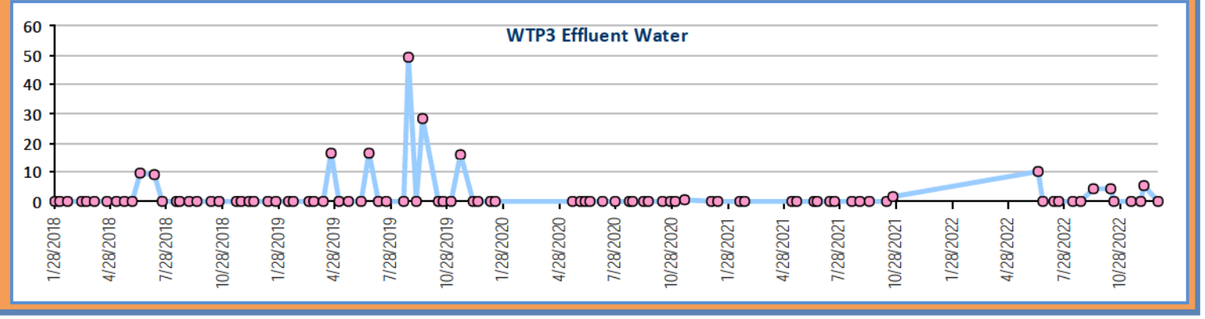








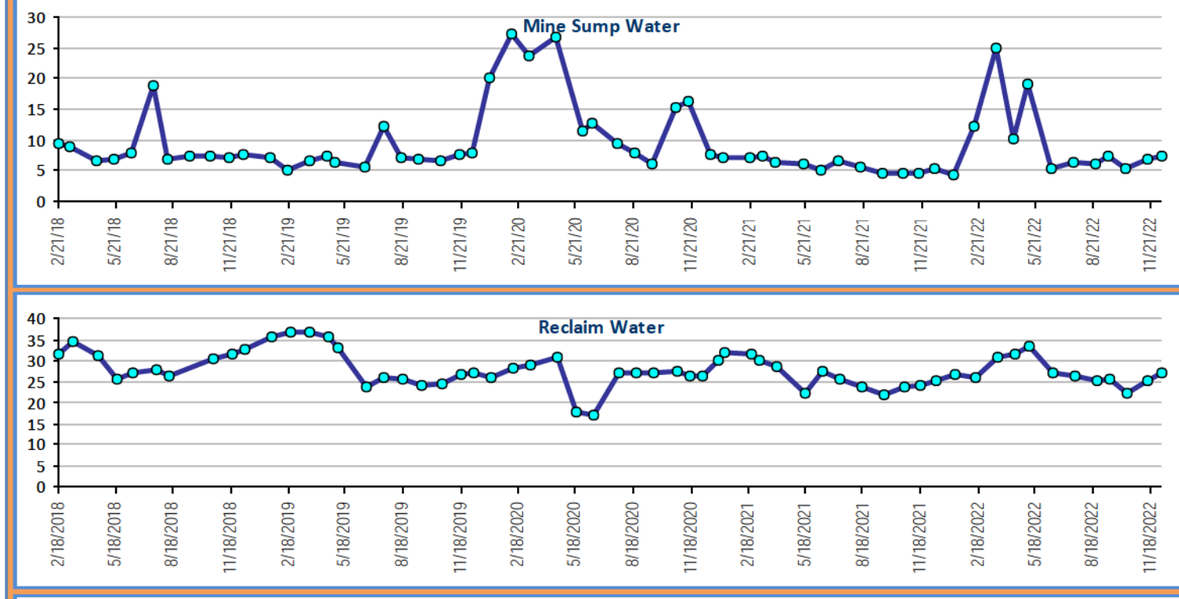


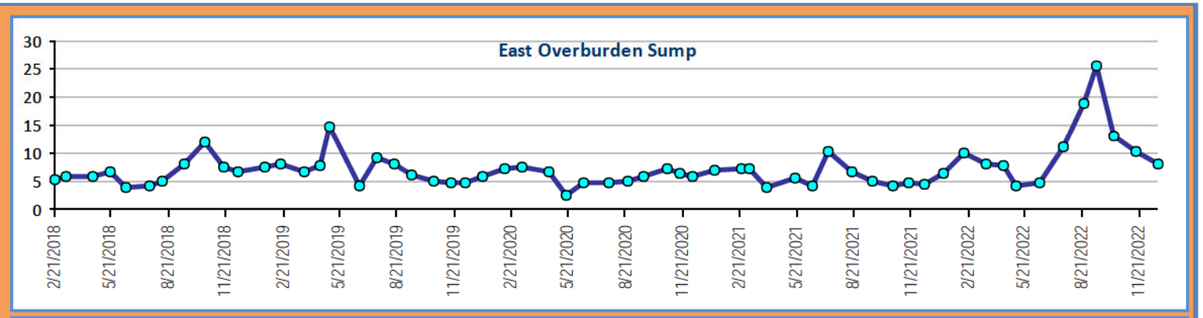


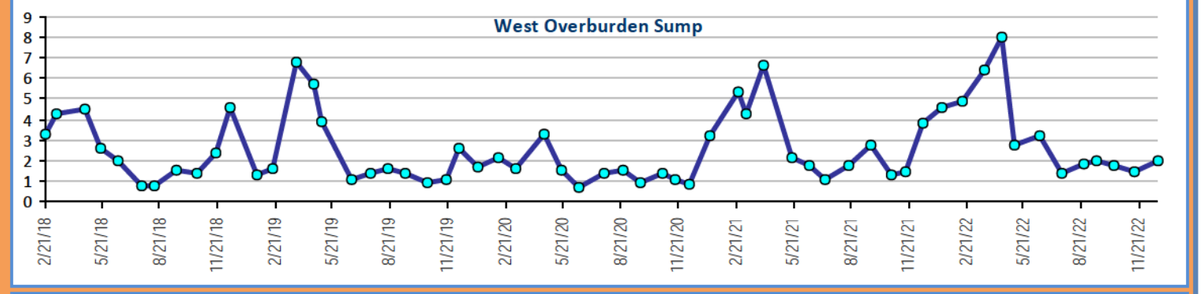
RED DOG MINE

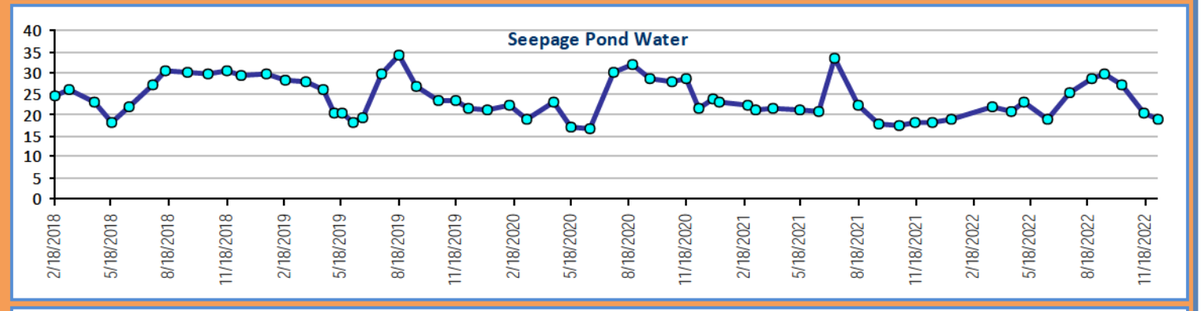
Mine Water Monitoring - Water Quality Profile II, Trend Charts

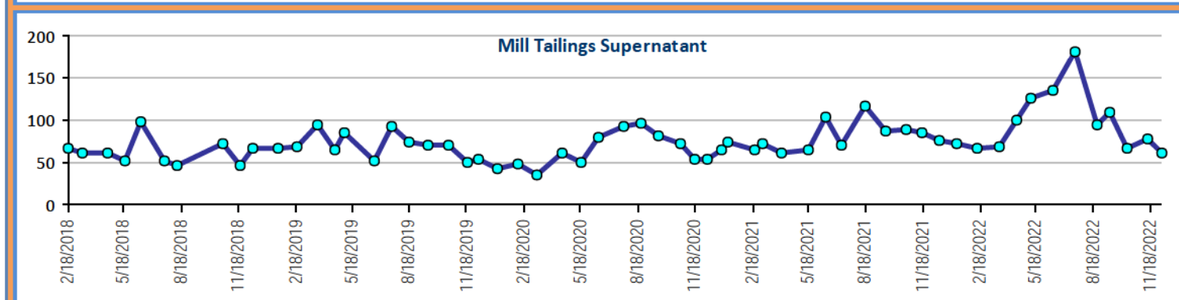
Chloride, dissolved, units mg/L

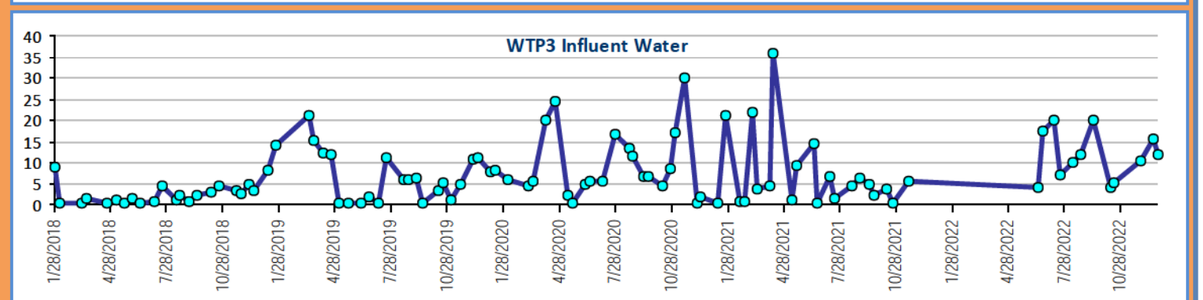


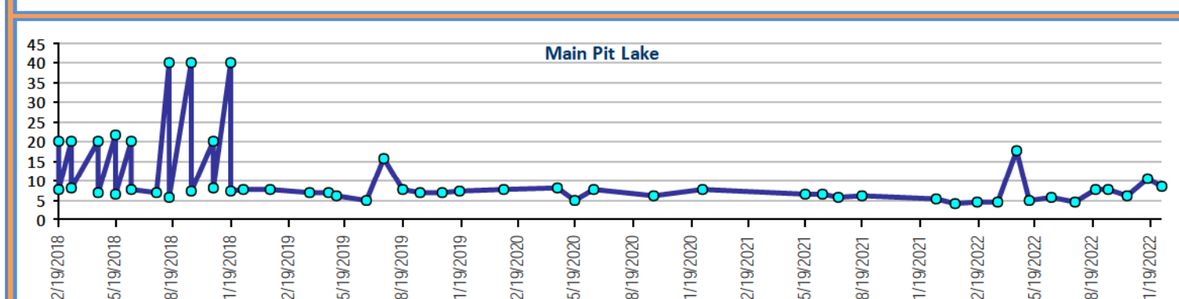


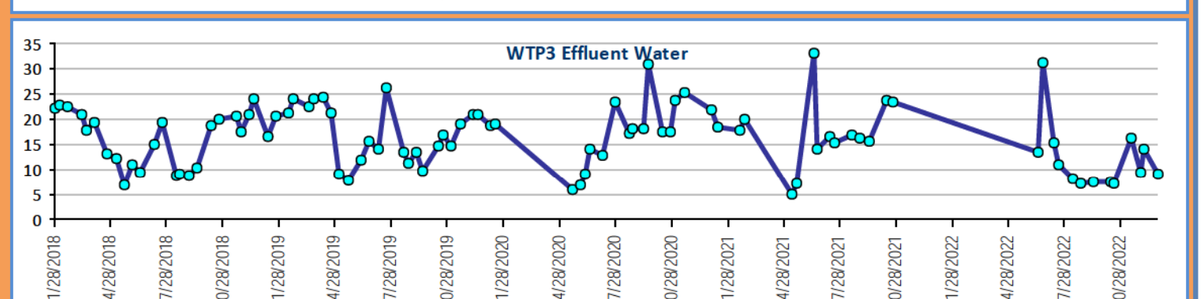








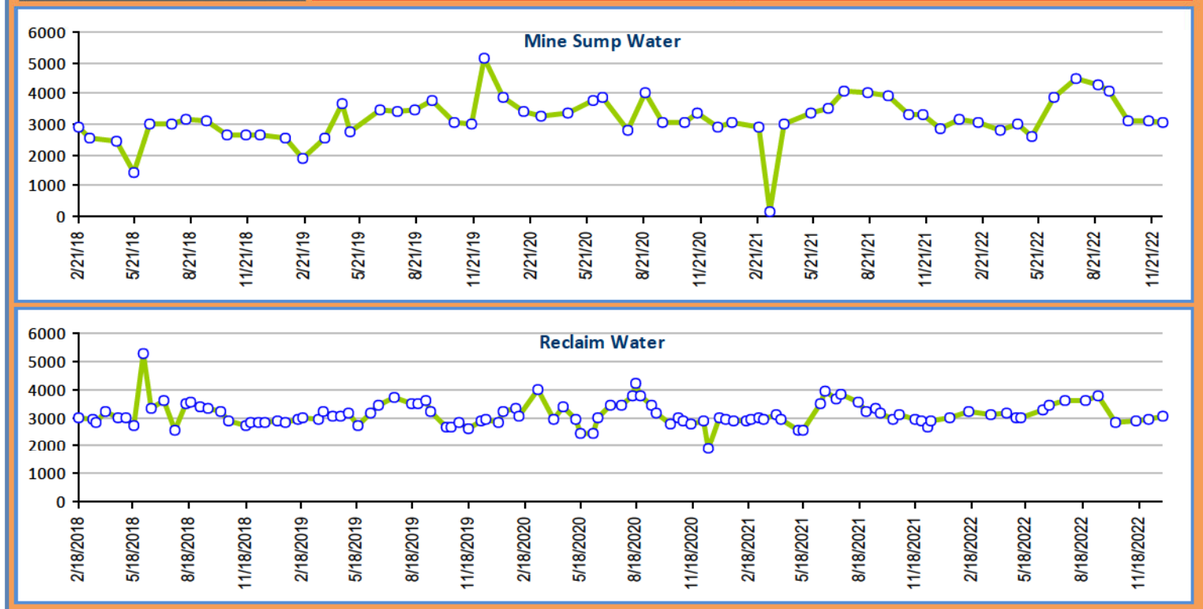


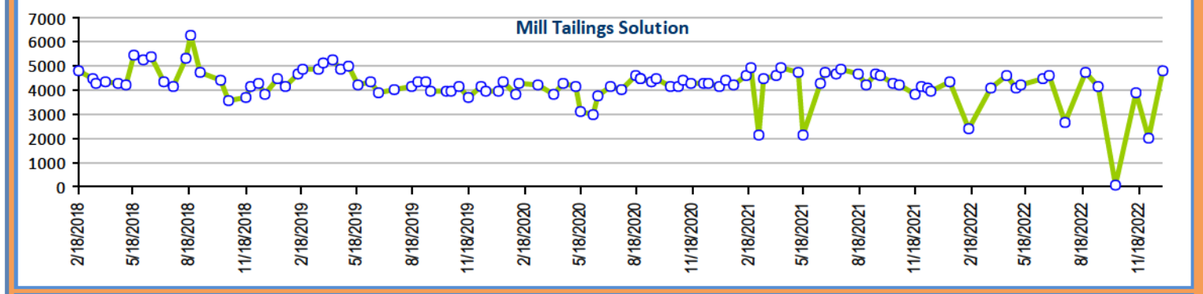


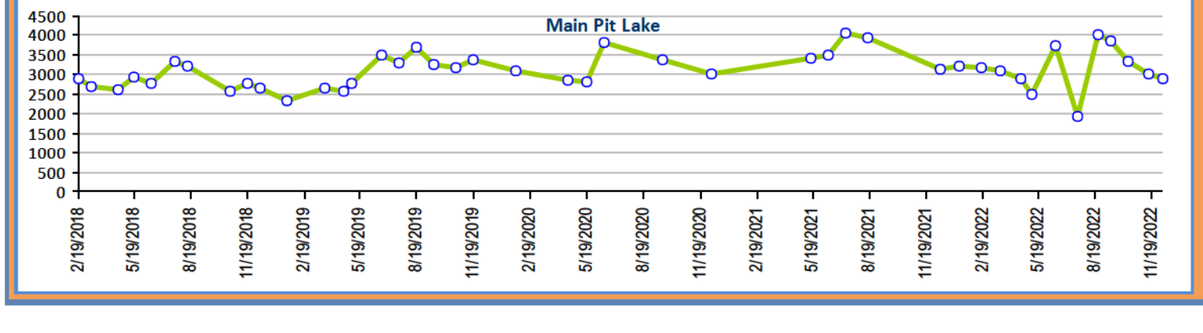
RED DOG MINE

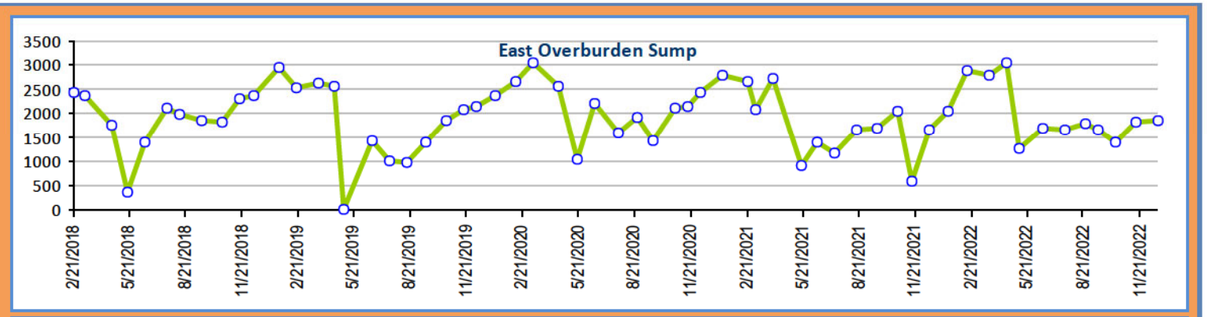
Mine Water Monitoring - Water Quality Profile II, Trend Charts

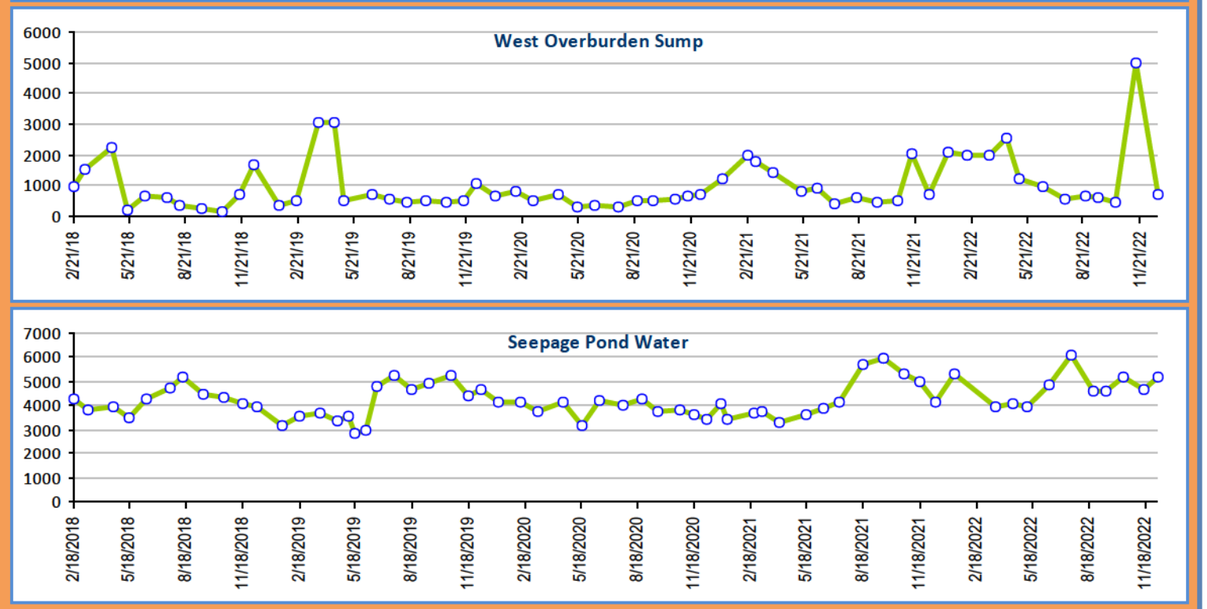
Conductivity, units uS/cm

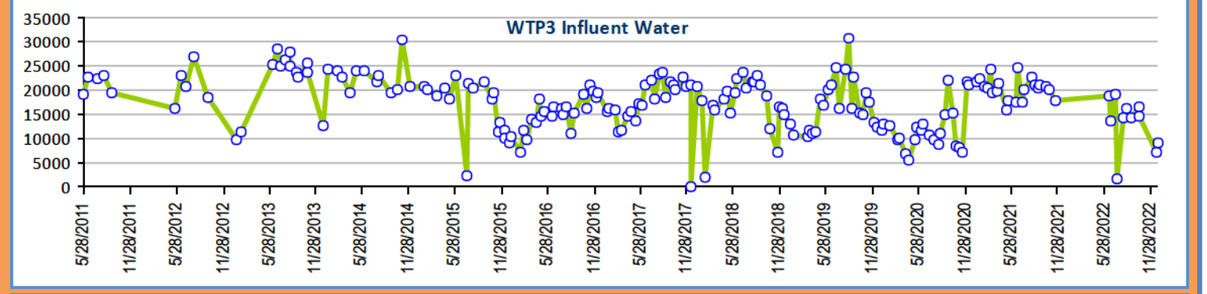


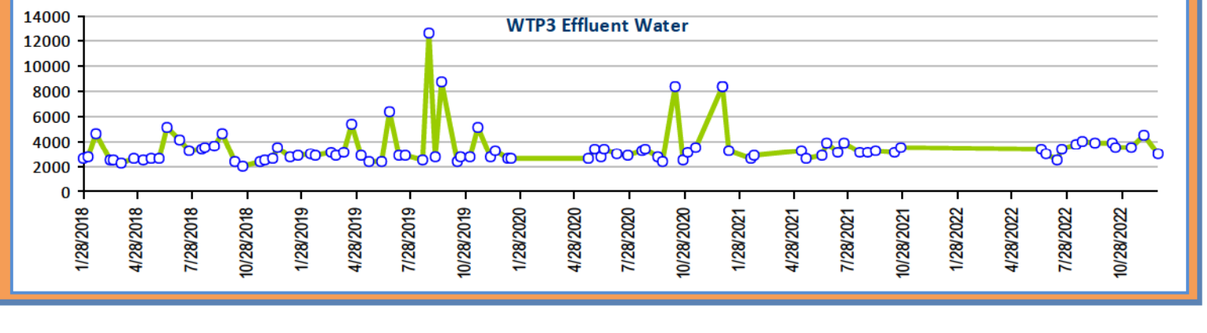








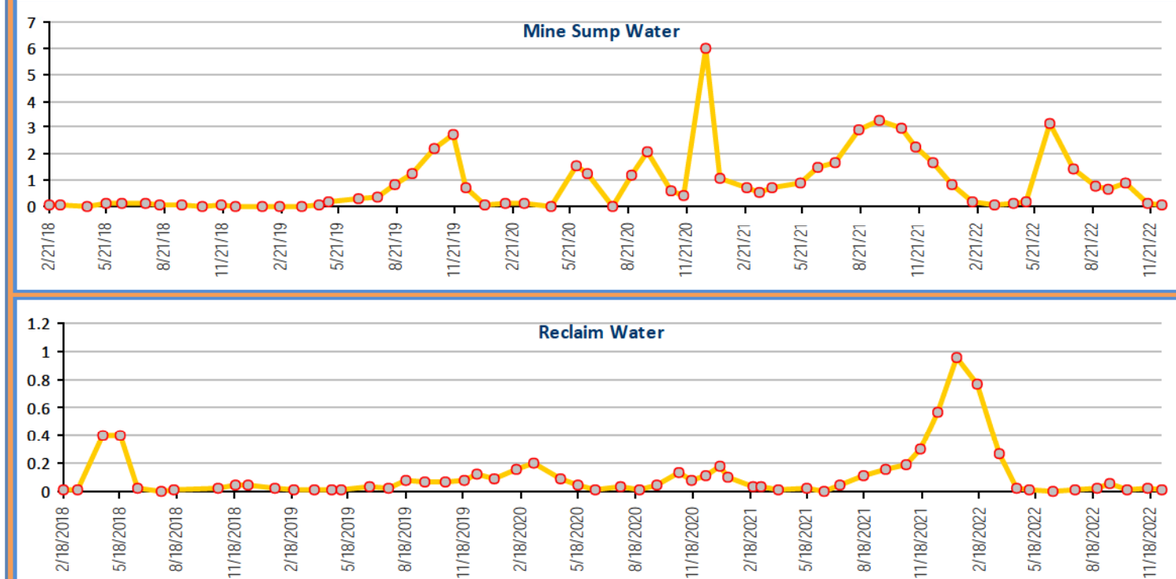


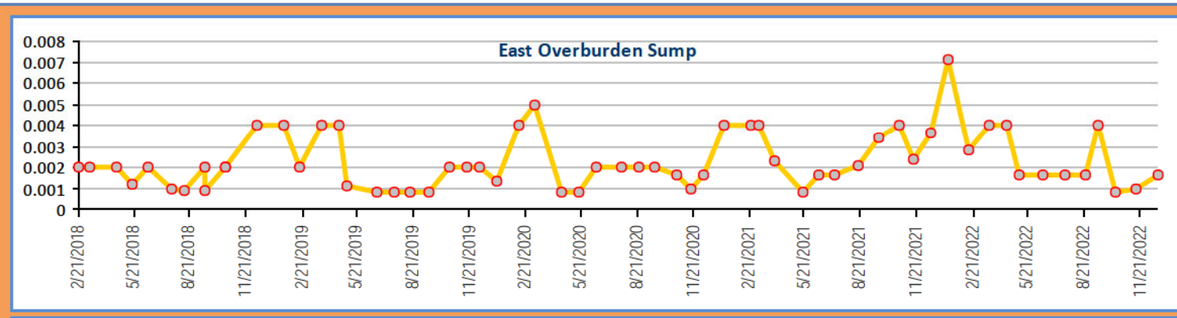


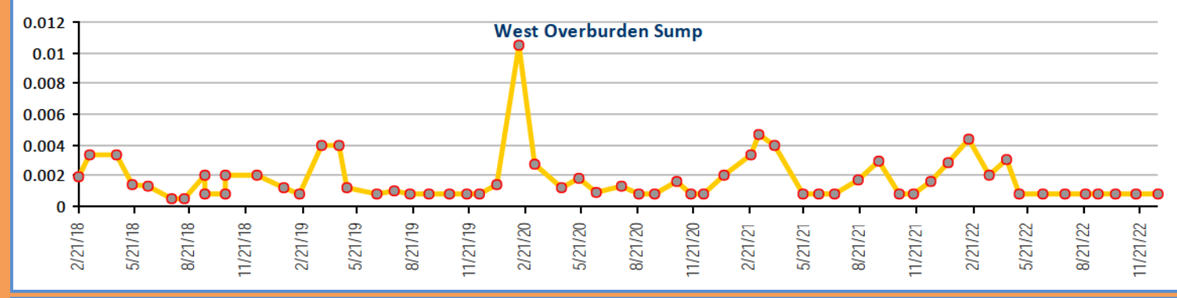
RED DOG MINE

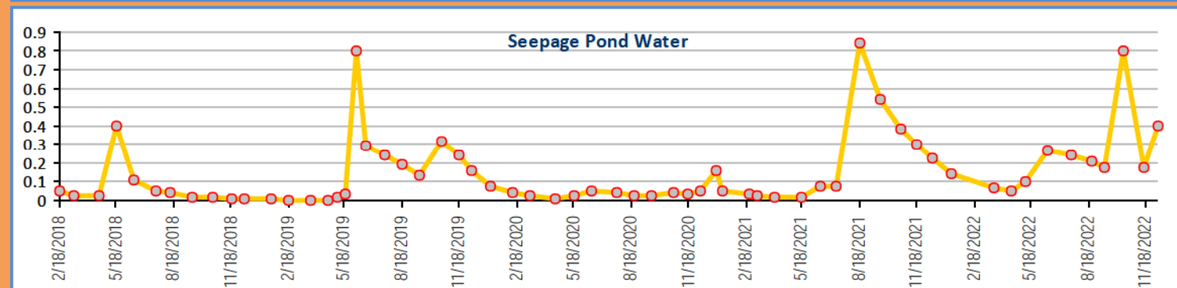
Mine Water Monitoring - Water Quality Profile II, Trend Charts

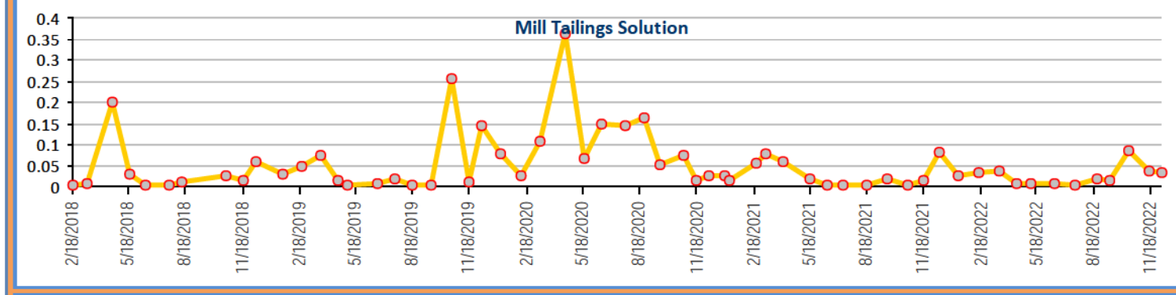
Copper, dissolved, units mg/L

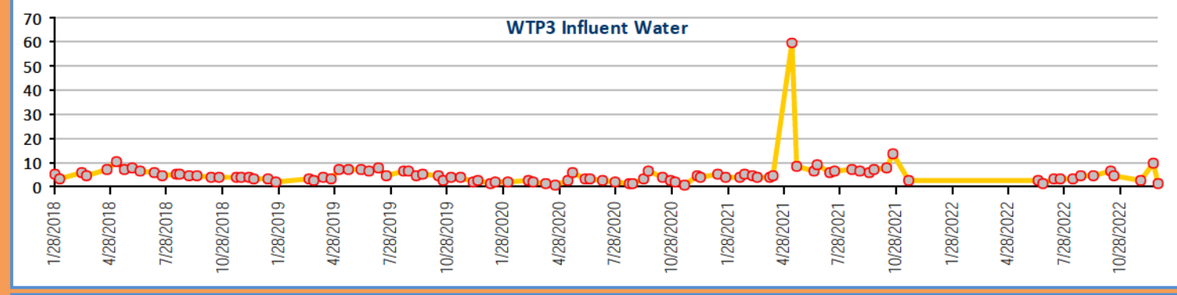


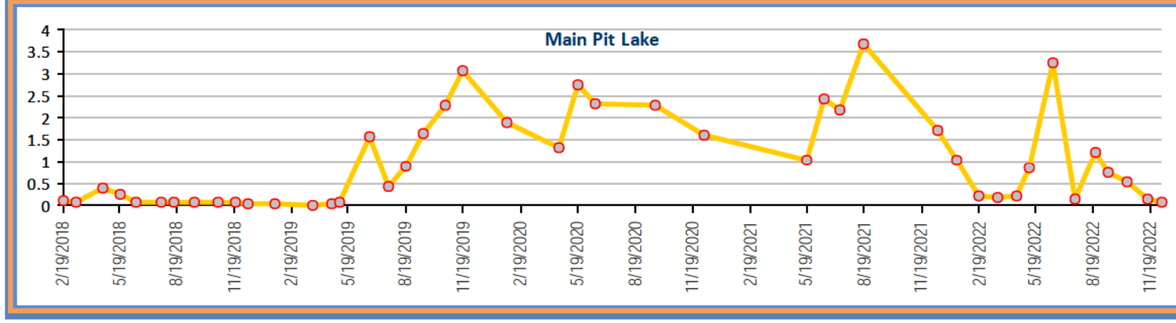


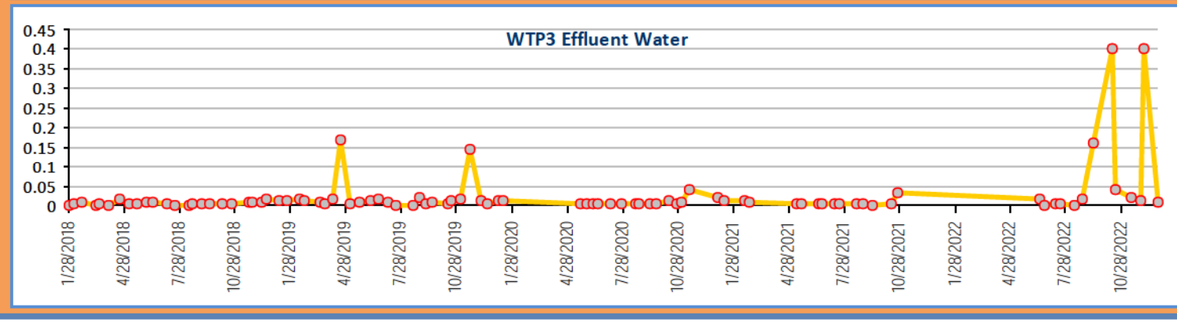








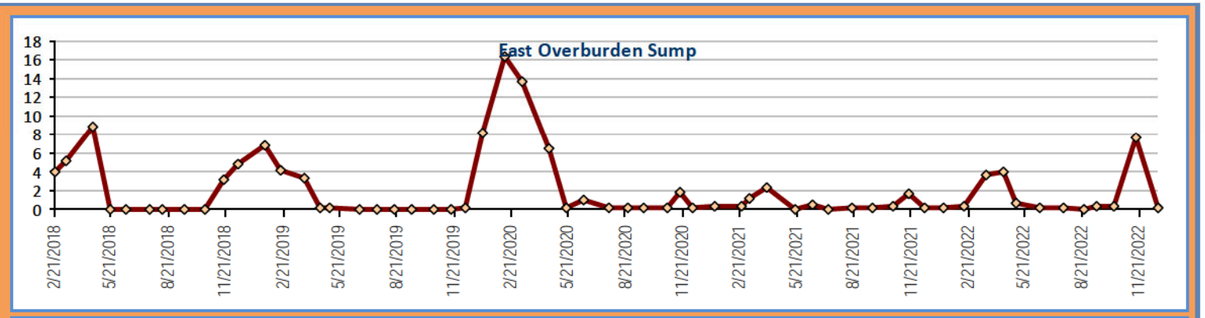


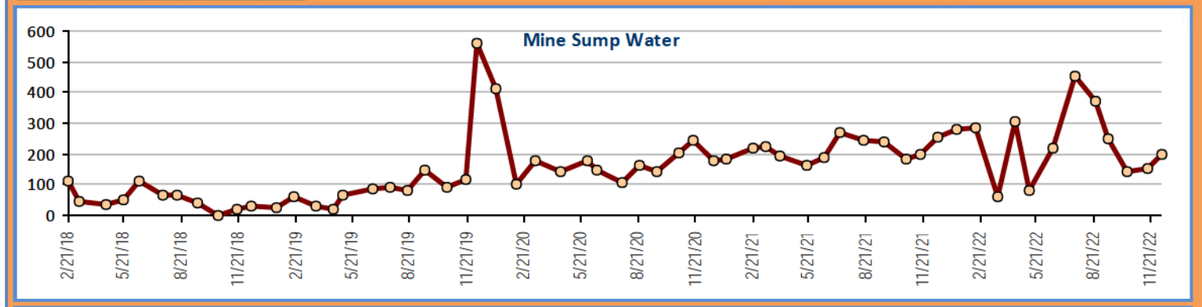


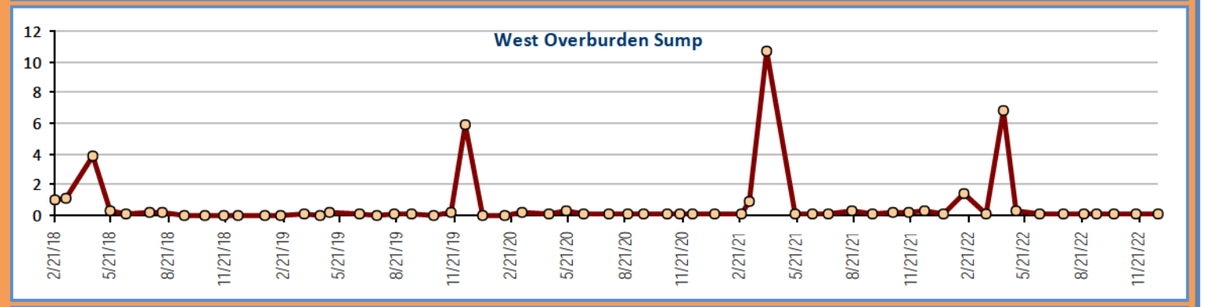
RED DOG MINE

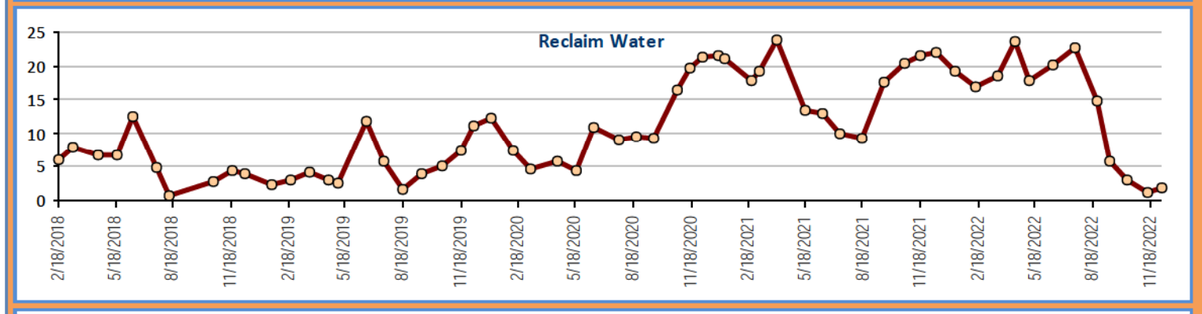
Mine Water Monitoring - Water Quality Profile II, Trend Charts

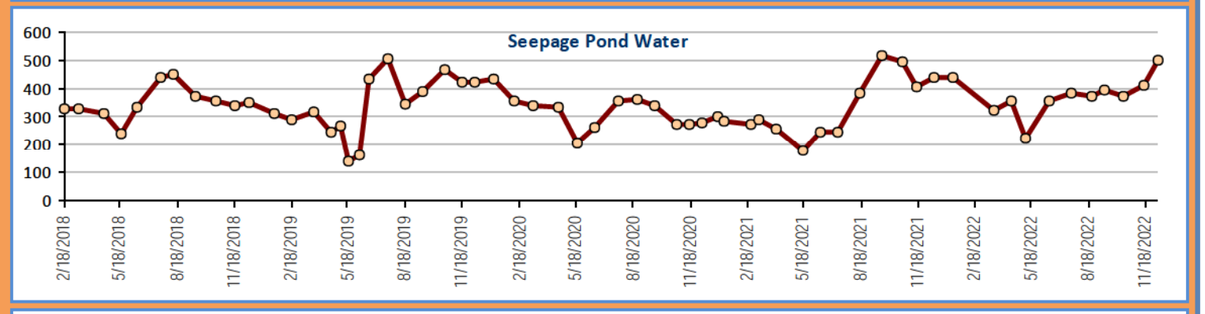
Iron, dissolved, units mg/L

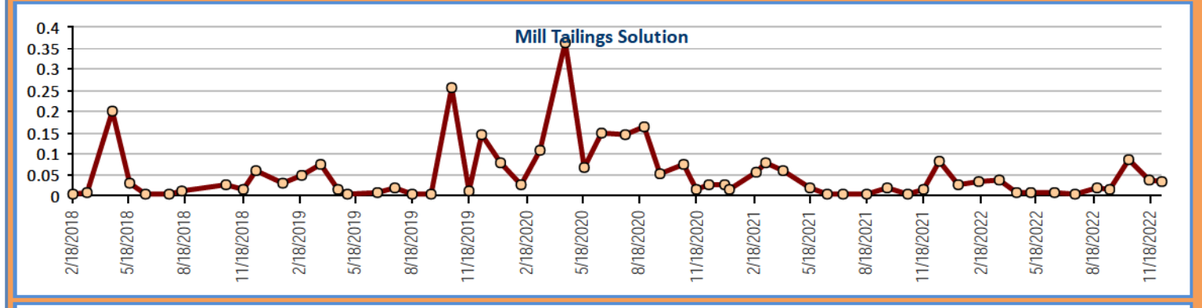


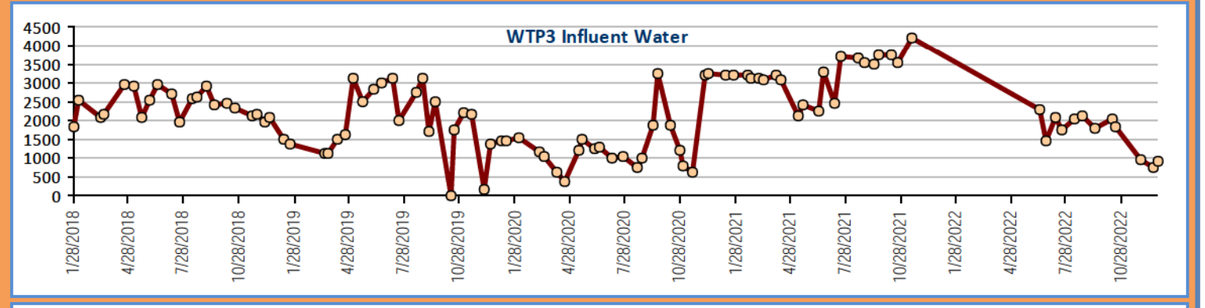


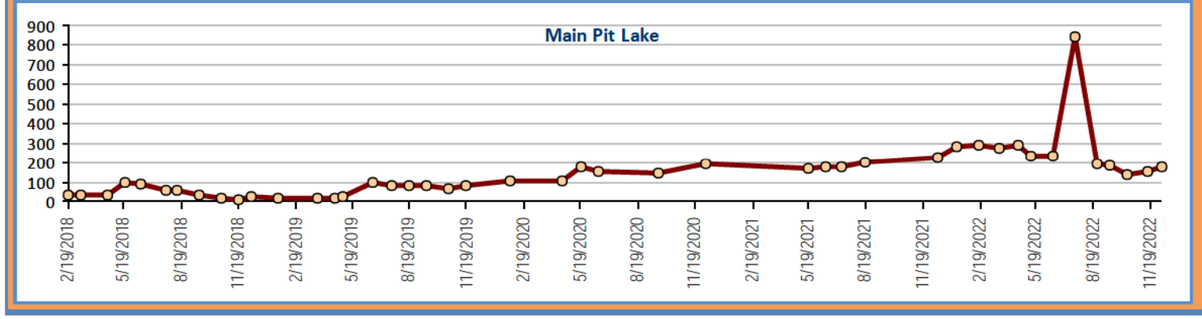


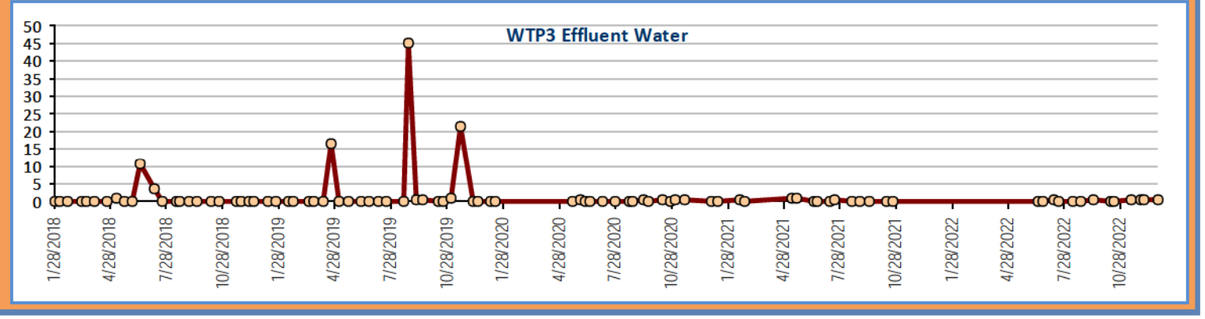








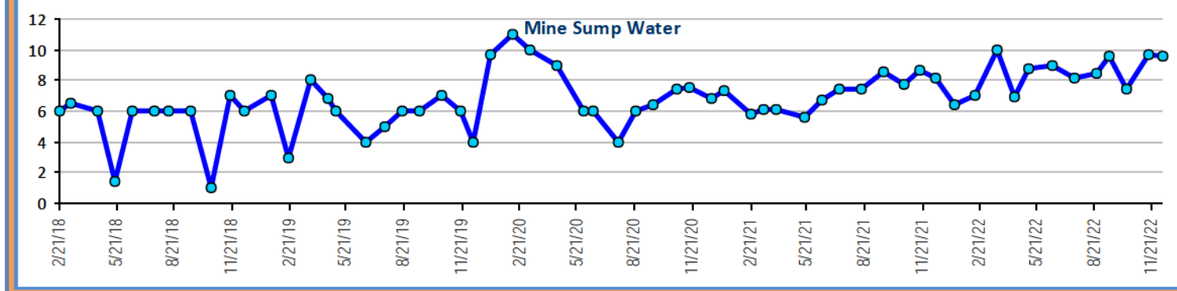


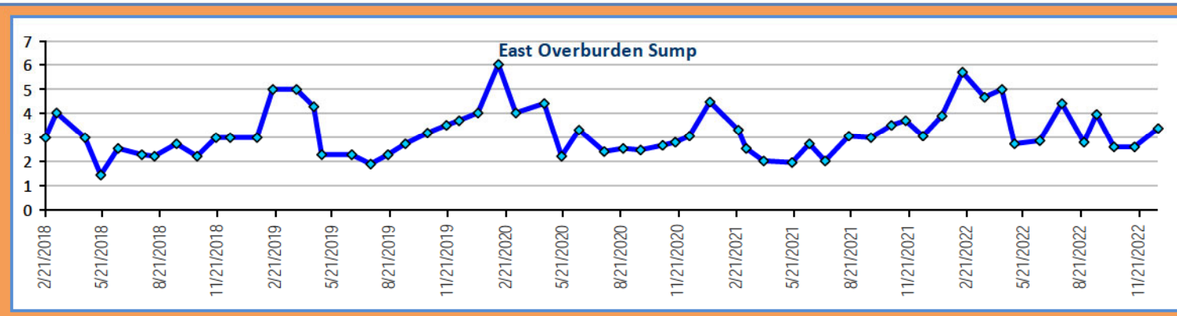


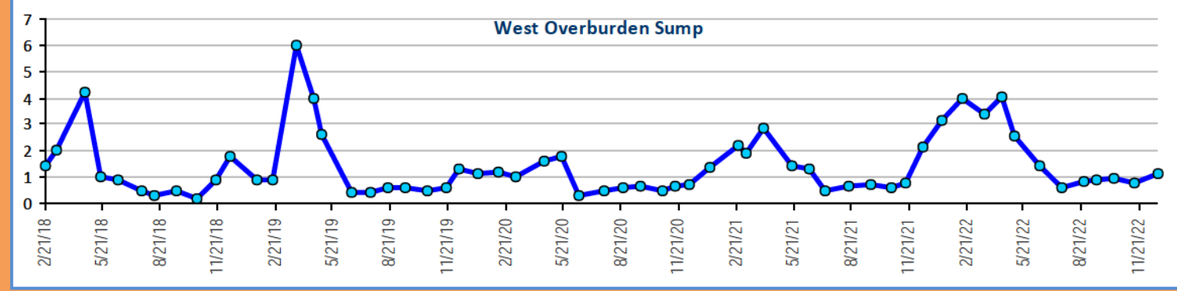
RED DOG MINE

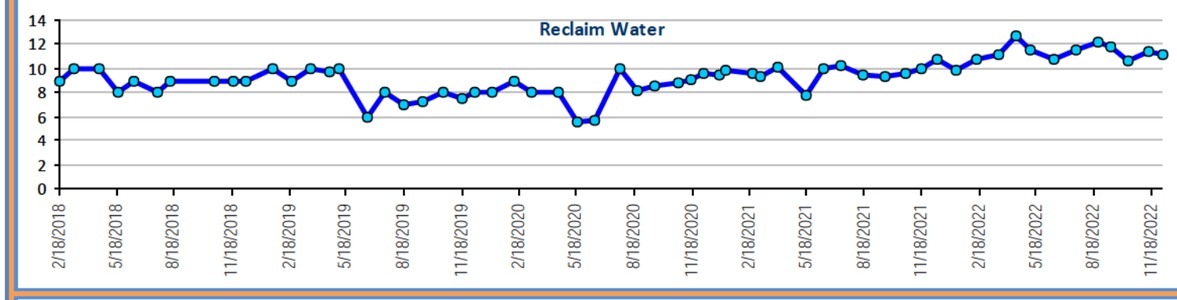
Mine Water Monitoring - Water Quality Profile II, Trend Charts

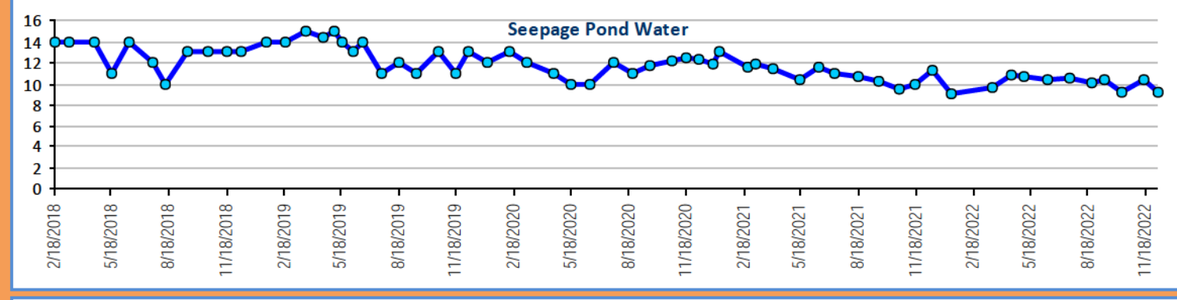
Potassium, dissolved, units mg/L

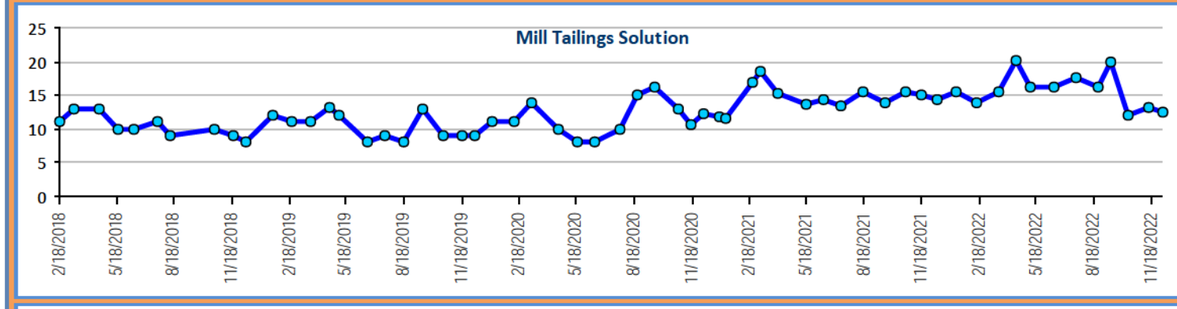


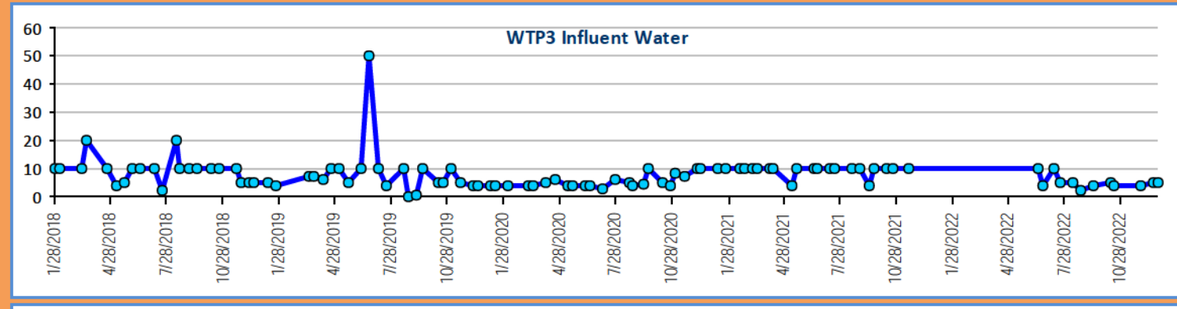


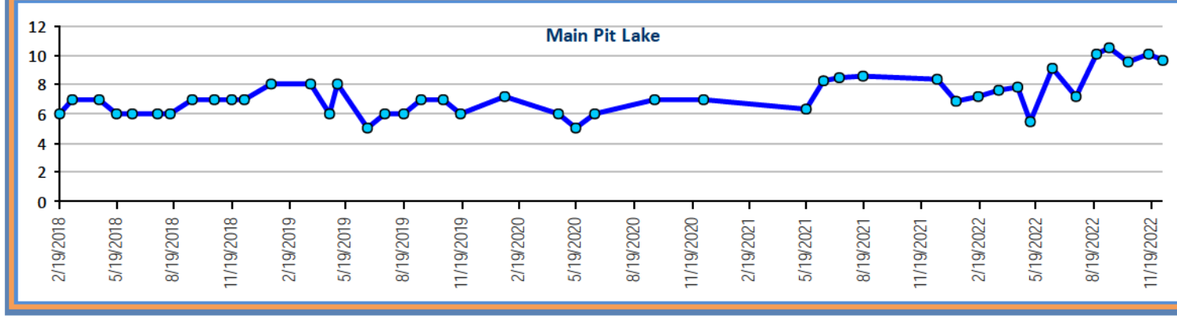


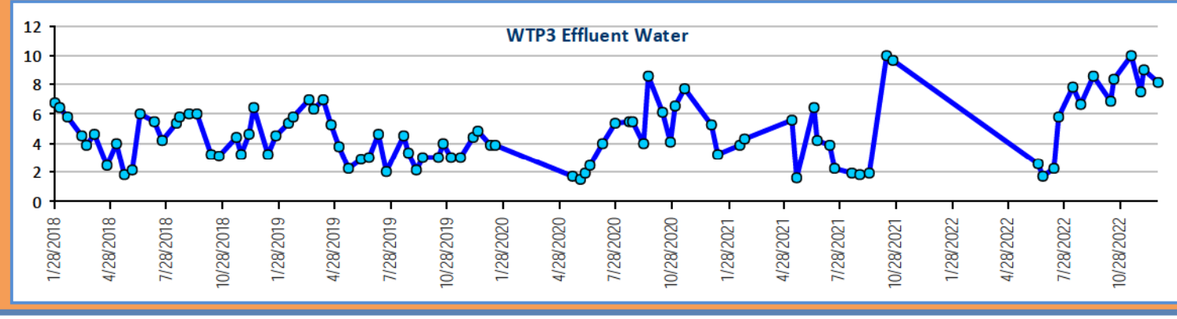








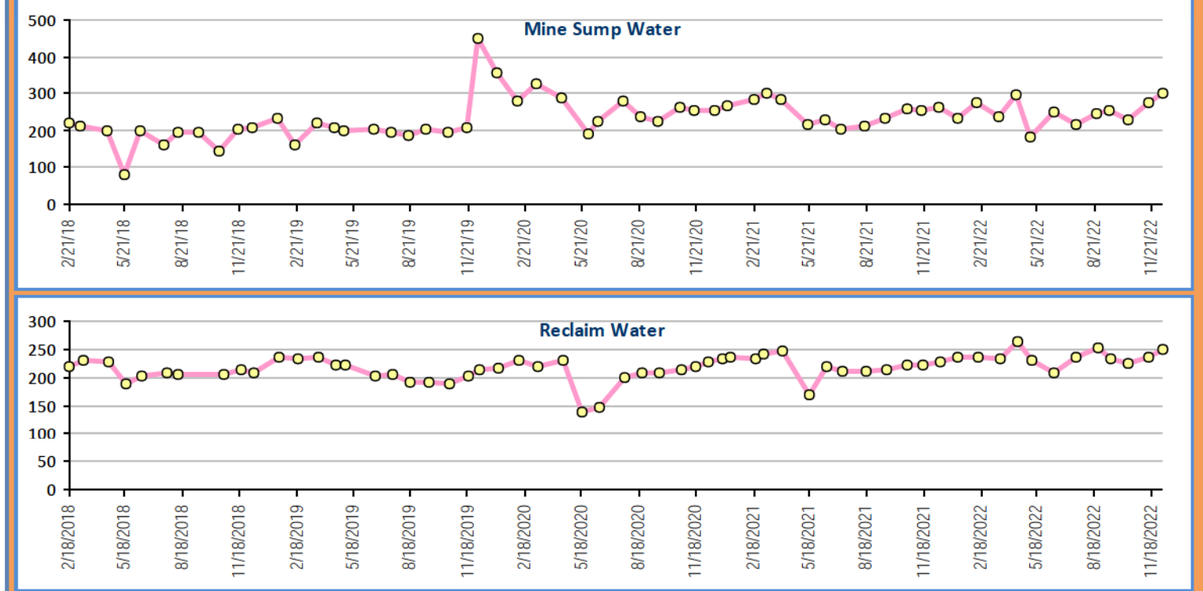


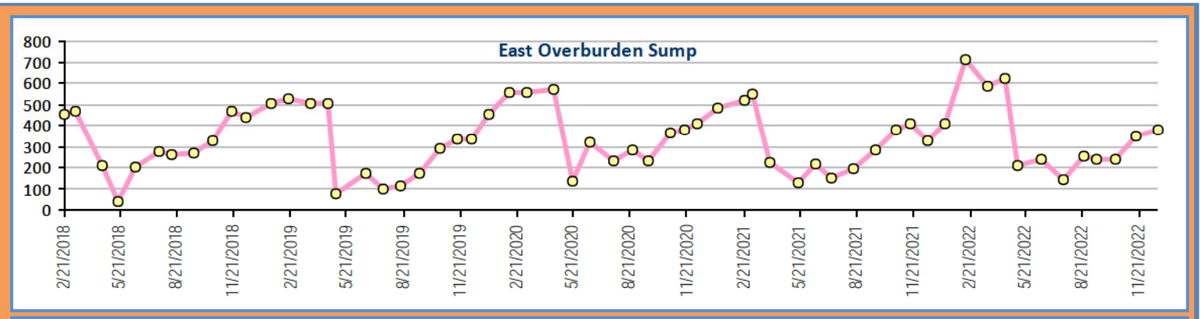


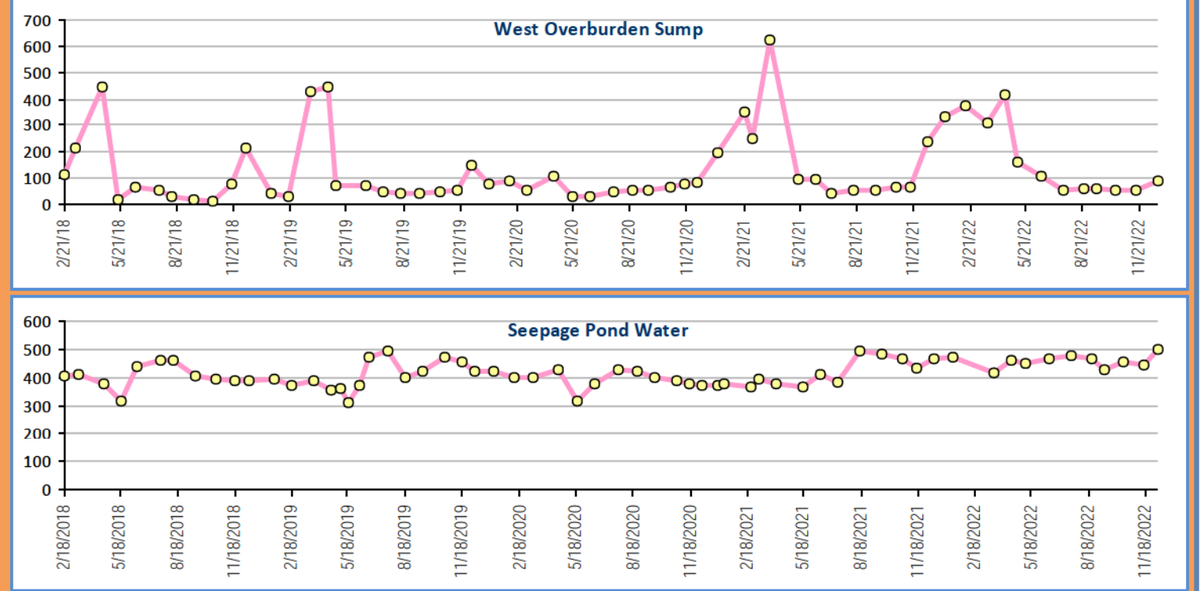
RED DOG MINE

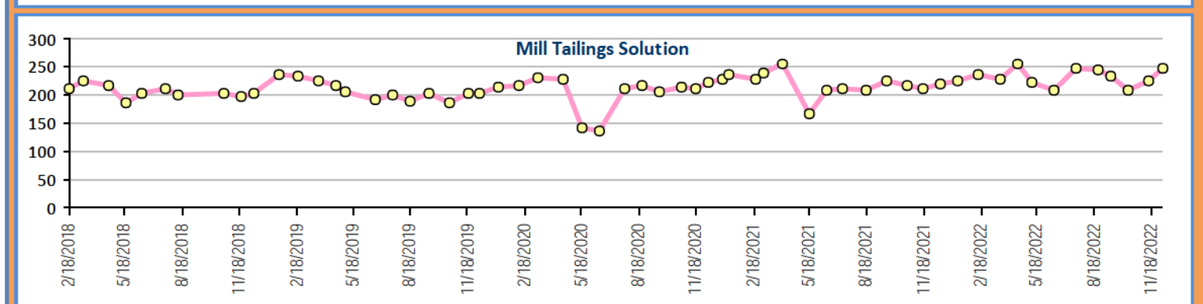
Mine Water Monitoring - Water Quality Profile II, Trend Charts

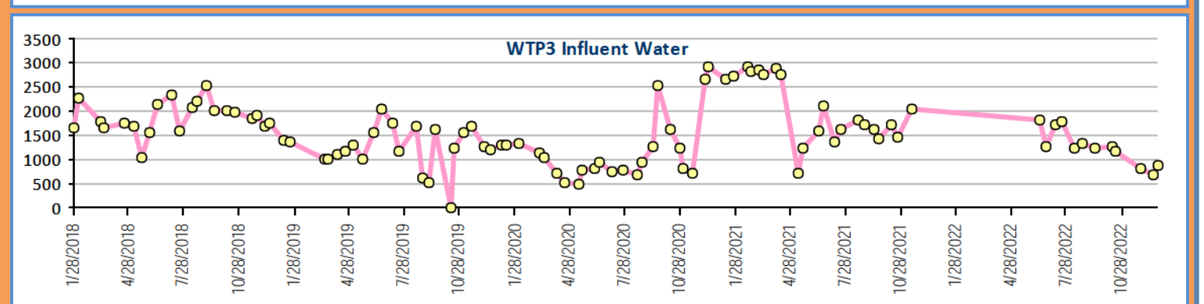
Magnesium, dissolved, units mg/L

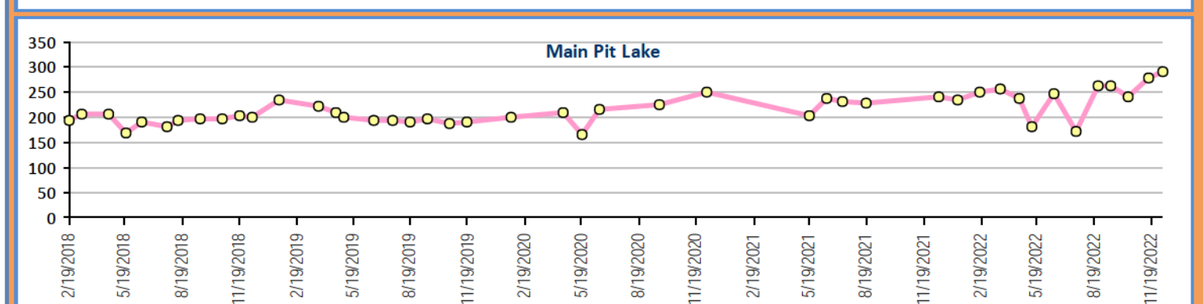


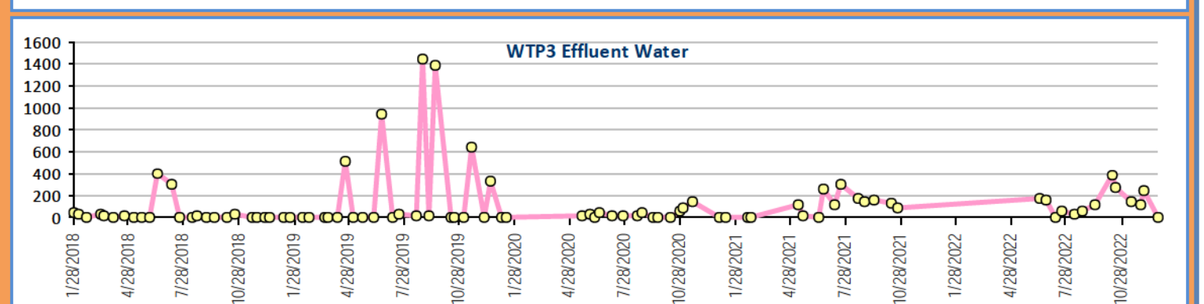








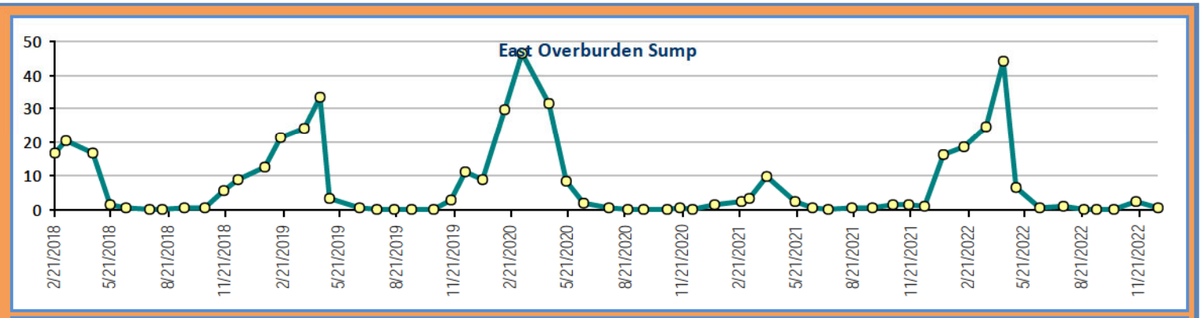


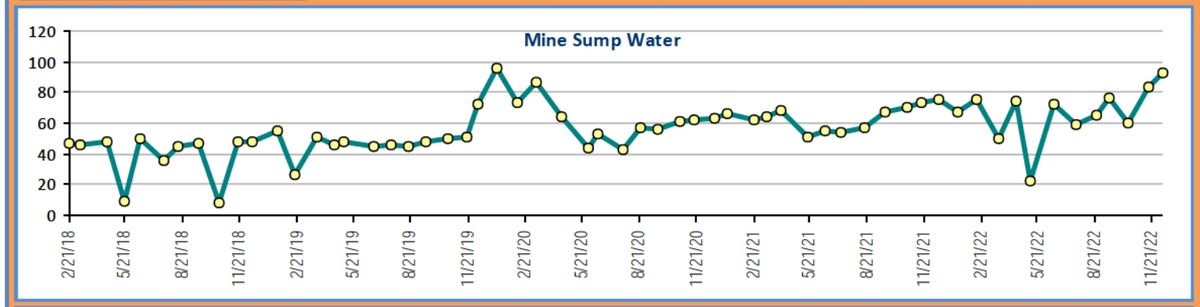


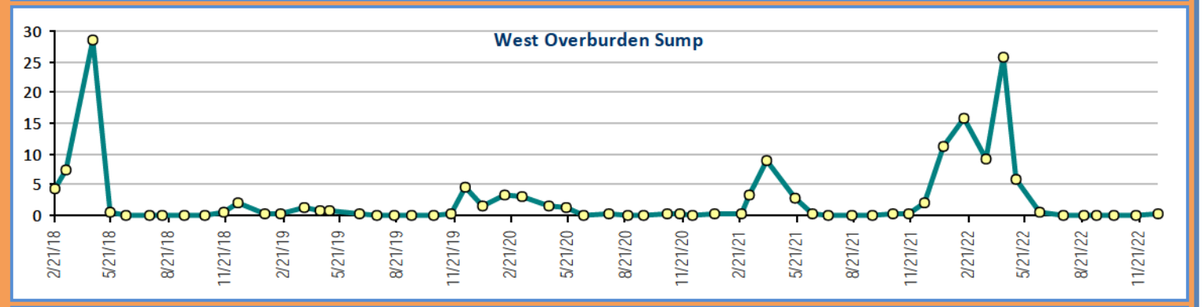
RED DOG MINE

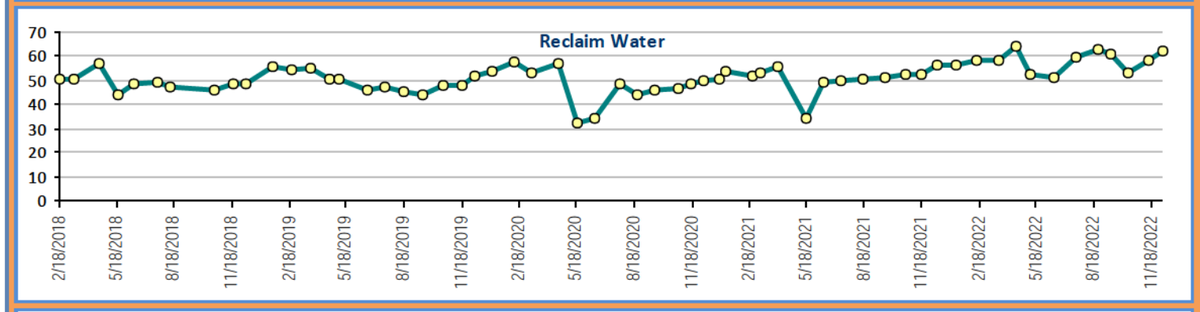
Mine Water Monitoring - Water Quality Profile II, Trend Charts

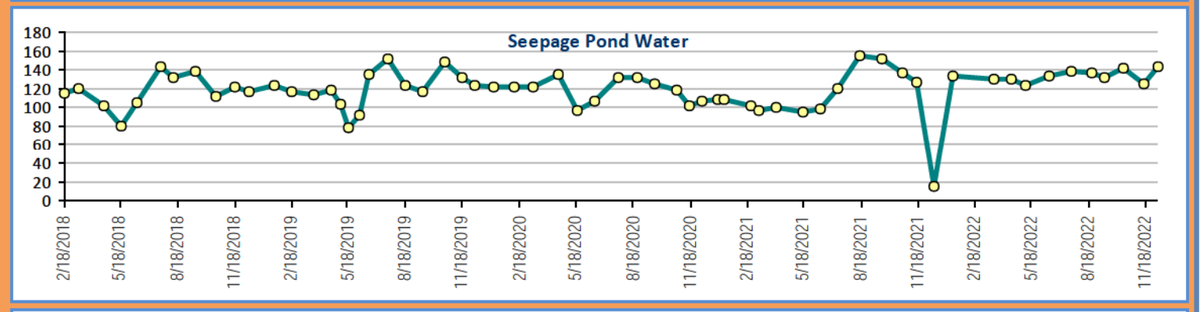
Manganese, dissolved, units mg/L

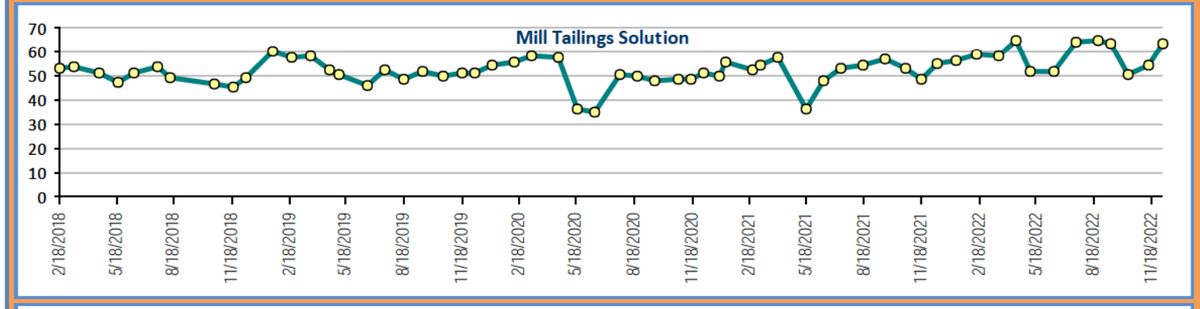


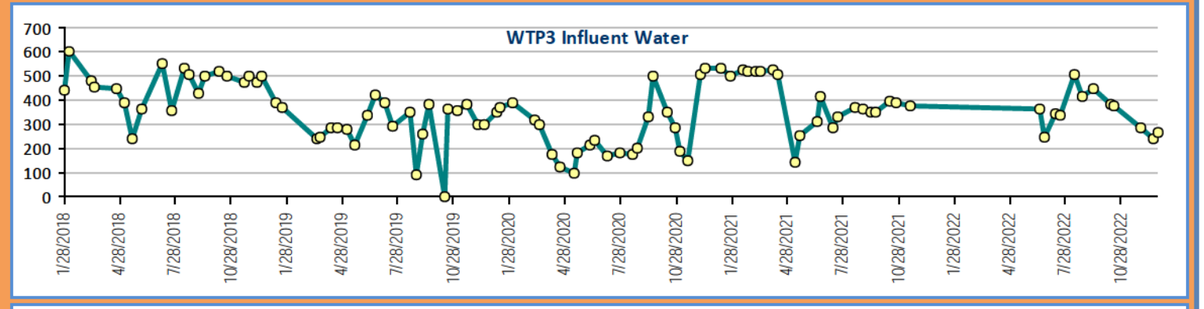


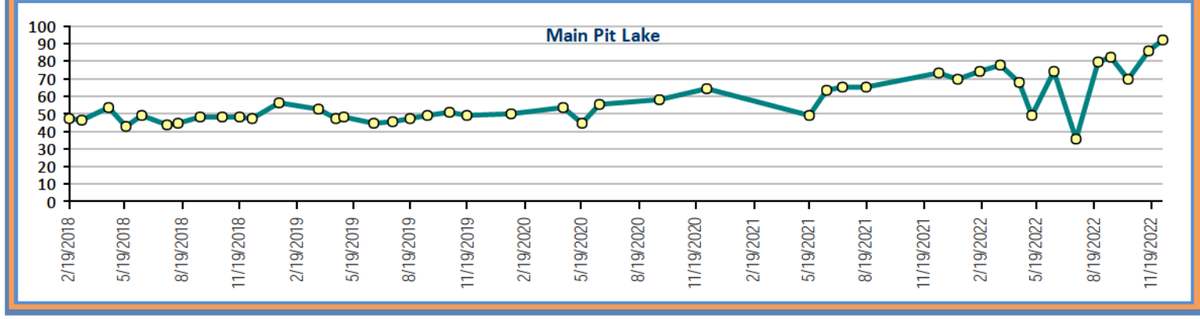


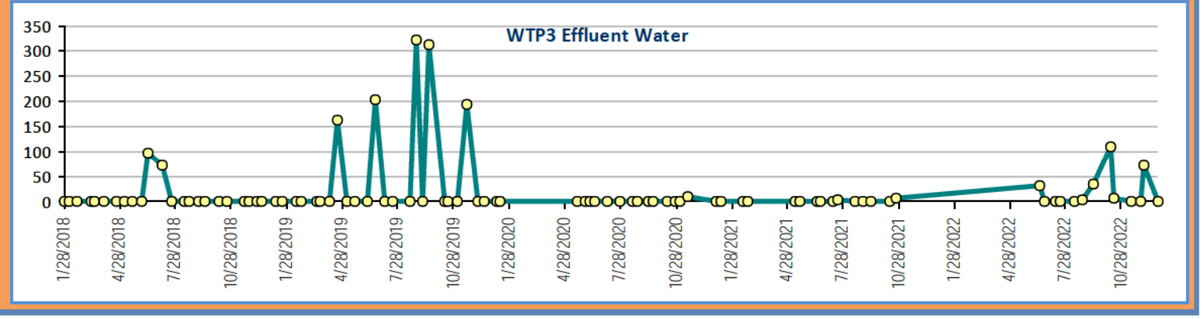








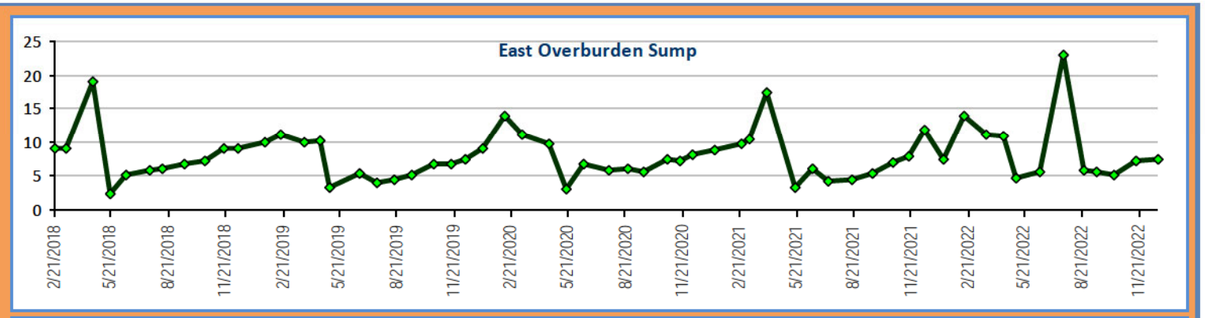


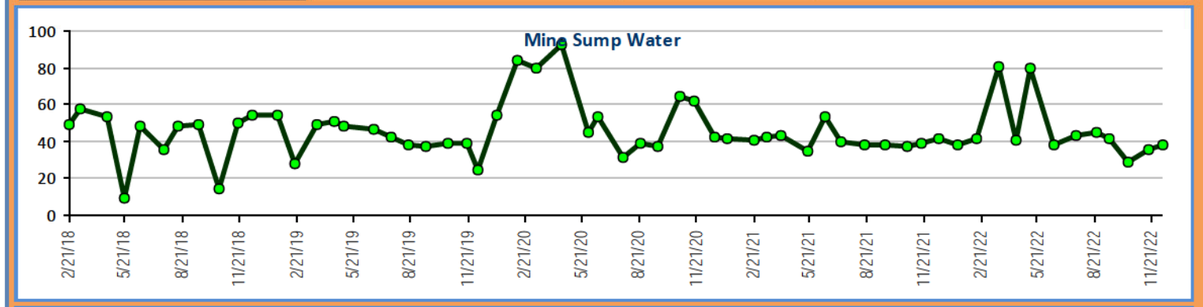


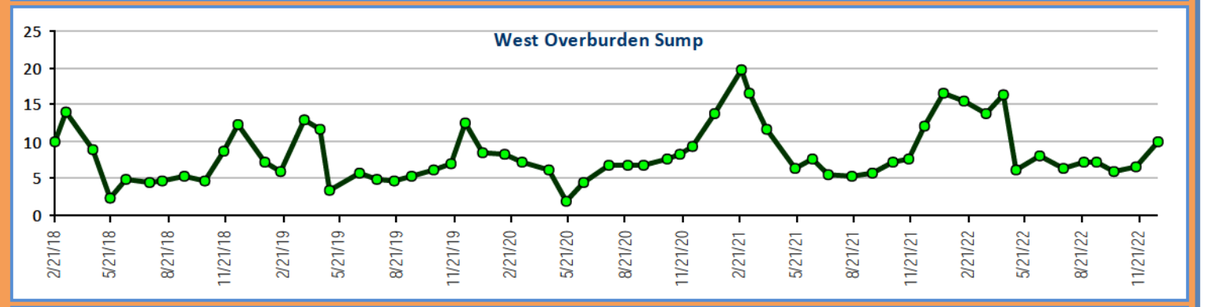
RED DOG MINE

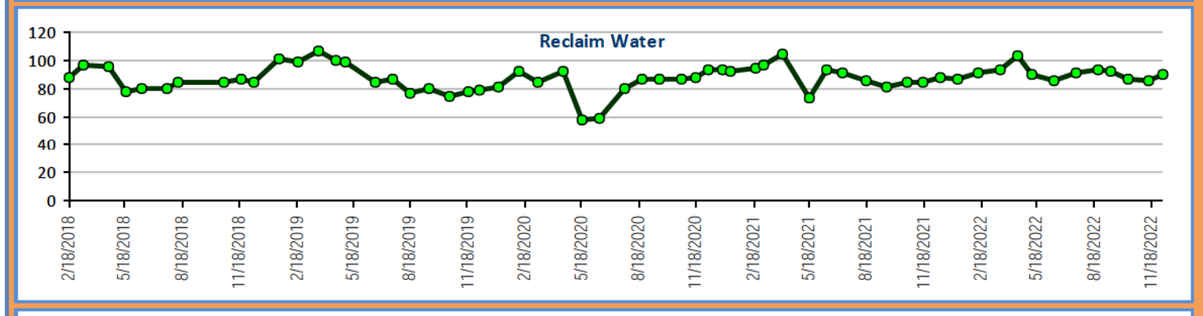
Mine Water Monitoring - Water Quality Profile II, Trend Charts

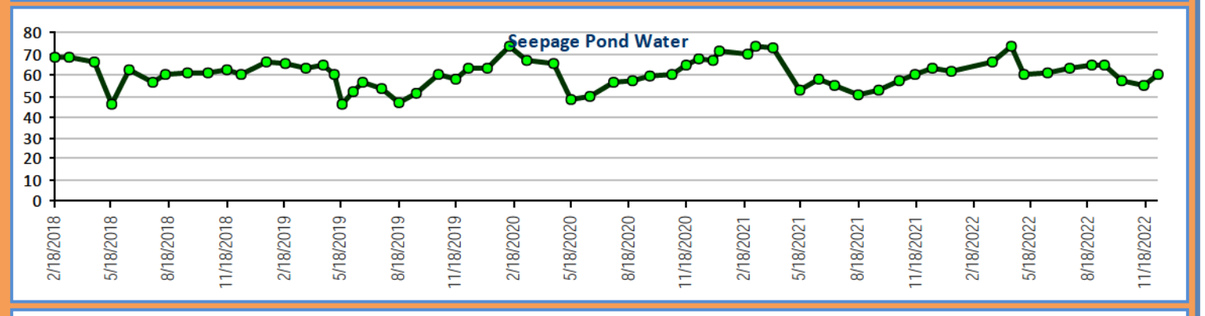
Sodium, dissolved, units mg/L

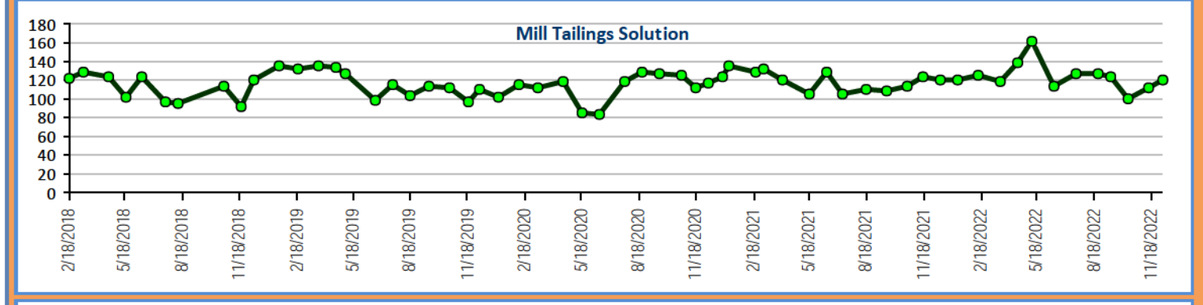


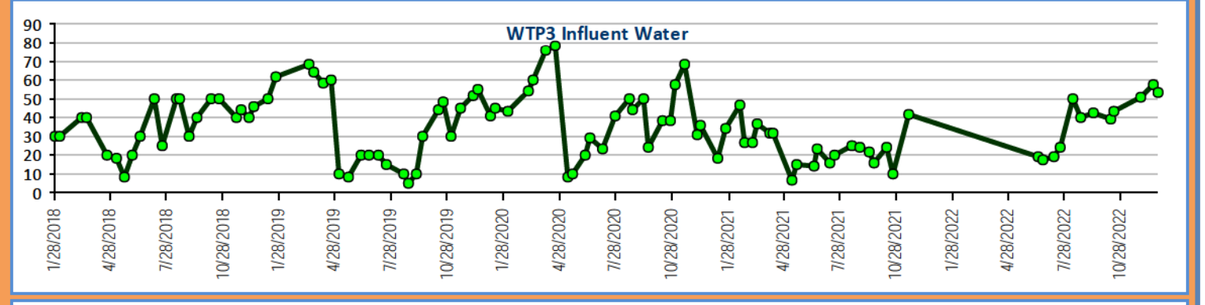


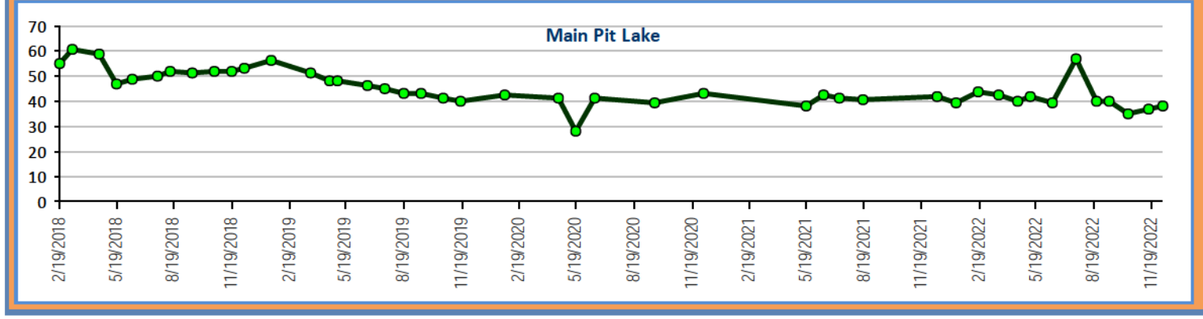


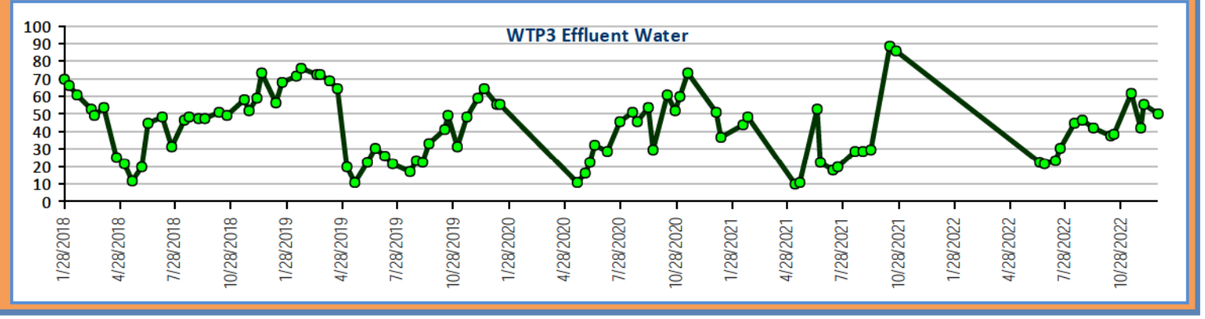








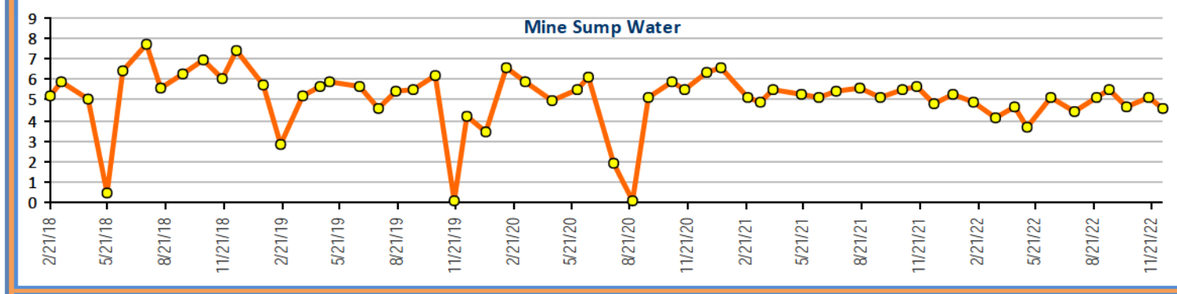


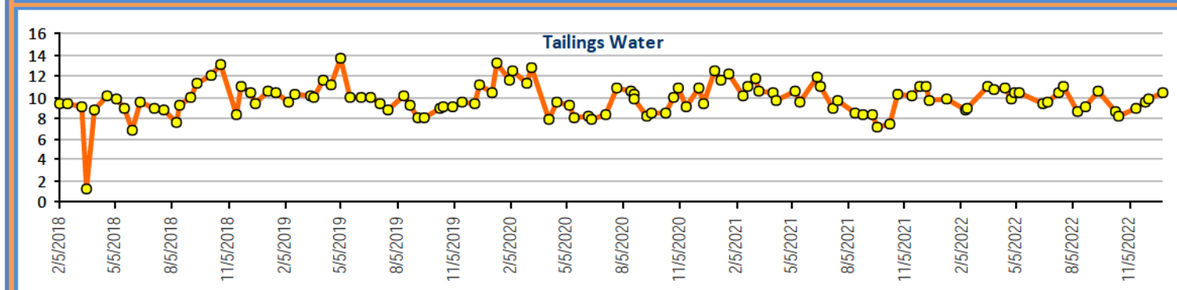


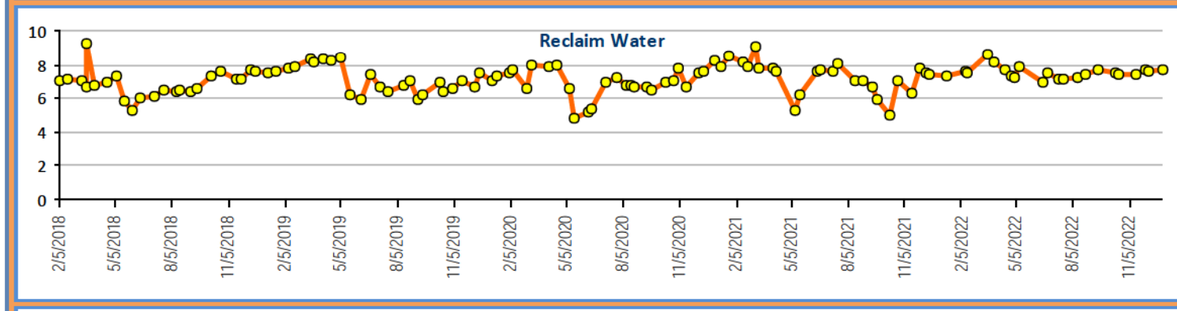
RED DOG MINE

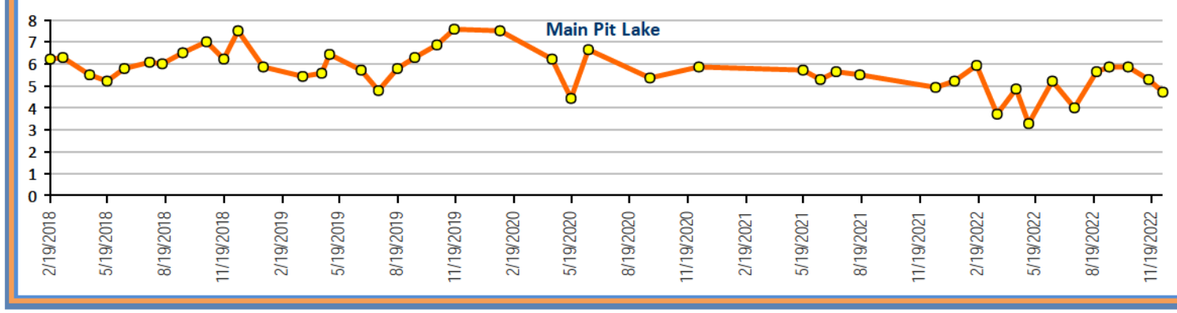
Mine Water Monitoring - Water Quality Profile II, Trend Charts

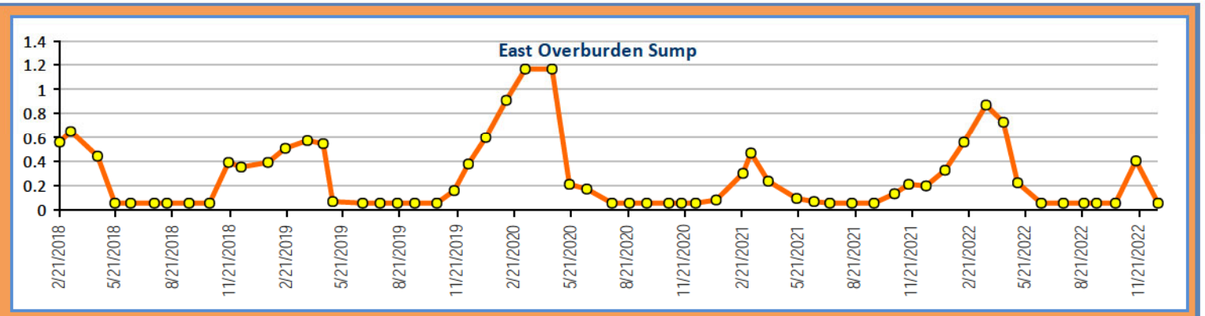
Ammonia as N, units mg/L

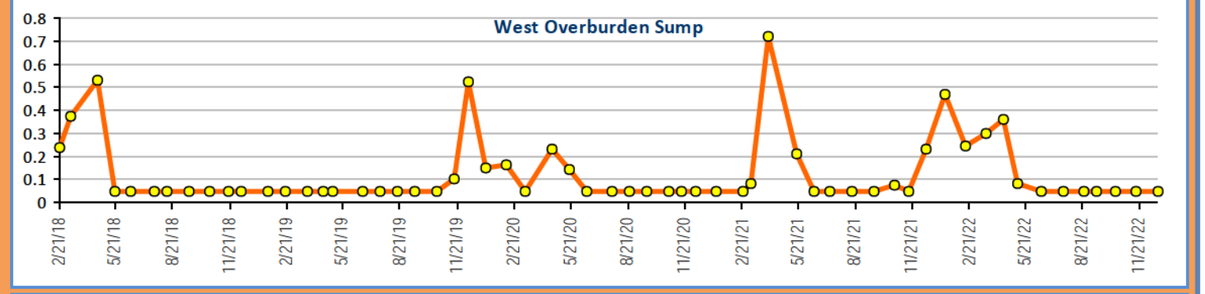


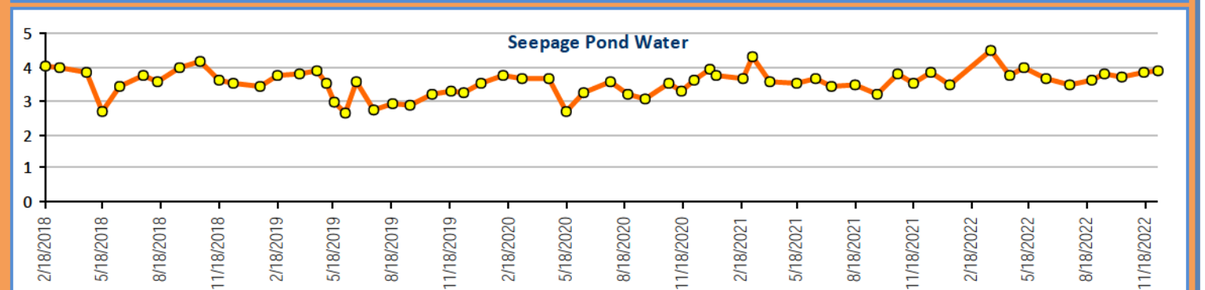


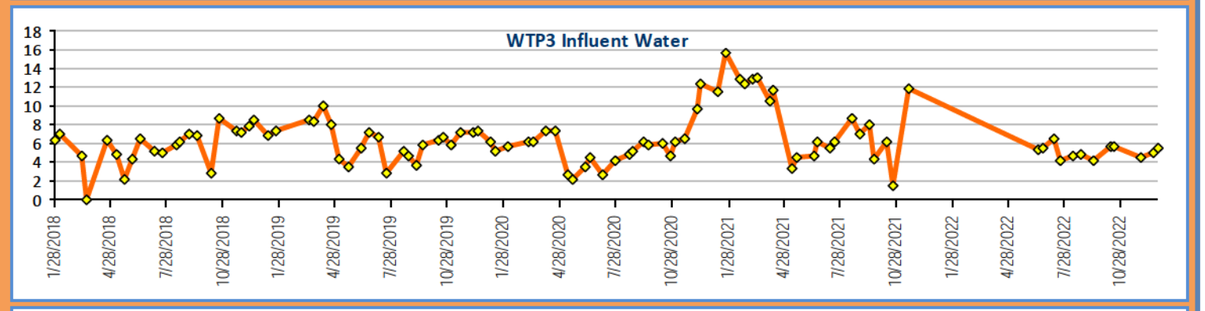


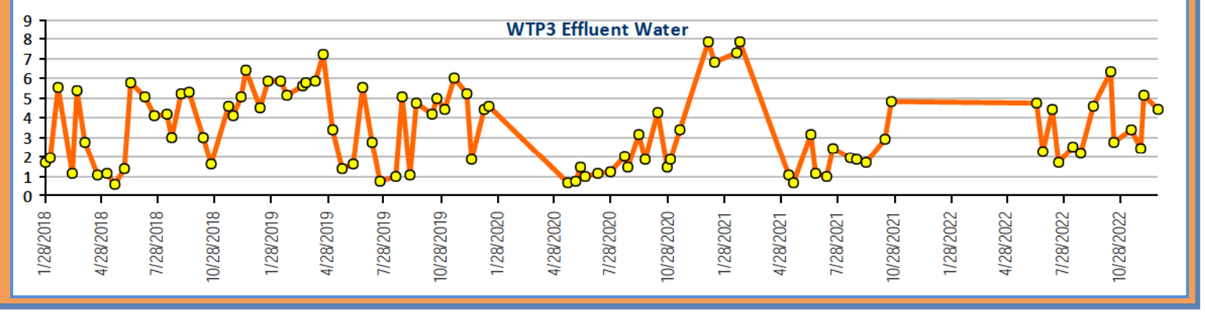








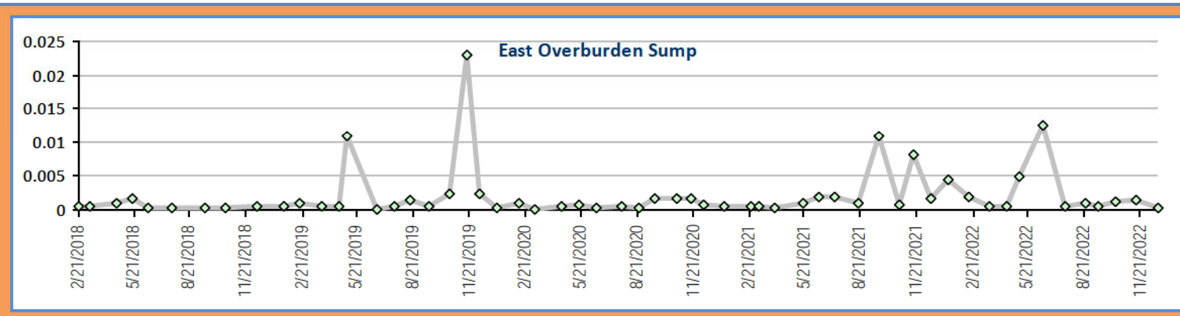


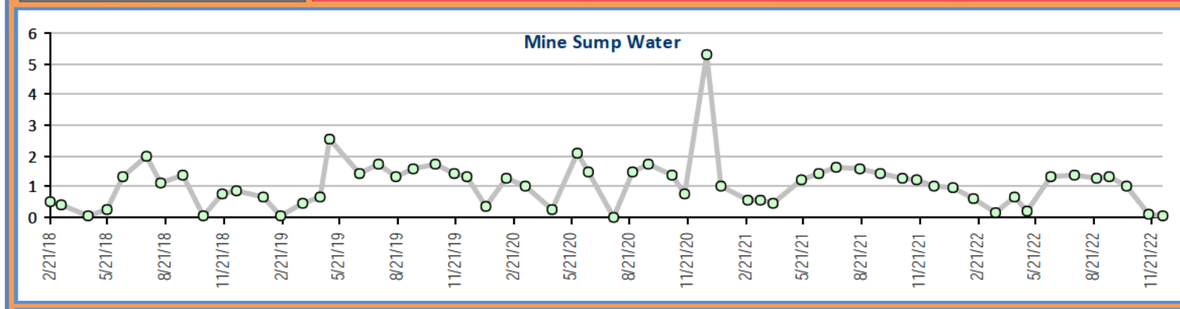


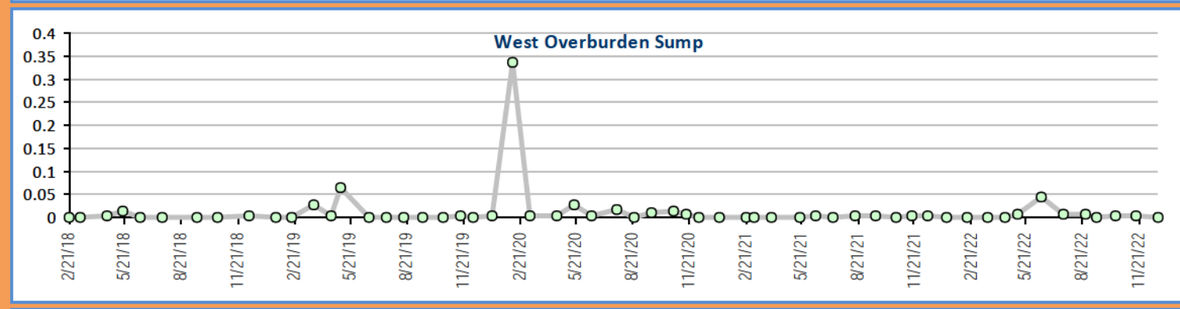
RED DOG MINE

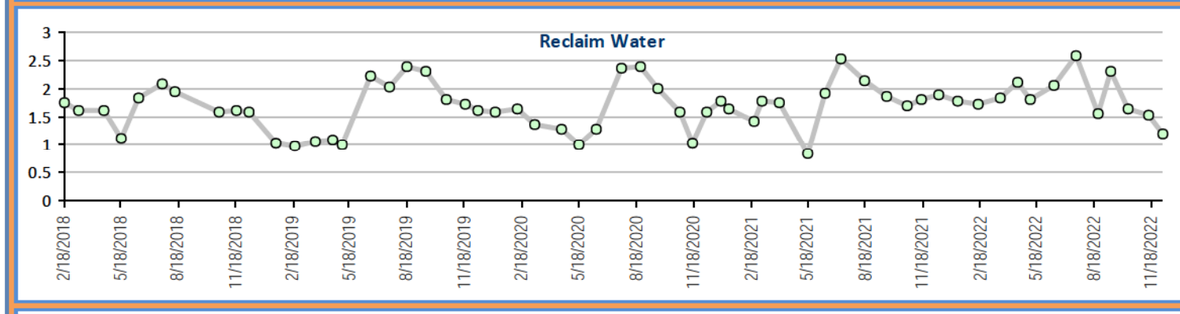
Mine Water Monitoring - Water Quality Profile II, Trend Charts

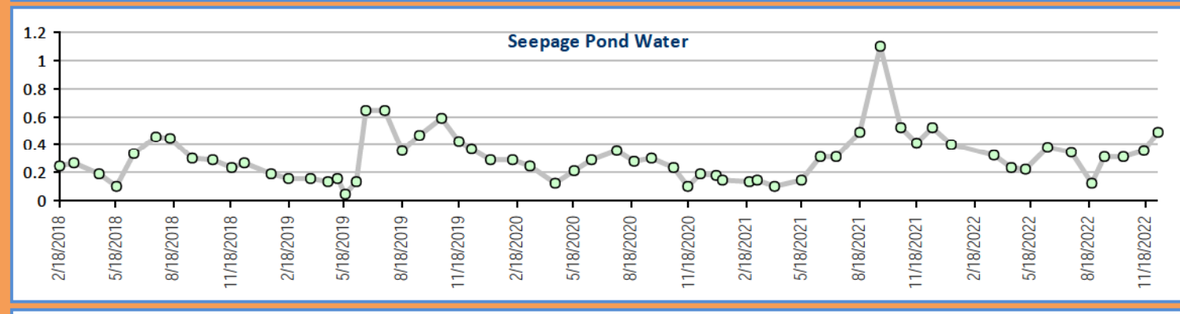
Lead, dissolved, units mg/L

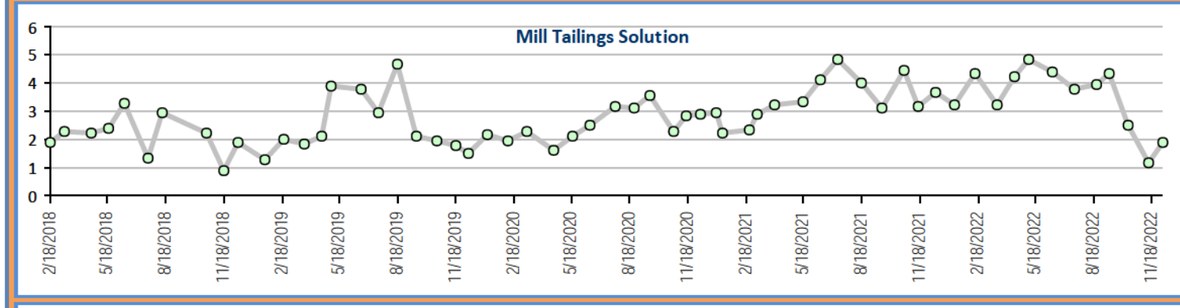


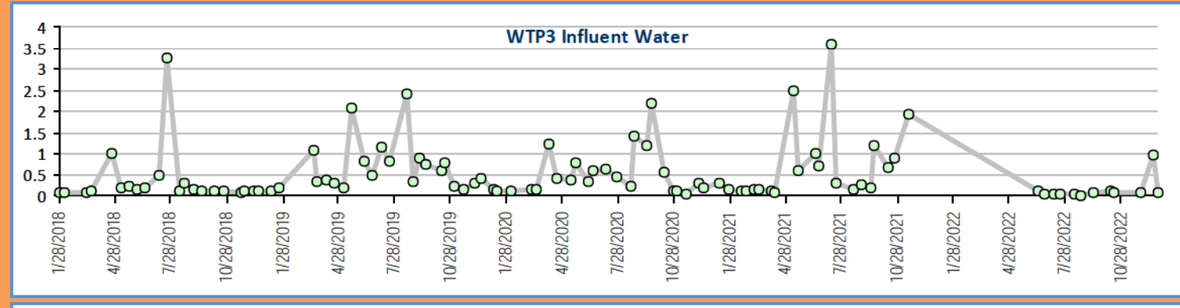


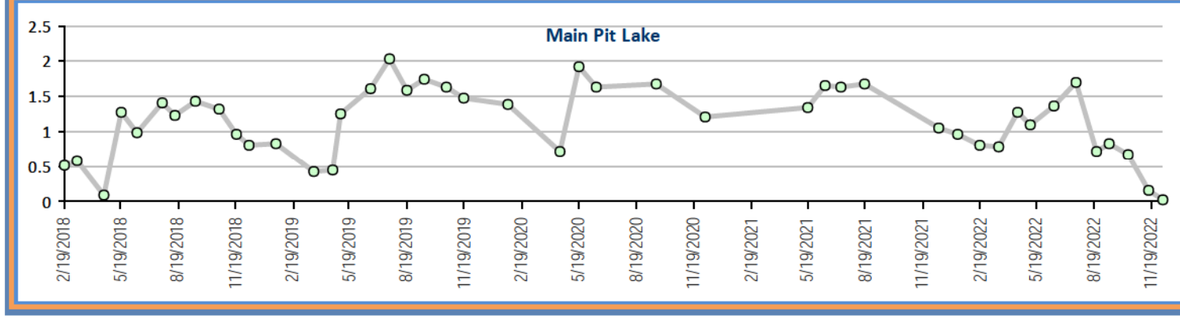


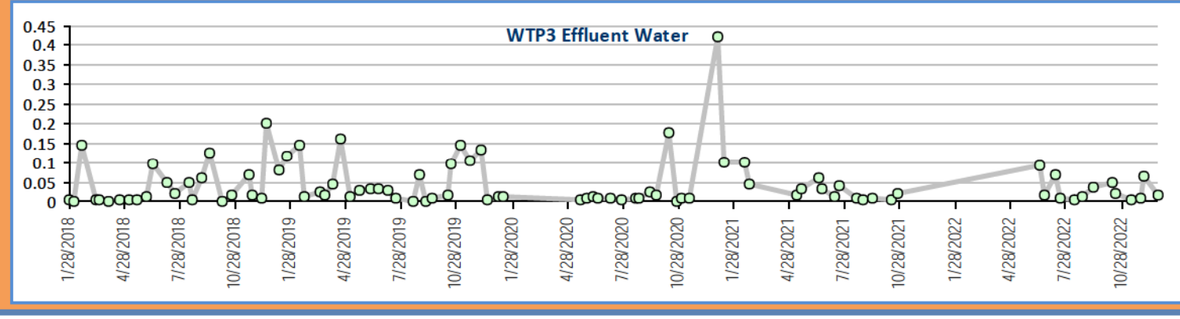








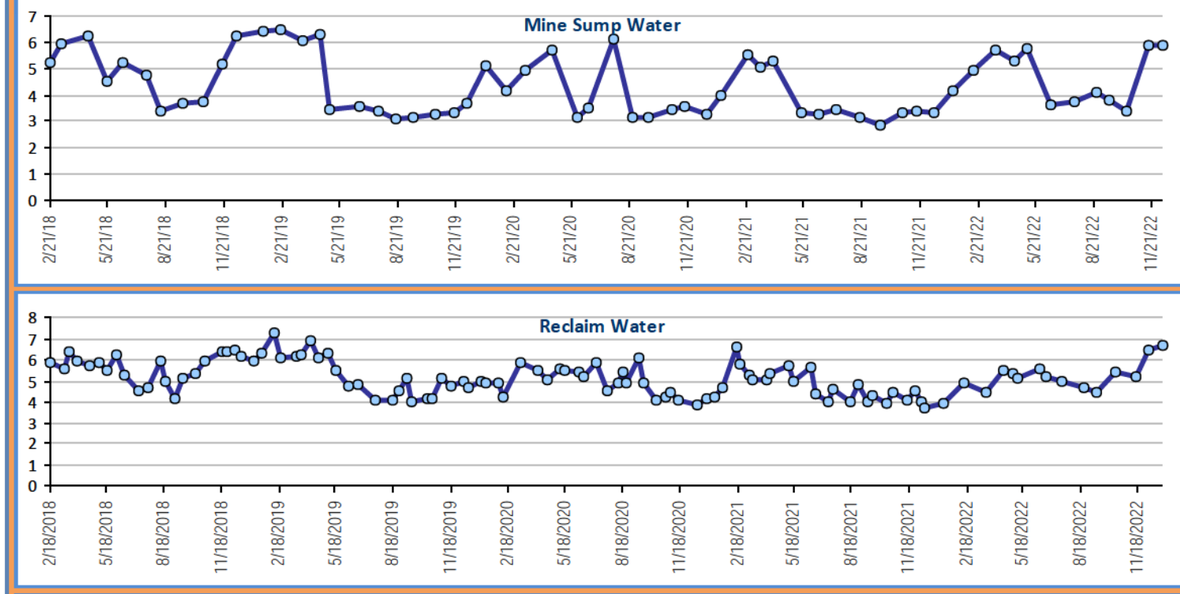


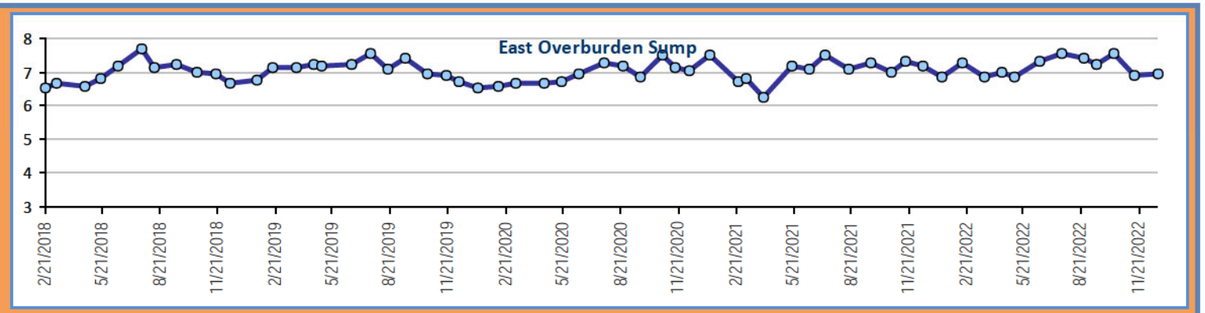


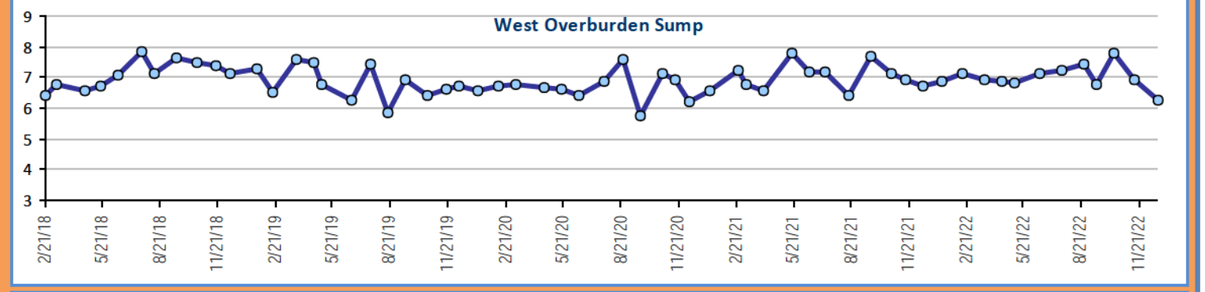
RED DOG MINE

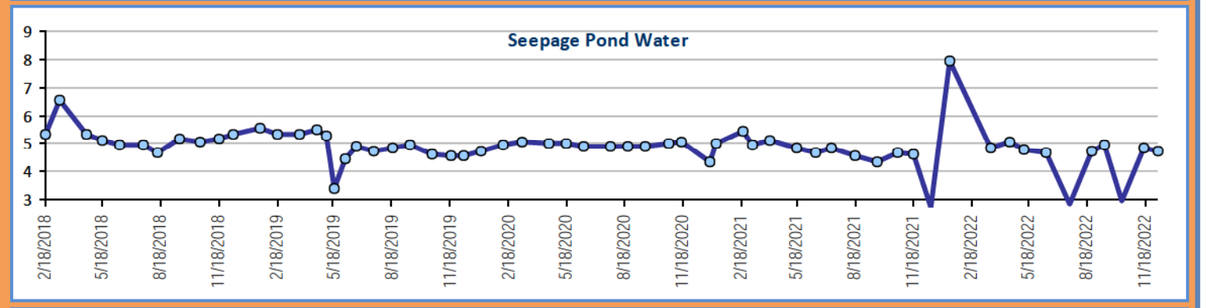
Mine Water Monitoring - Water Quality Profile II, Trend Charts

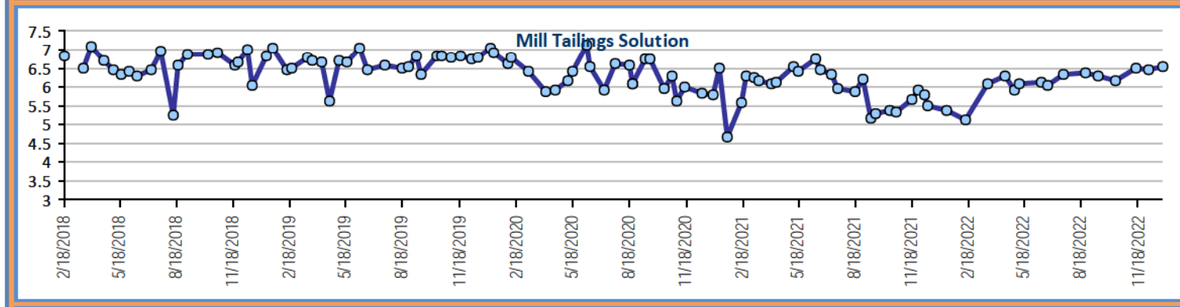
pH, units

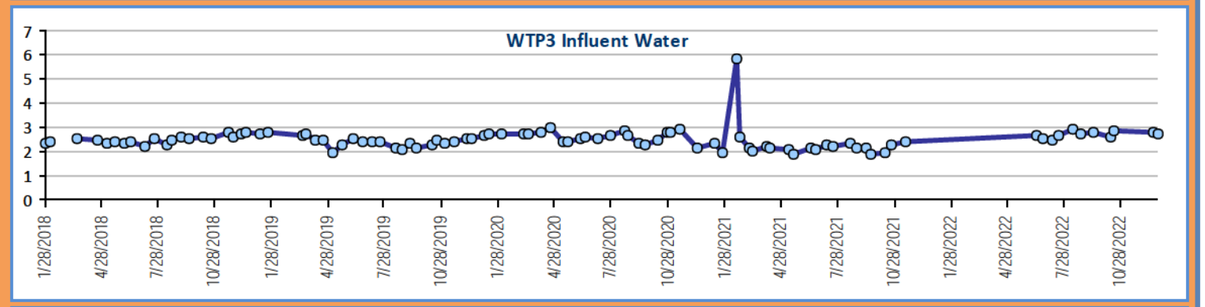


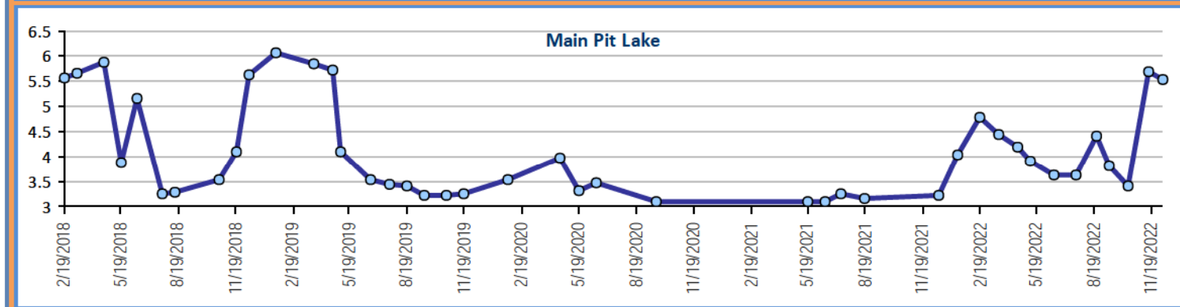


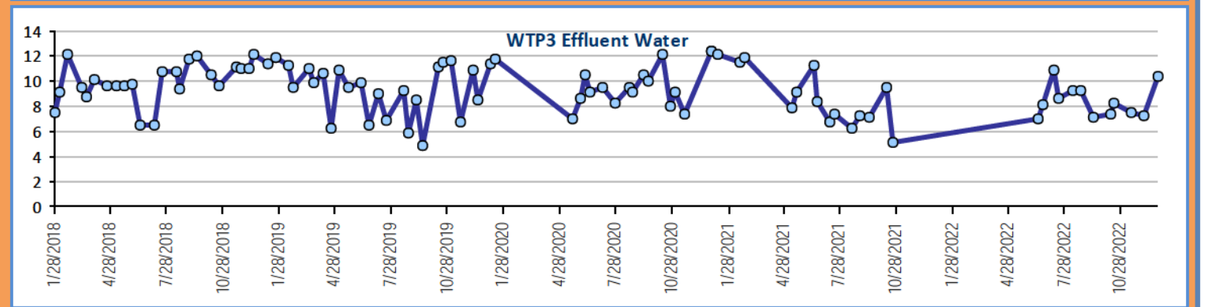








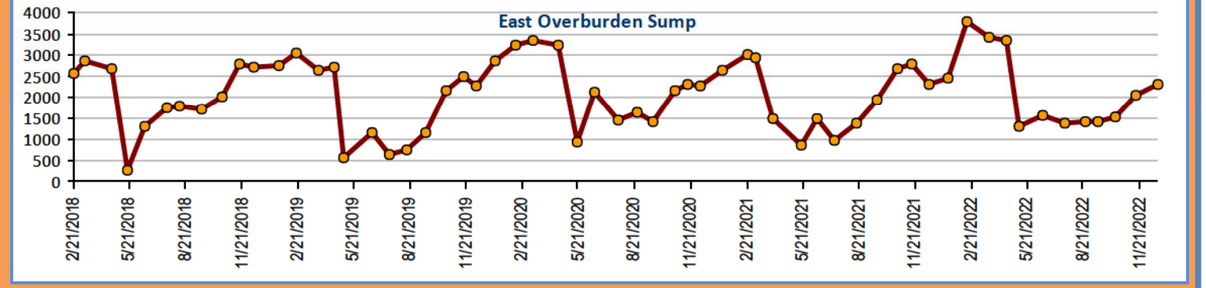


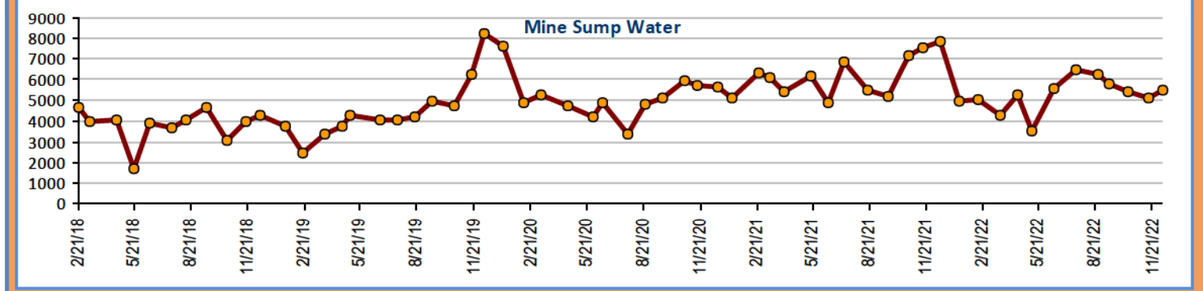


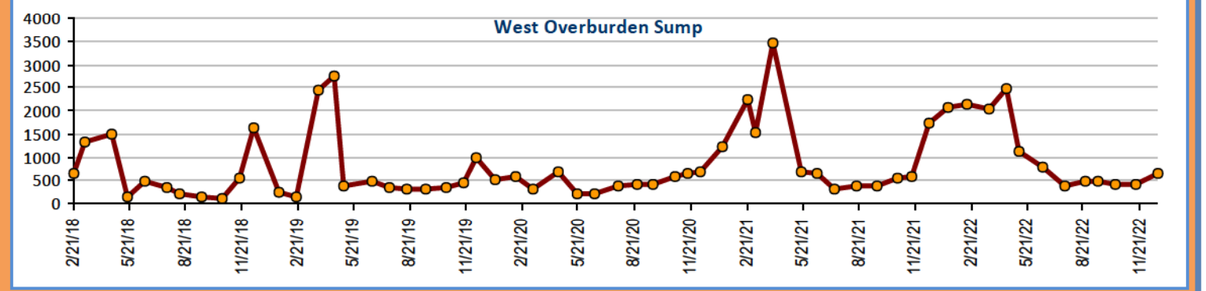
RED DOG MINE

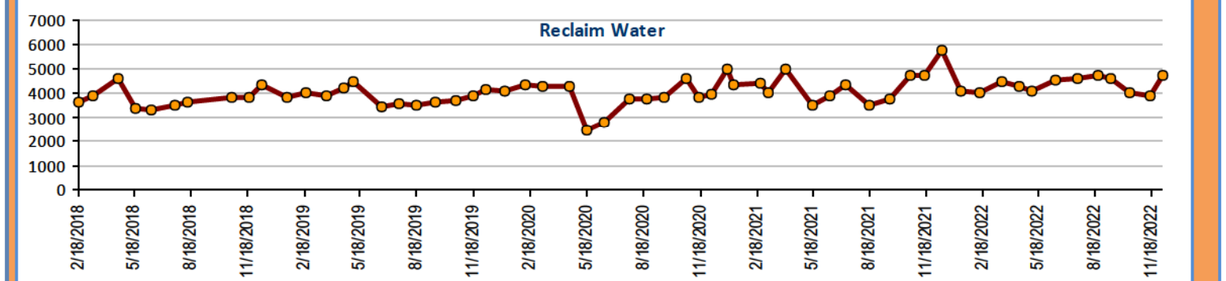
Mine Water Monitoring - Water Quality Profile II, Trend Charts

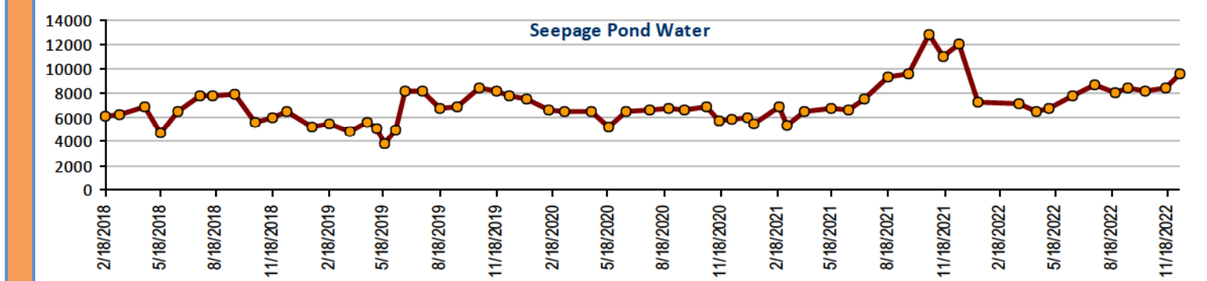
Sulfate, units mg/L

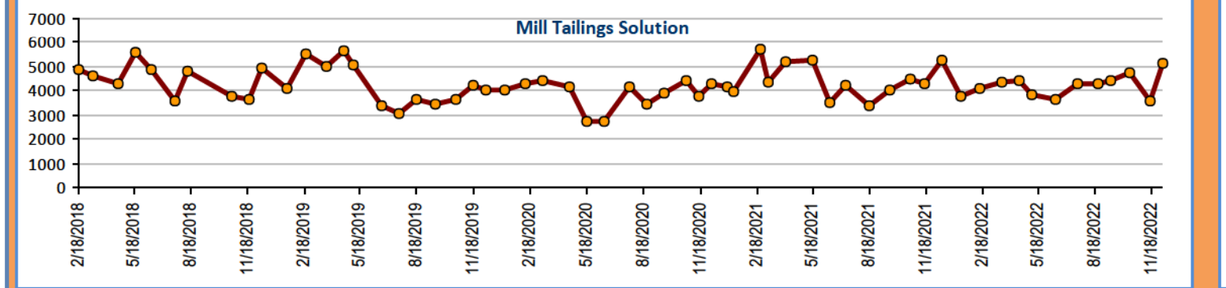


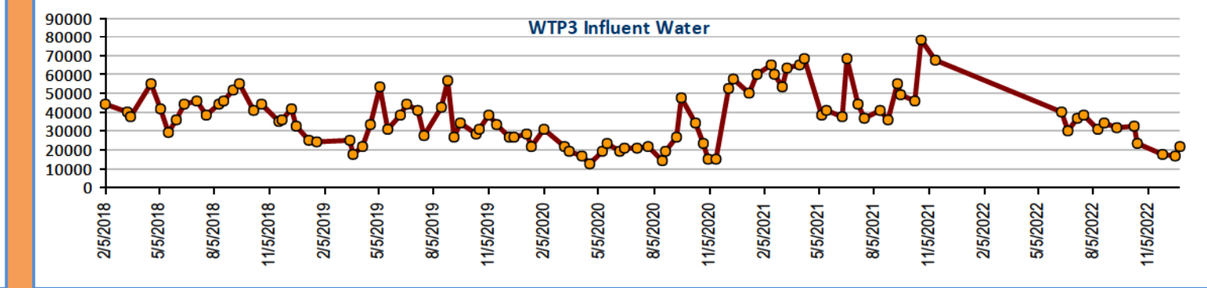


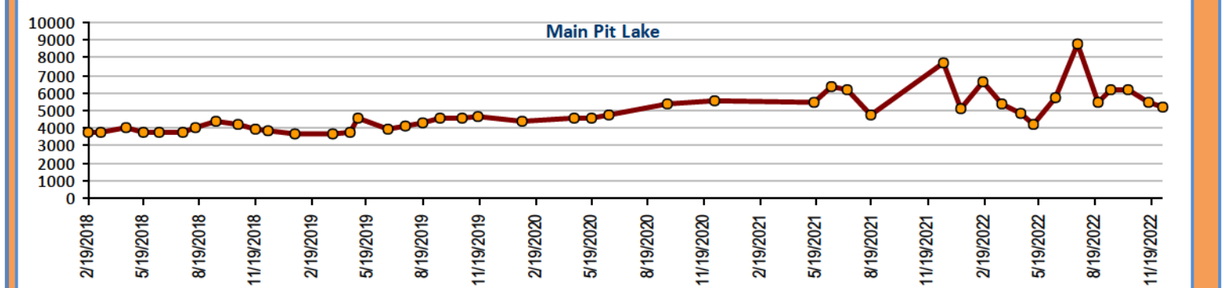


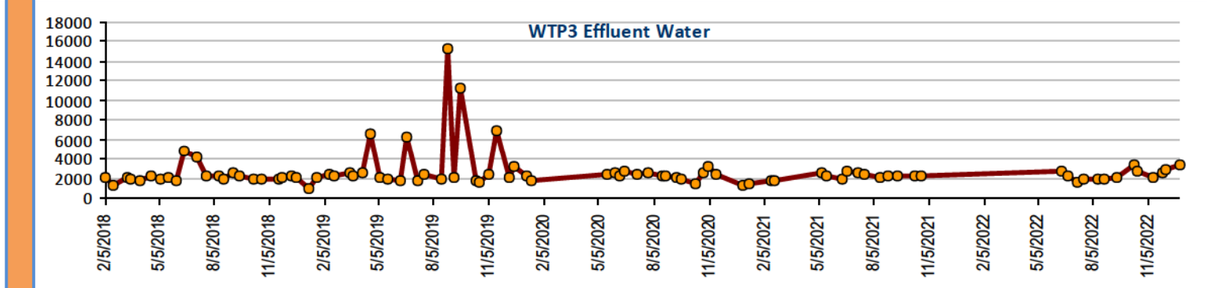








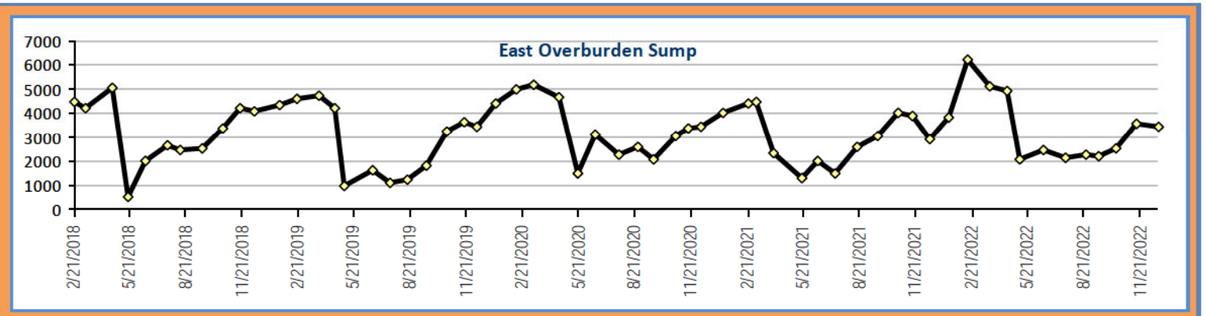


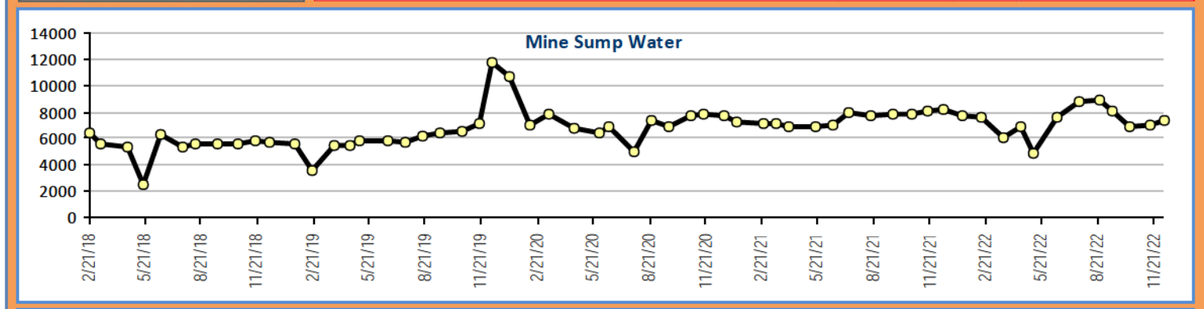


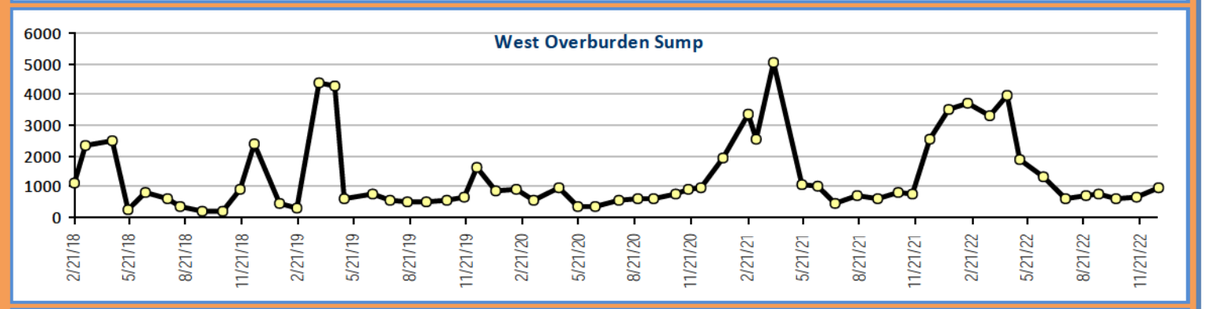
RED DOG MINE

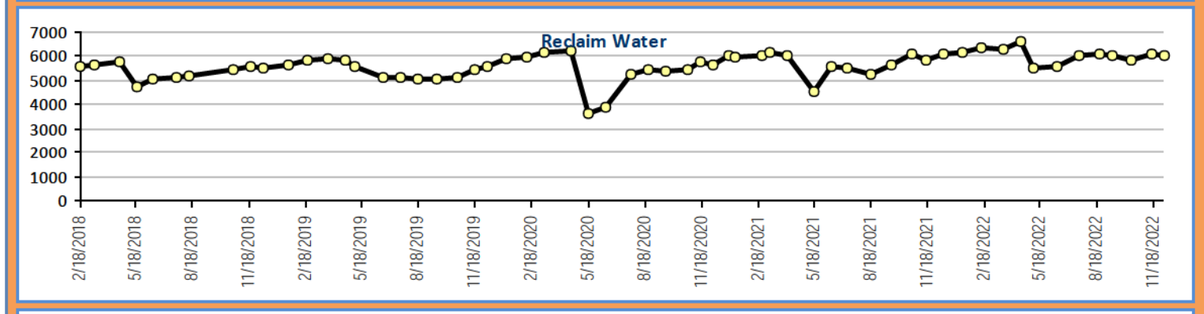
Mine Water Monitoring - Water Quality Profile II, Trend Charts

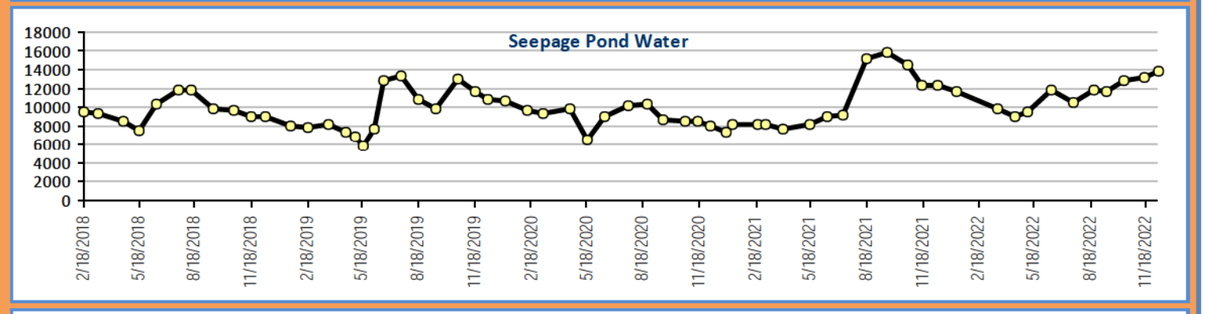
Total Dissolved Solids, units, mg/L

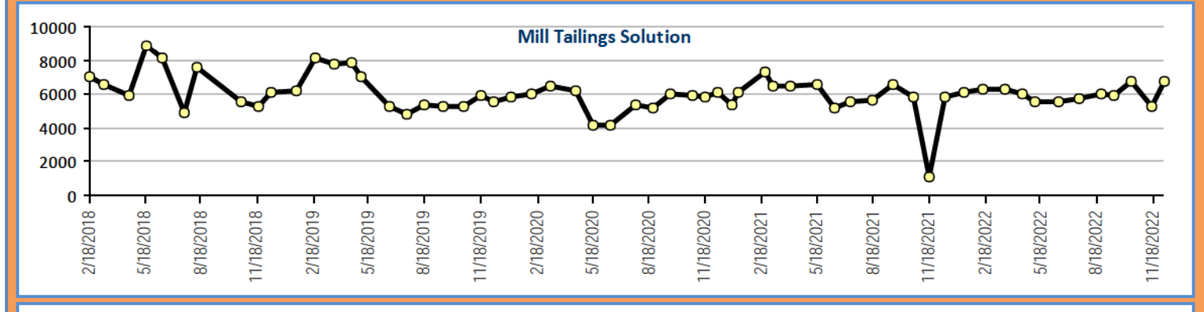


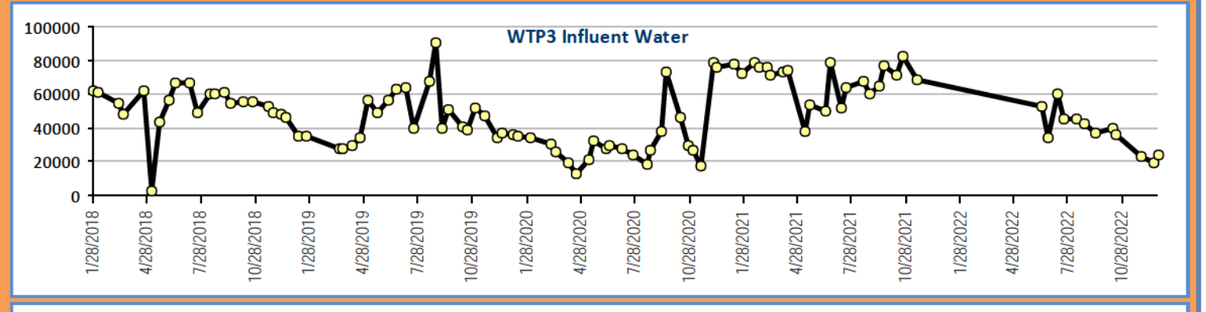


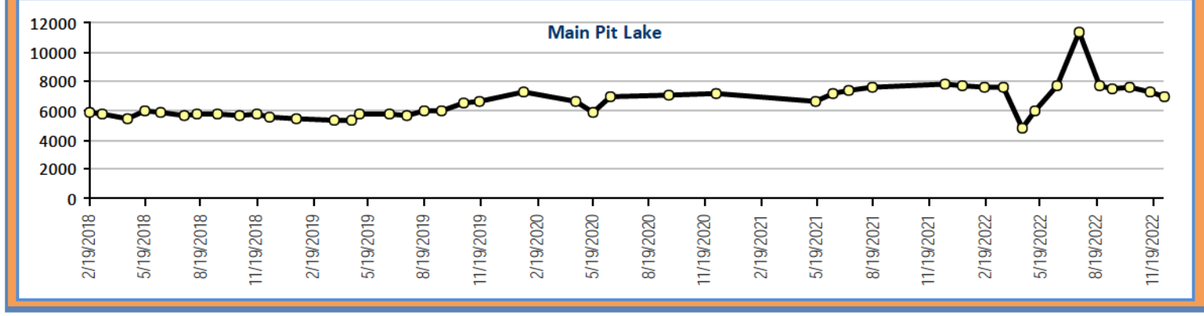


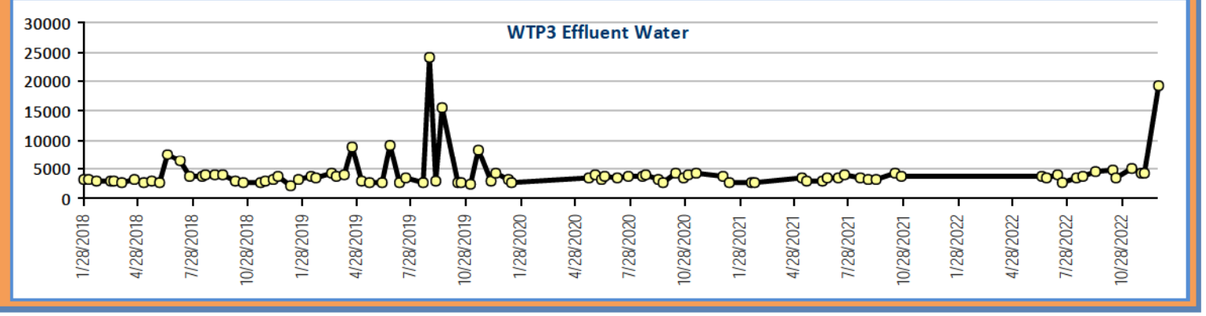








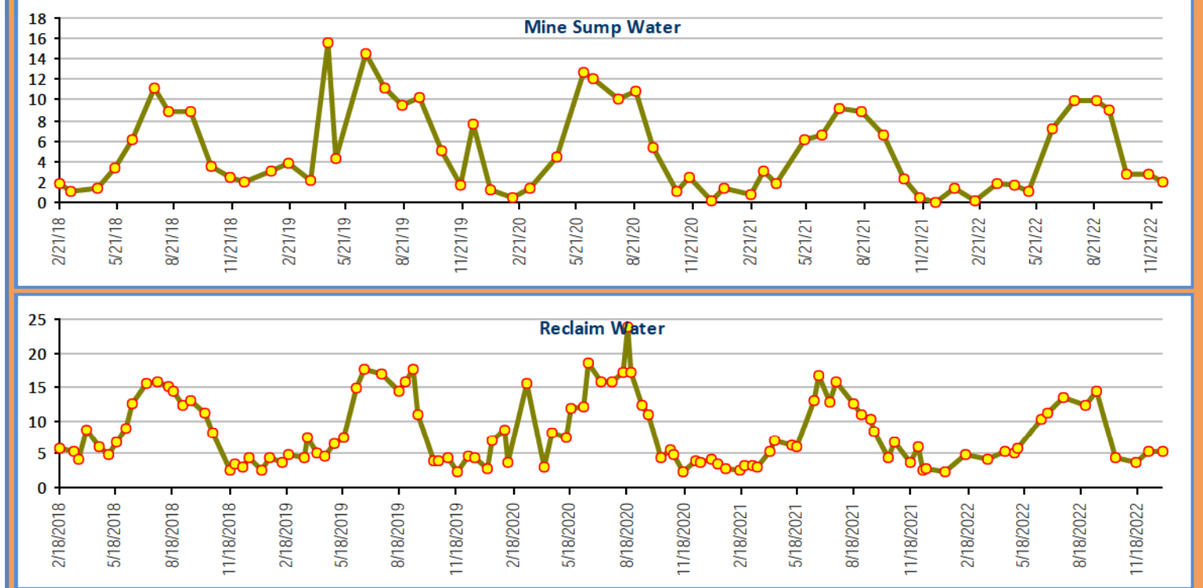


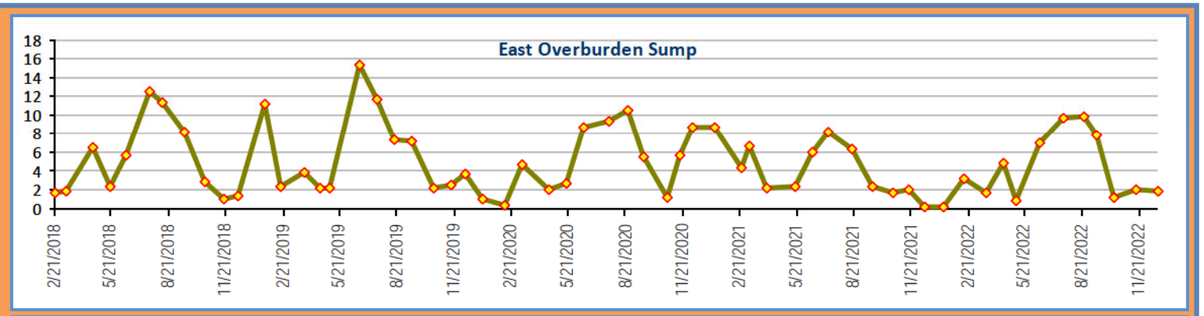


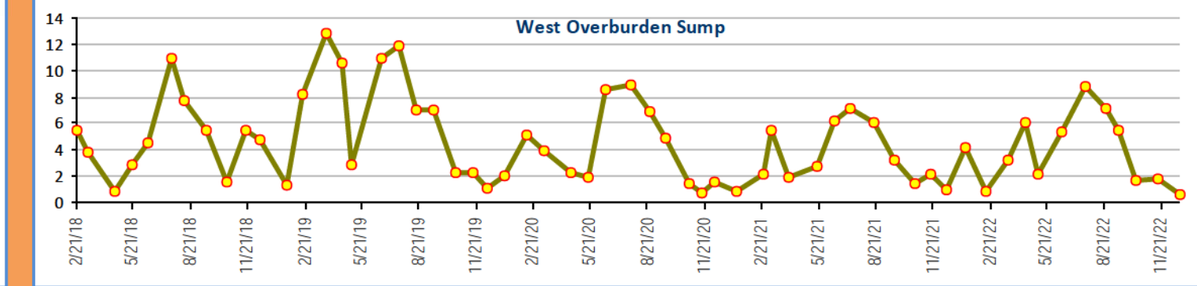
RED DOG MINE

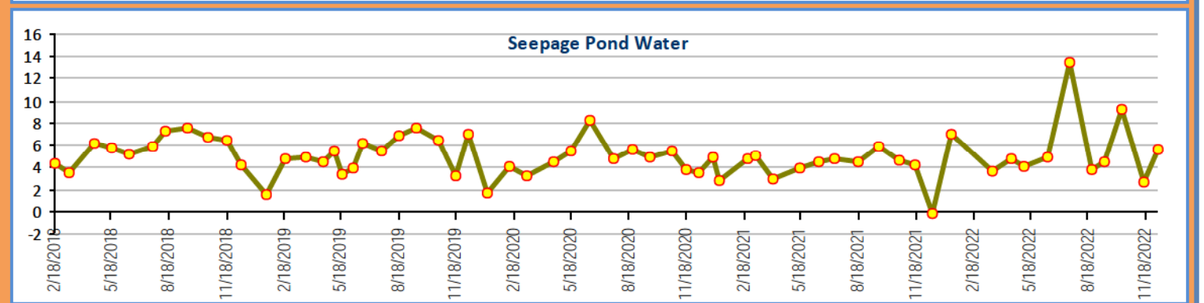
Mine Water Monitoring - Water Quality Profile II, Trend Charts

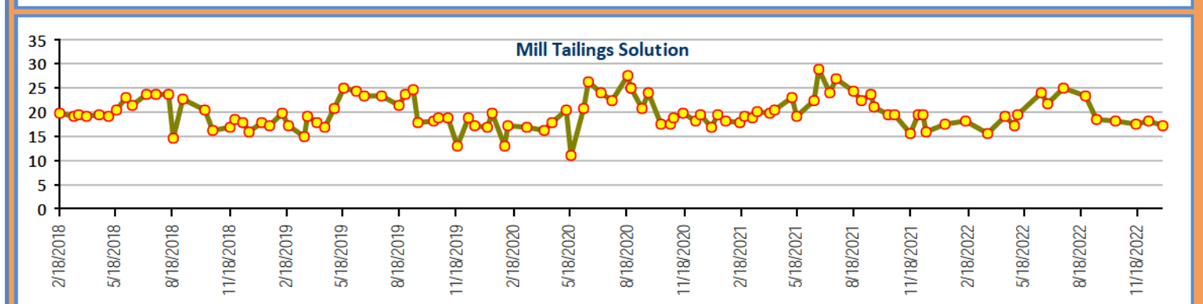
Temperature, Celsius

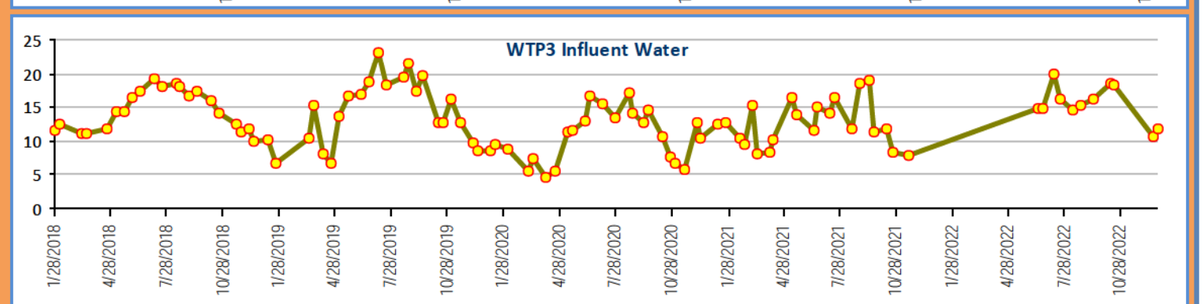


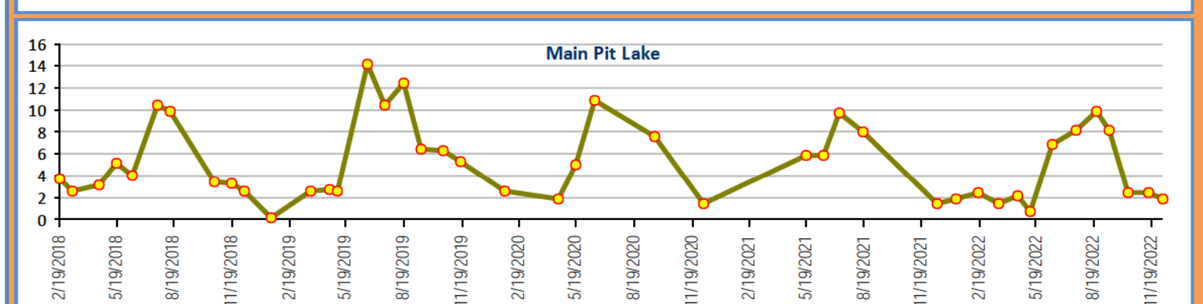


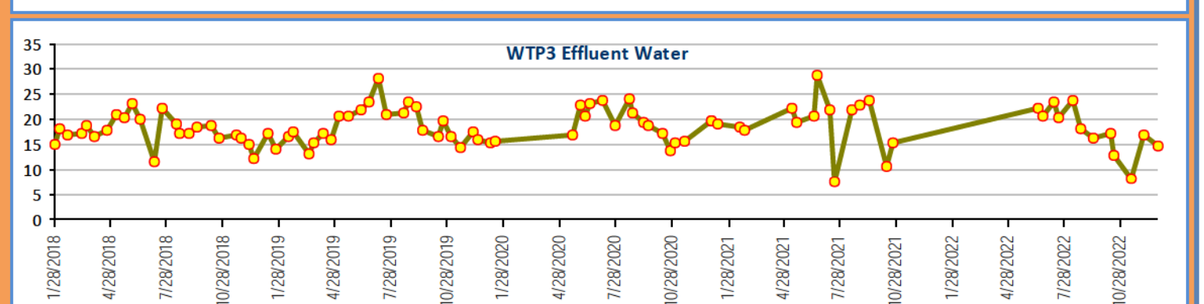








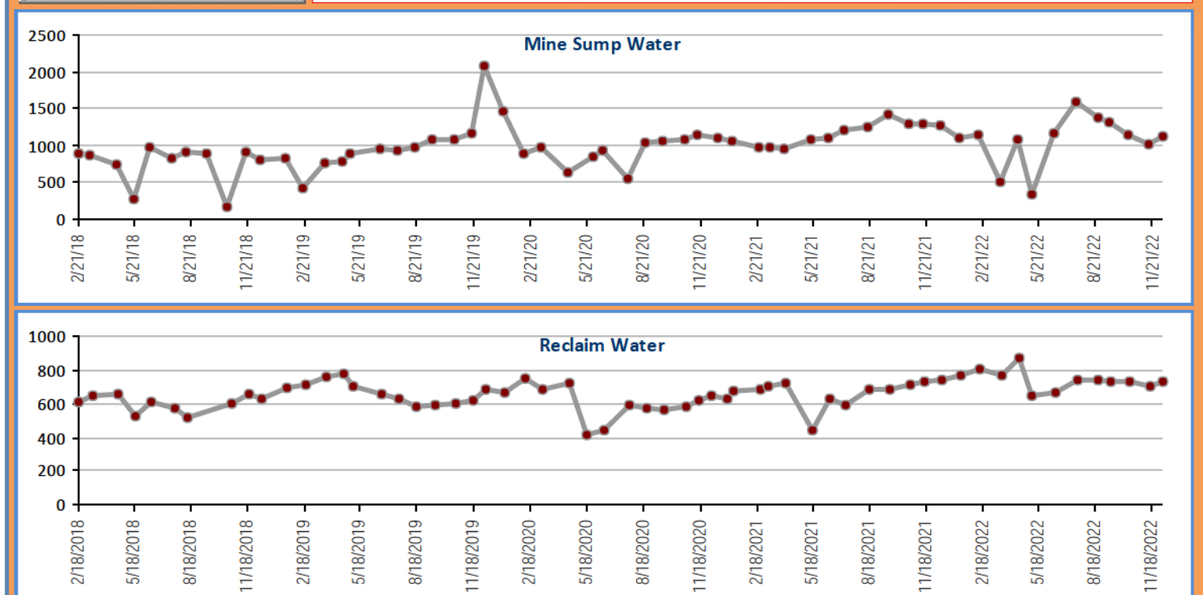


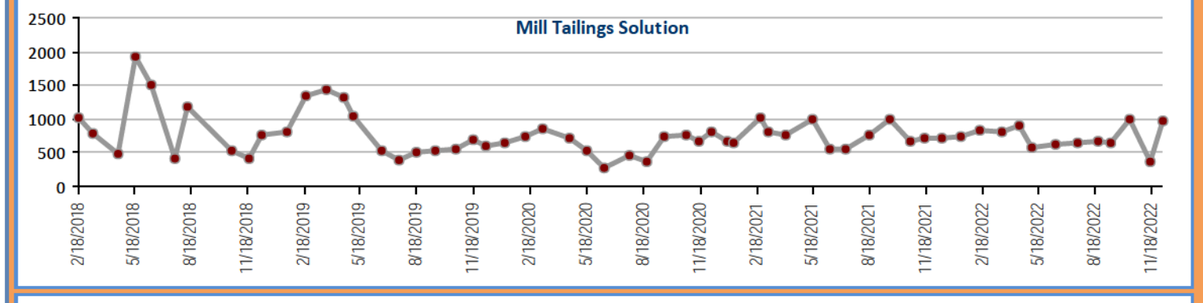


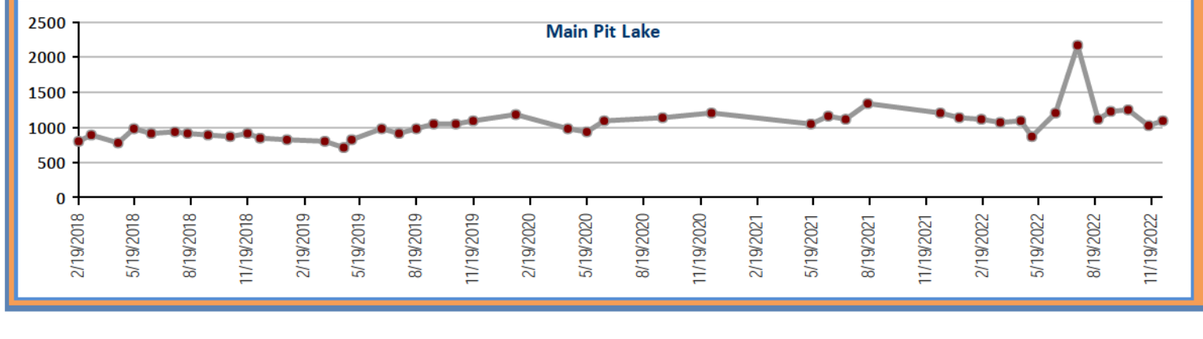
RED DOG MINE

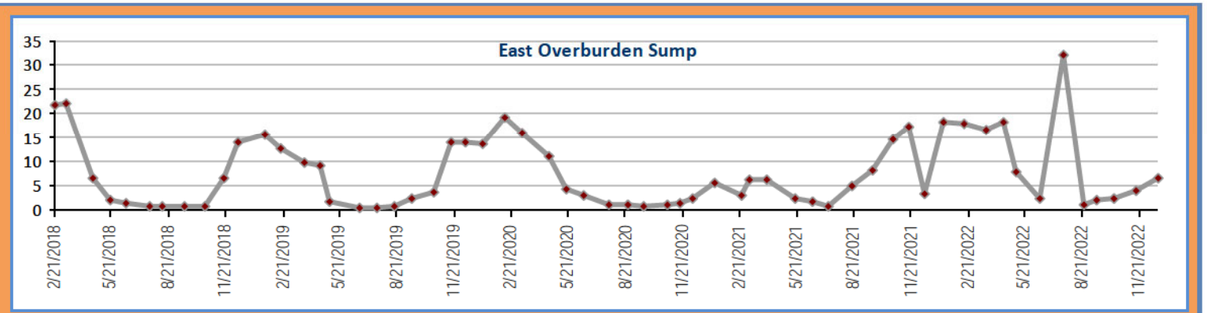
Mine Water Monitoring - Water Quality Profile II, Trend Charts

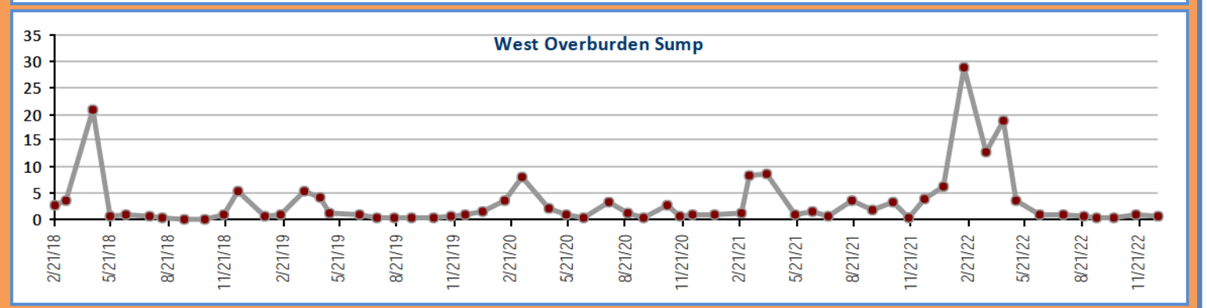
Zinc, dissolved, units, mg/L

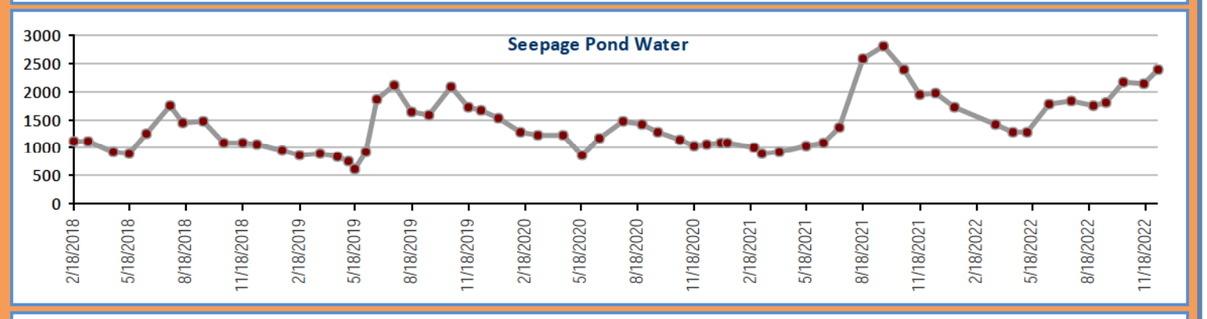


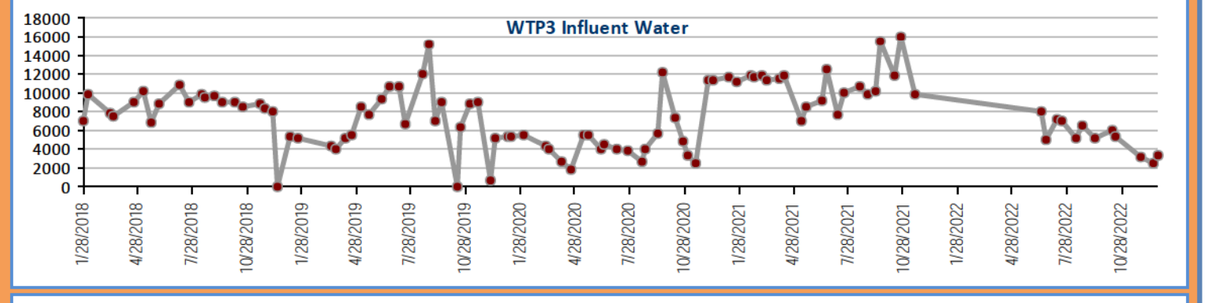


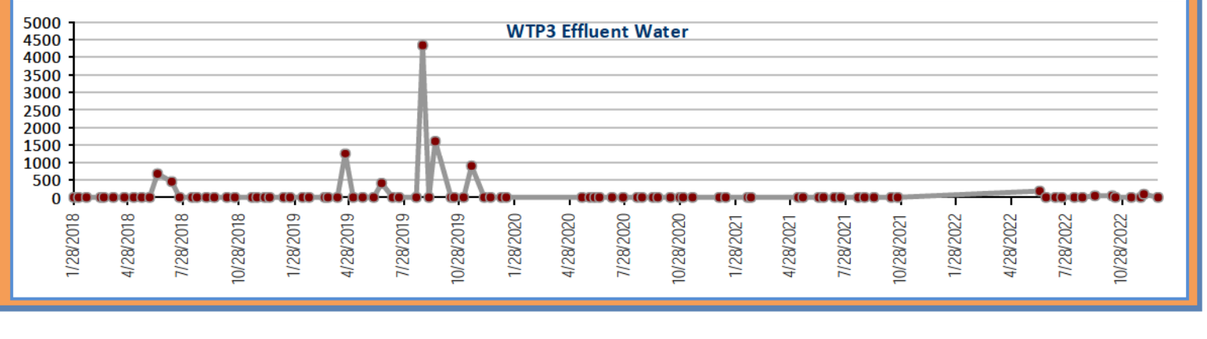












Appendix D: Water Quality Profile I Charts – Mine Drainage Monitoring Stations

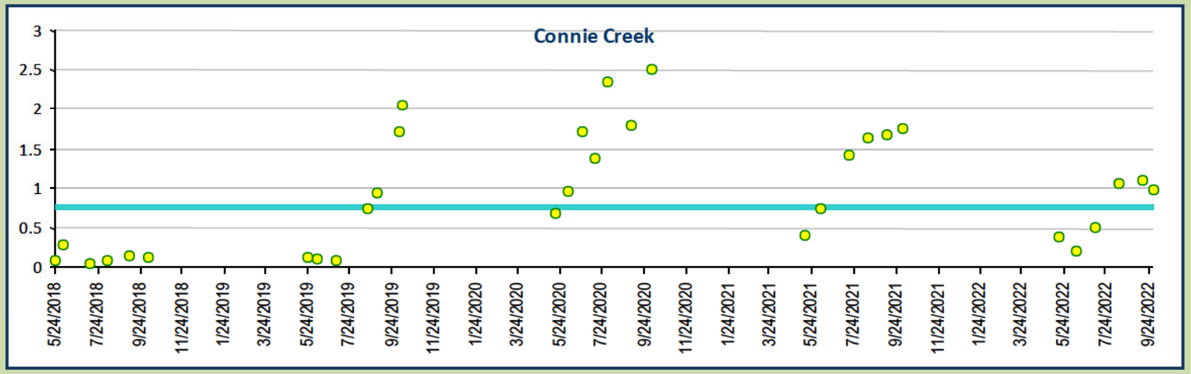
RED DOG MINE

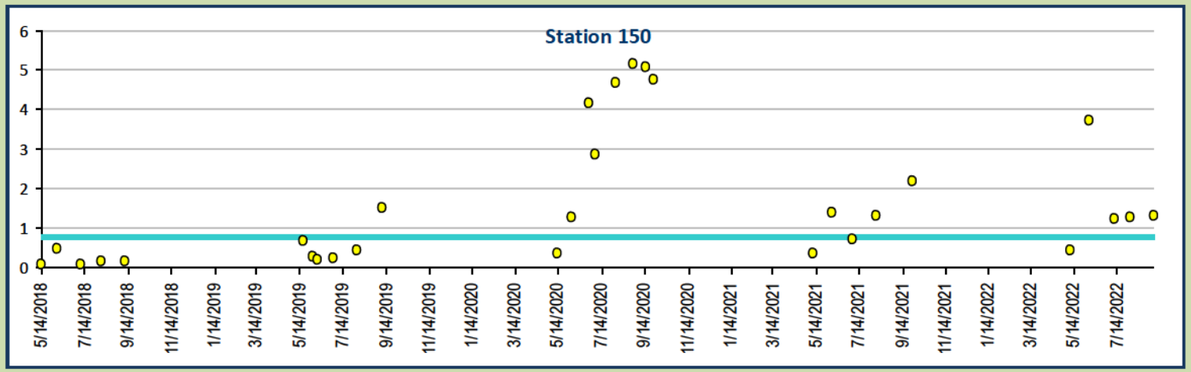
Water Monitoring Mine Drainage
Water Quality Profile I , 5-Year Trend Charts

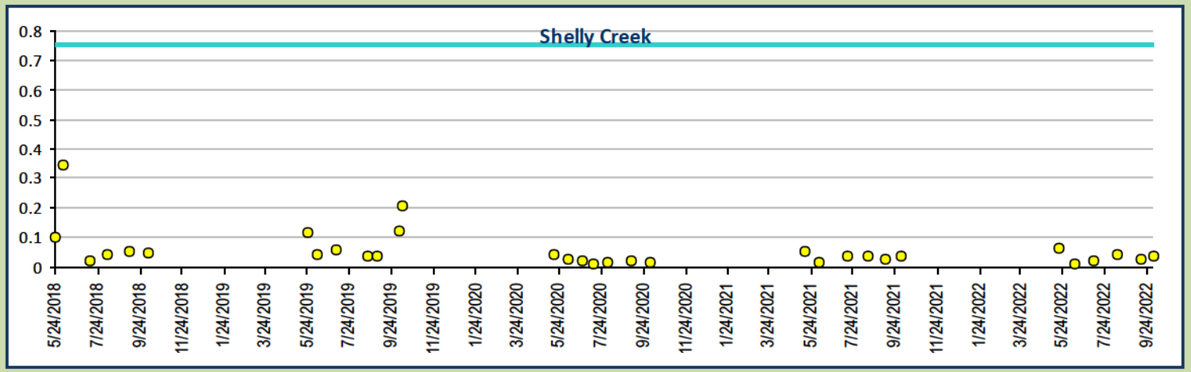
Aluminum, Total recoverable, units mg/L

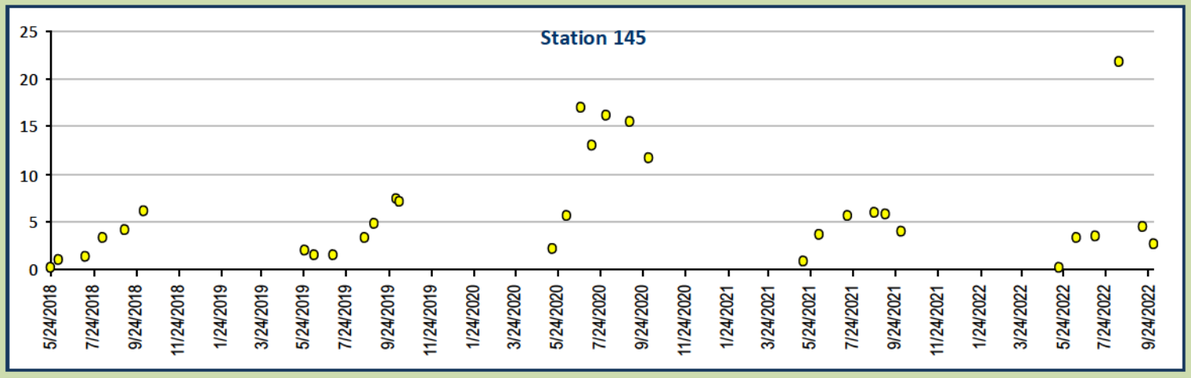
Aquatic Life - Fresh Water Chronic WQS mg/L

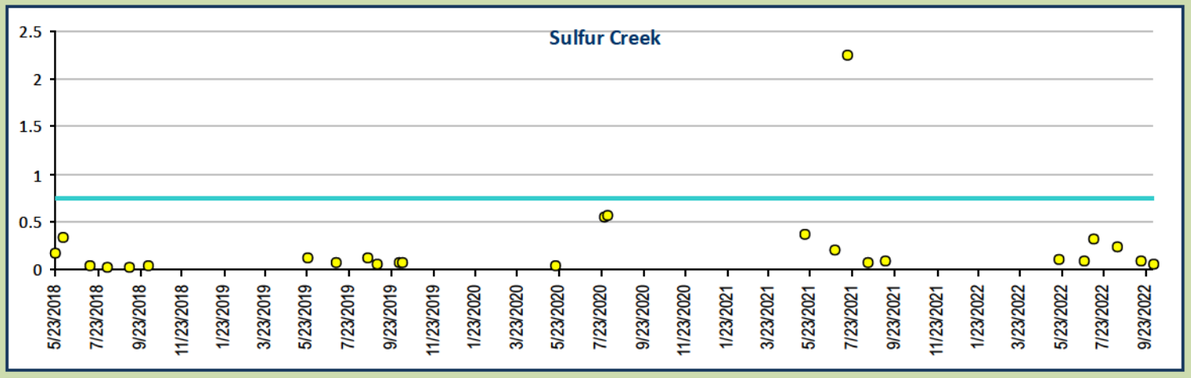
If pH > 7 and hardness > 50. then WQS = 0.75mg/l

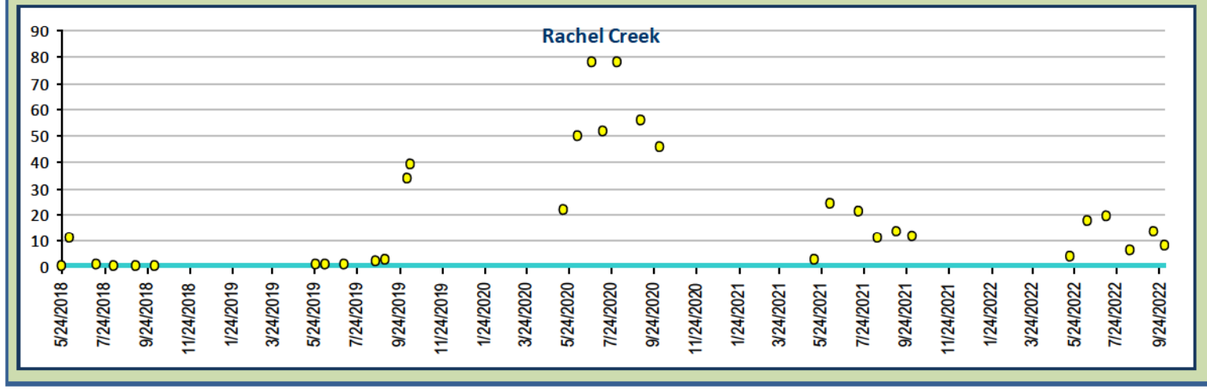


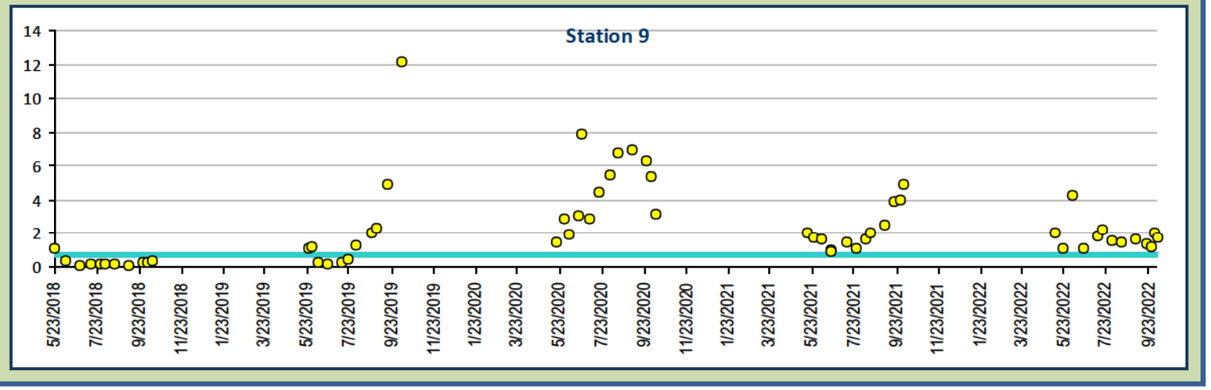












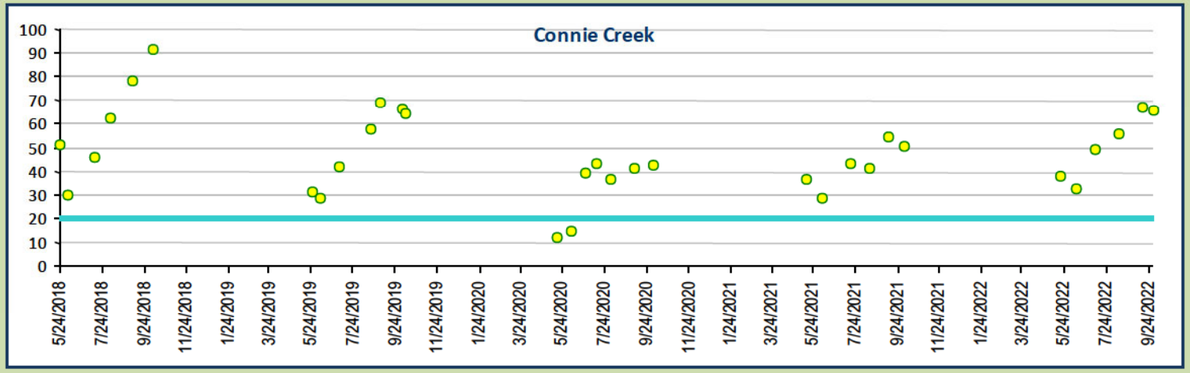
RED DOG MINE

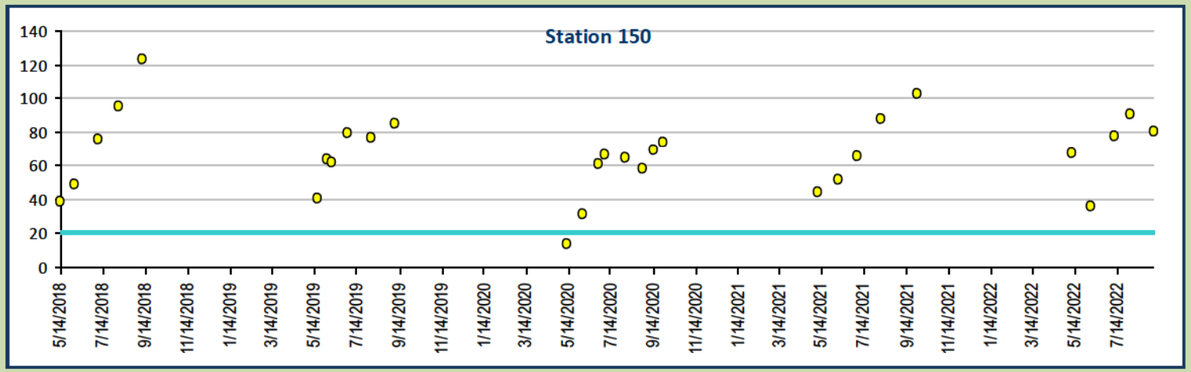
Water Monitoring Mine Drainage
Water Quality Profile I , 5-Year Trend Charts

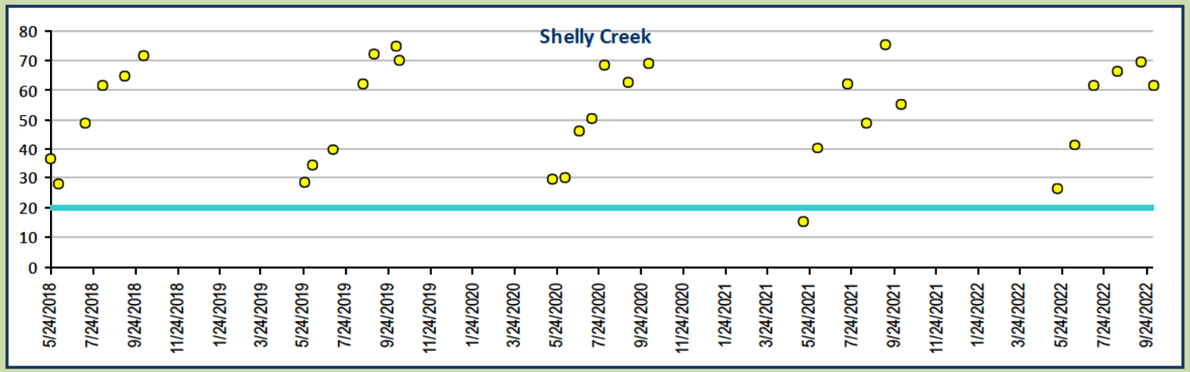
Alkalinity as CaCO3, units mg/L

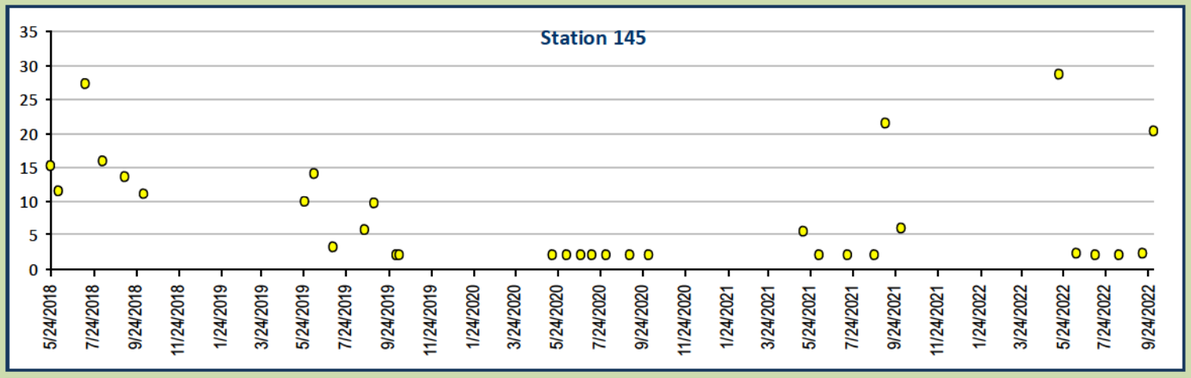
Aquatic Life - Fresh Water Chronic WQS mg/L

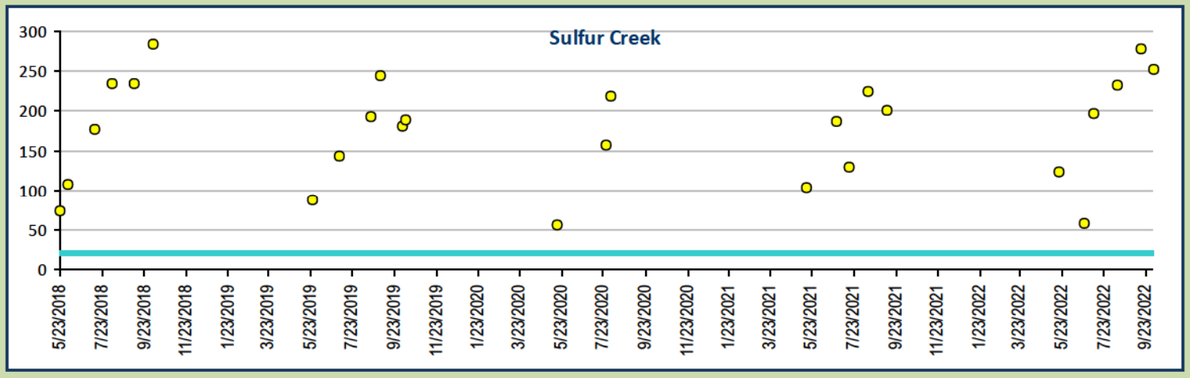
20 mg/L minimum

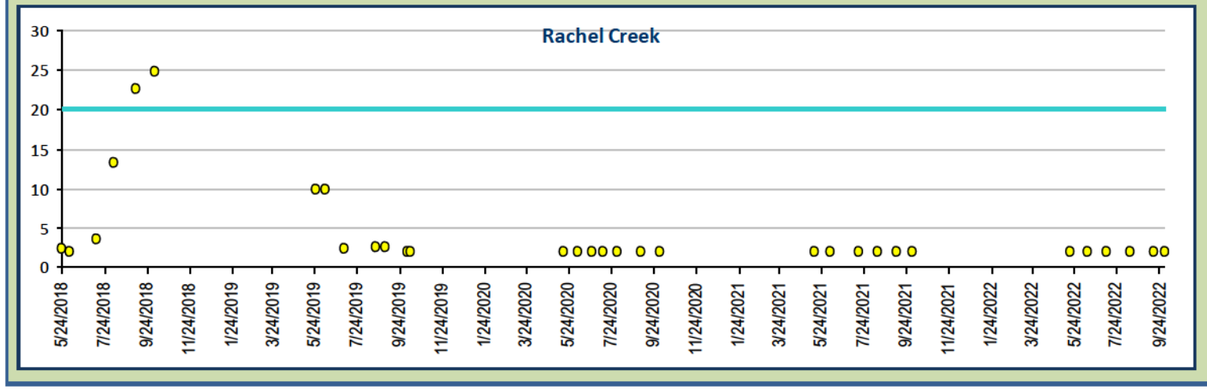


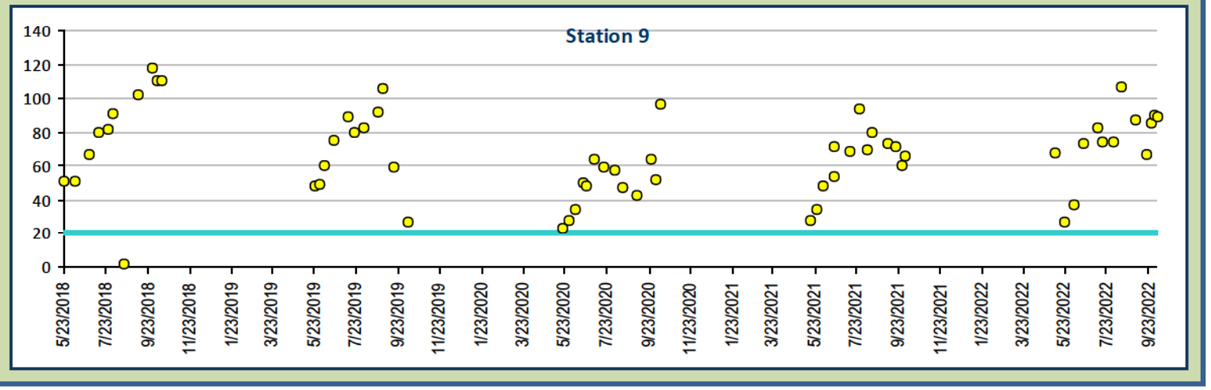








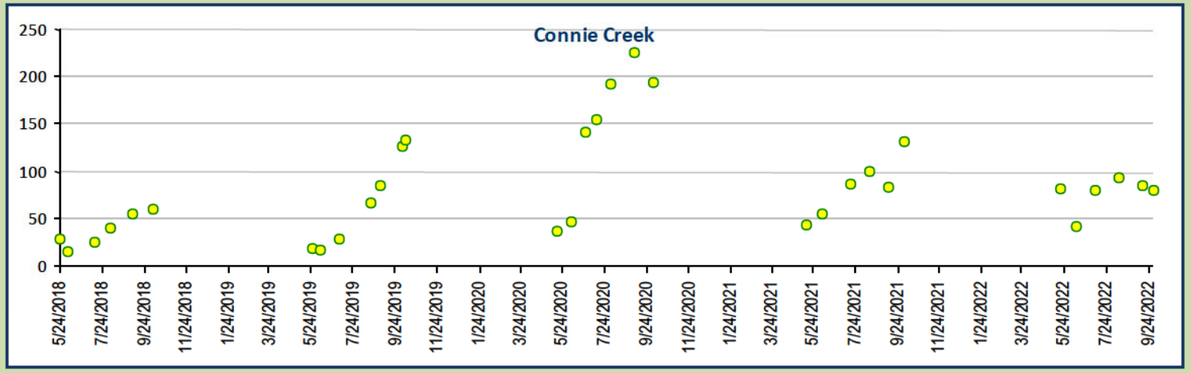


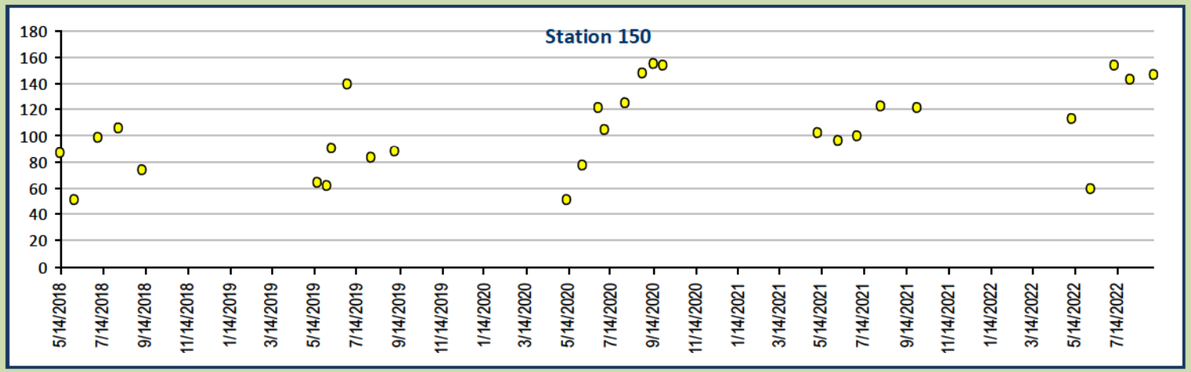


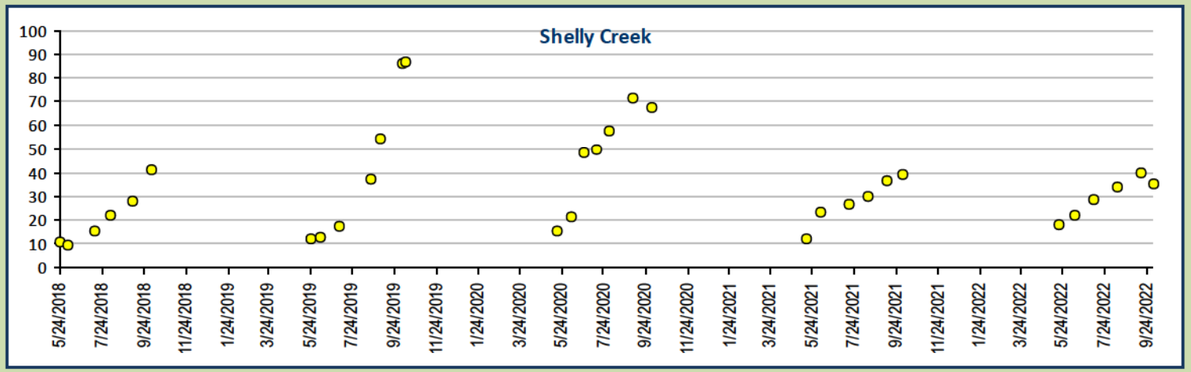
RED DOG MINE

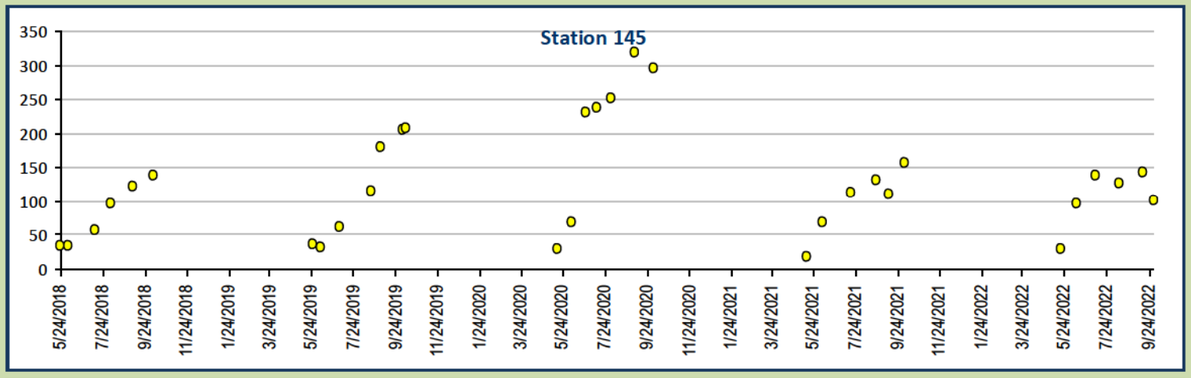
Water Monitoring Mine Drainage
Water Quality Profile I , 5-Year Trend Charts

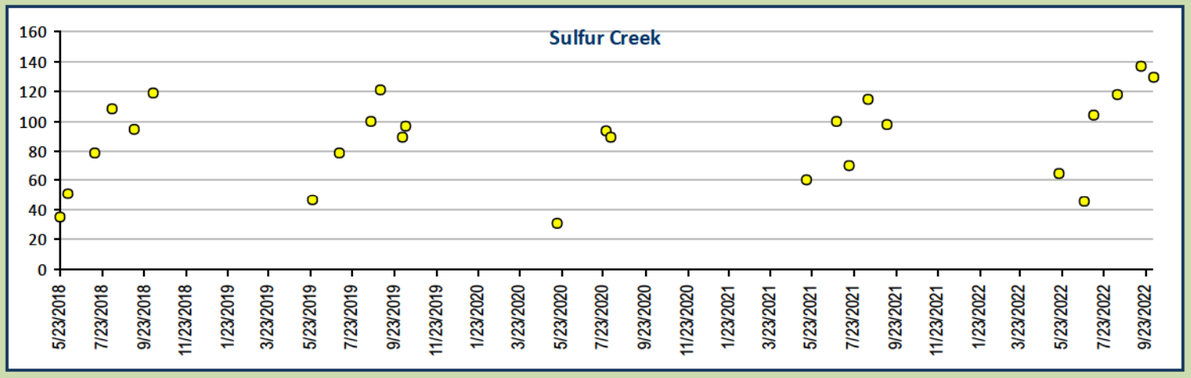
Calcium, Total recoverable, units mg/L

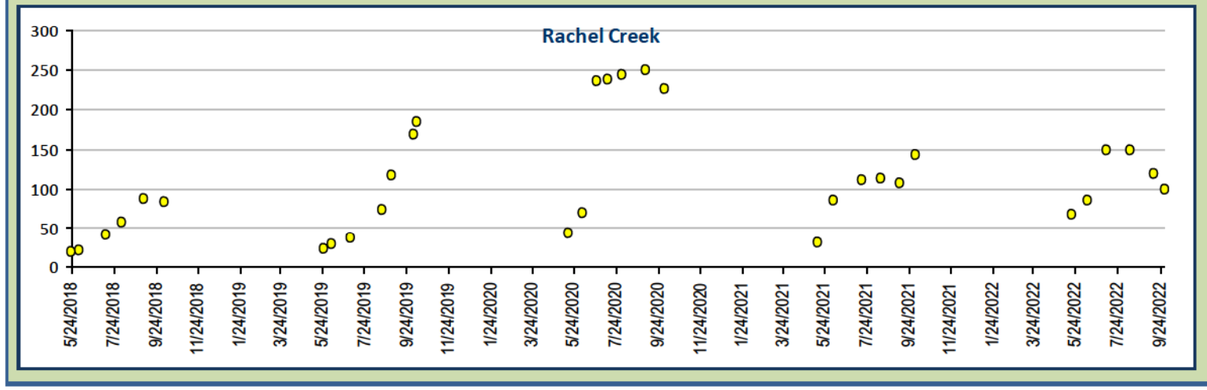


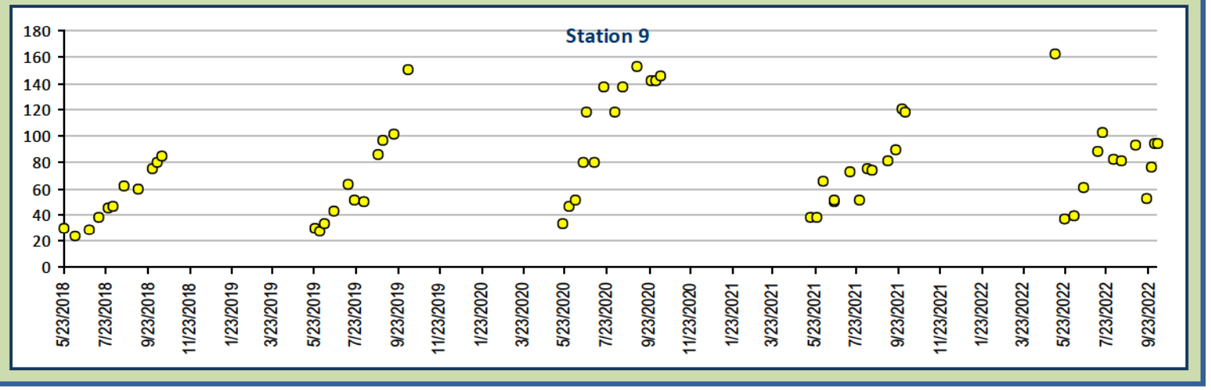












RED DOG MINE

Water Monitoring Mine Drainage
Water Quality Profile I , 5-Year Trend Charts

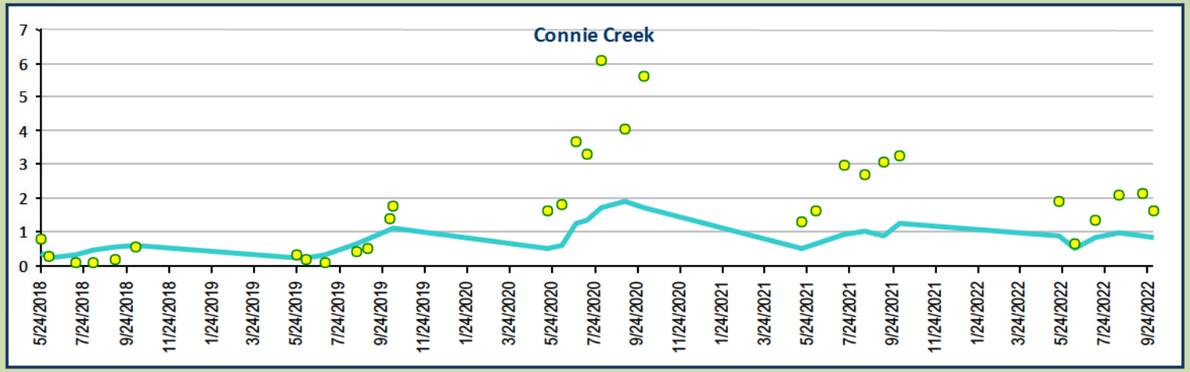
Cadmium, Total Recoverable, units ug/L

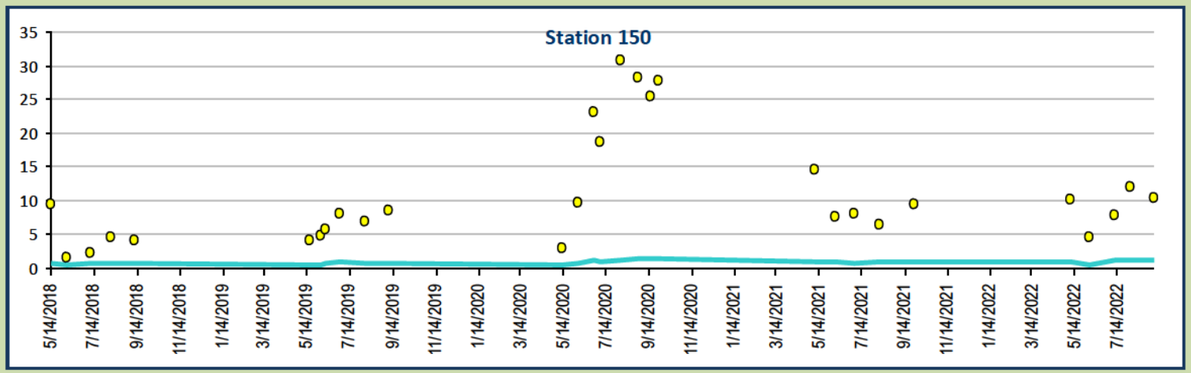
Aquatic Life - Fresh Water Chronic WQS ug/L

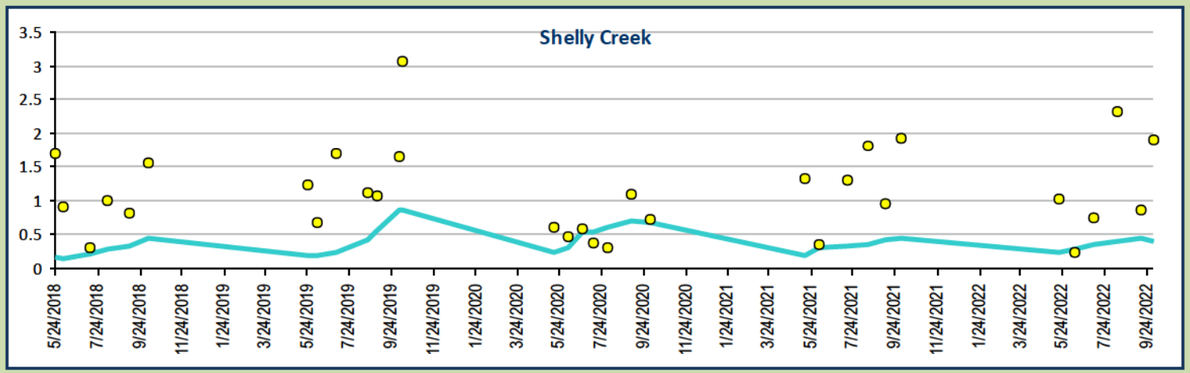
Hardness Dependent Calculation

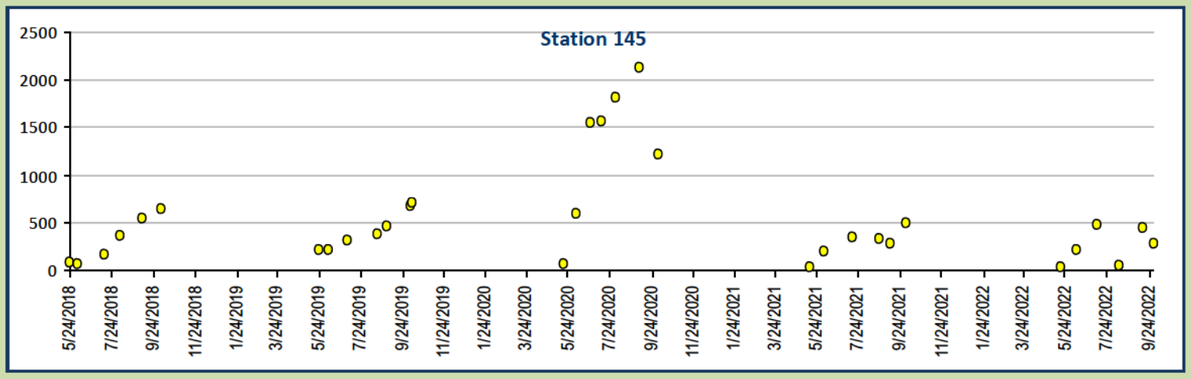
=EXP(0.7409*(LN(calc *hardness))-4.719)

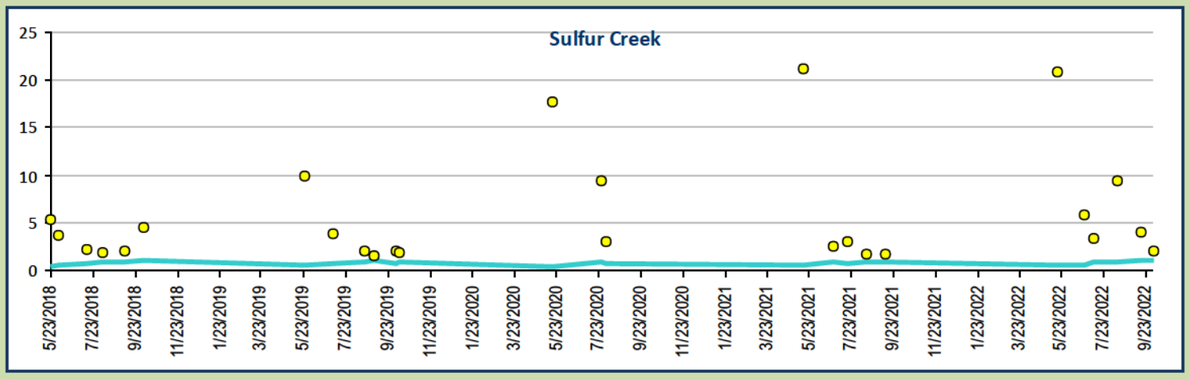
* Calculated using Standard Methods 2340B

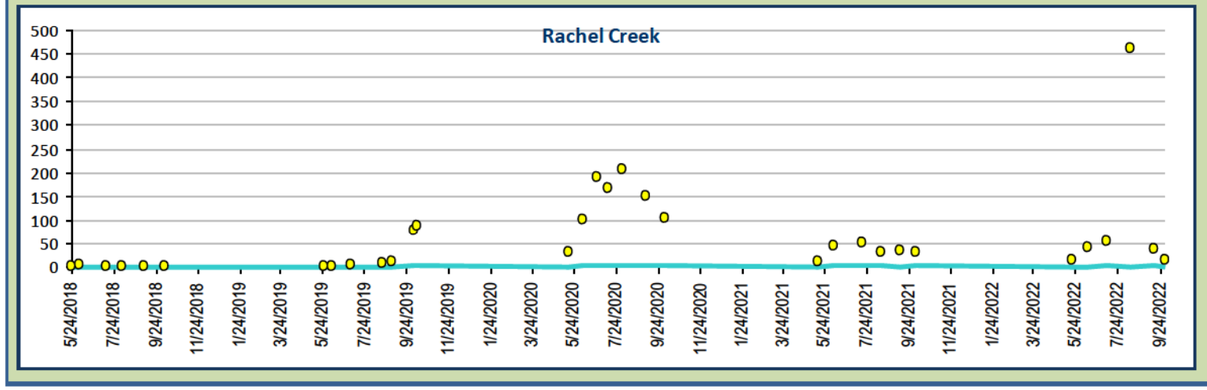


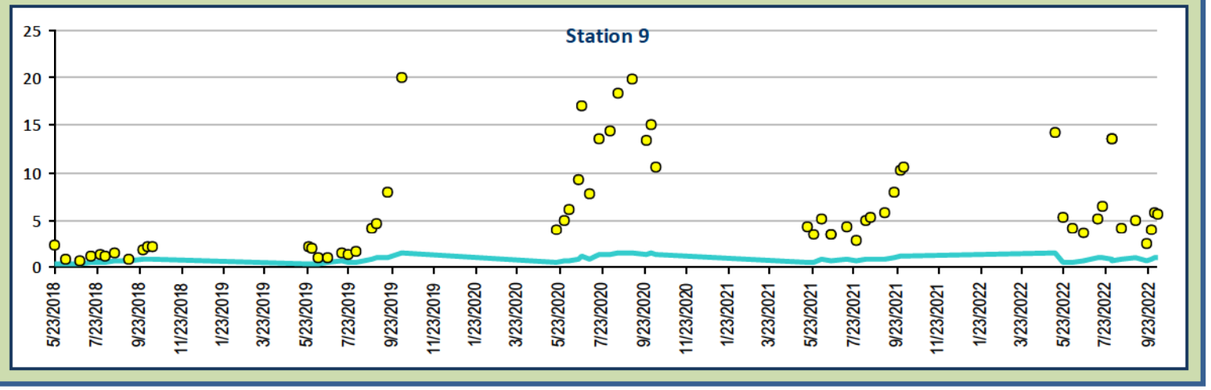












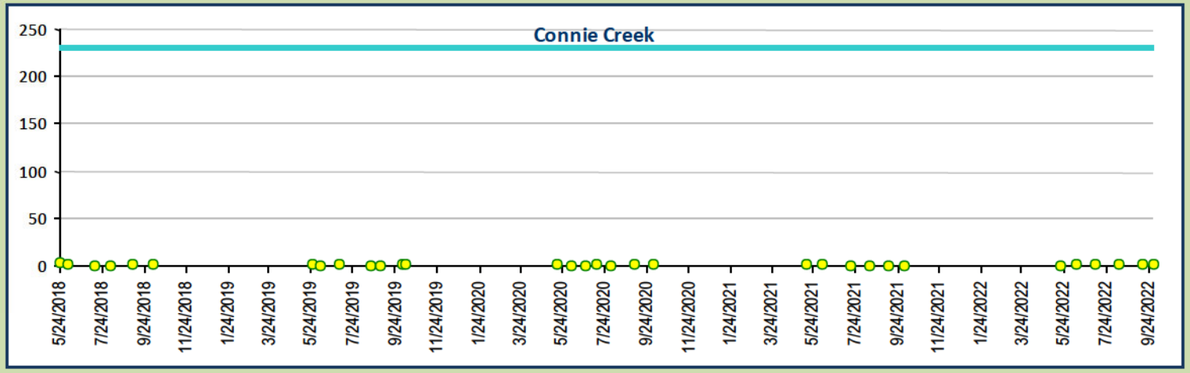
RED DOG MINE

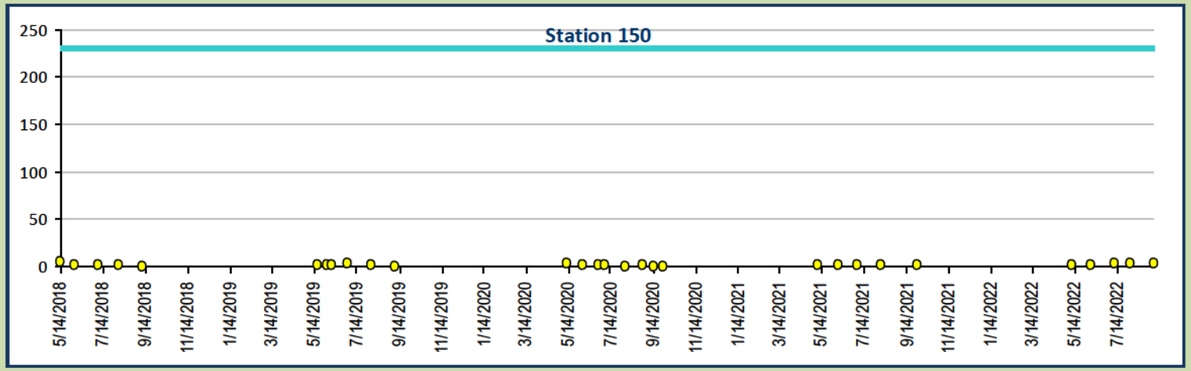
Water Monitoring Mine Drainage
Water Quality Profile I , 5-Year Trend Charts

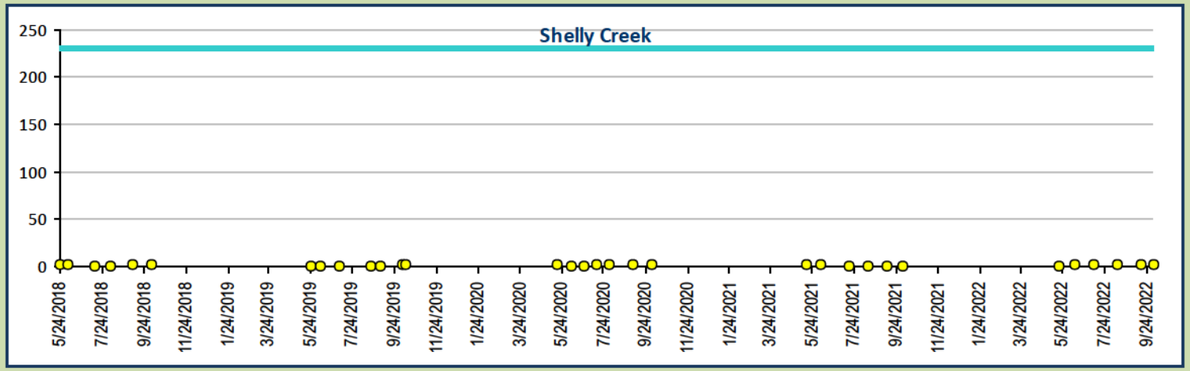
Chloride, Total Recoverable, units mg/L

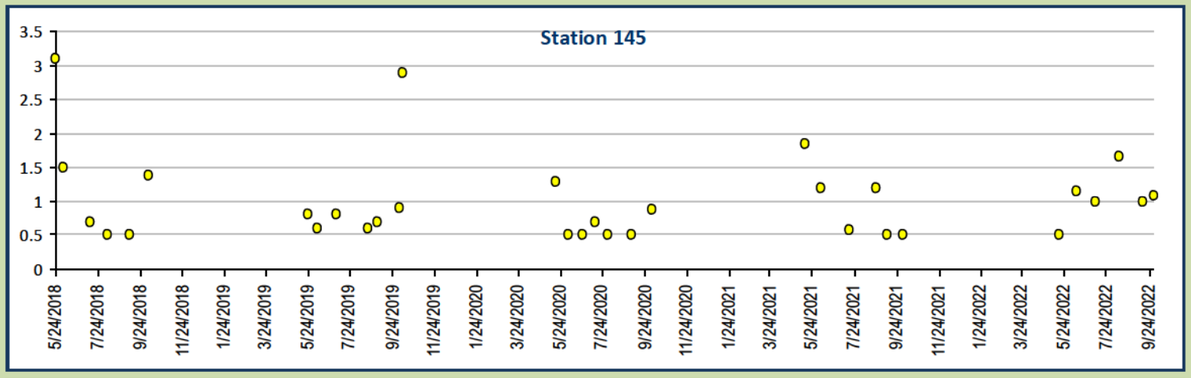
Aquatic Life - Fresh Water Chronic WQS mg/L

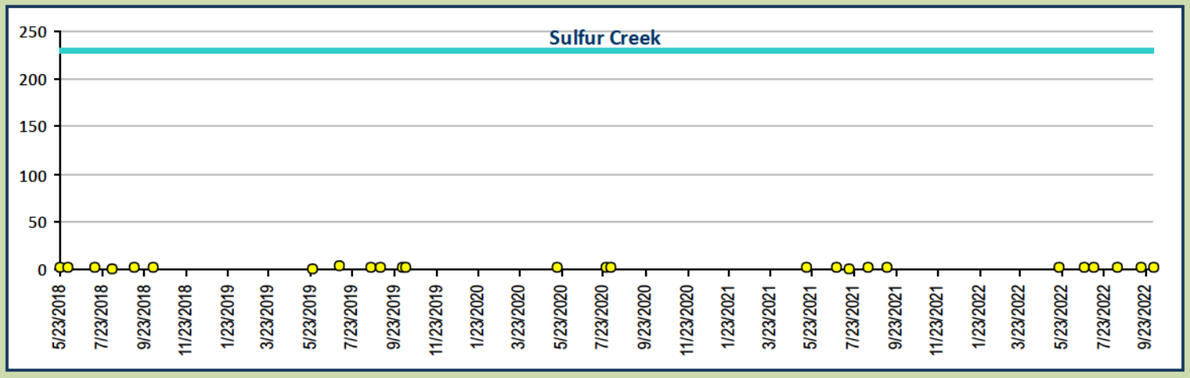
230 mg/L

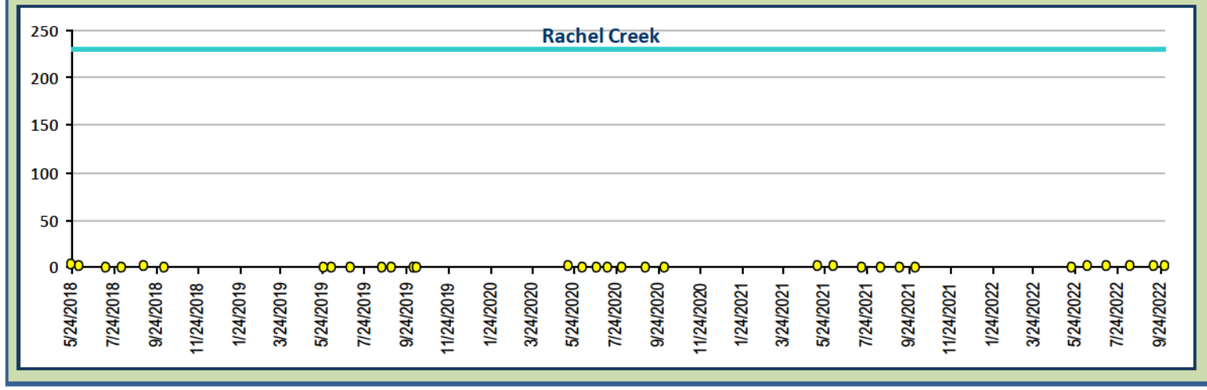


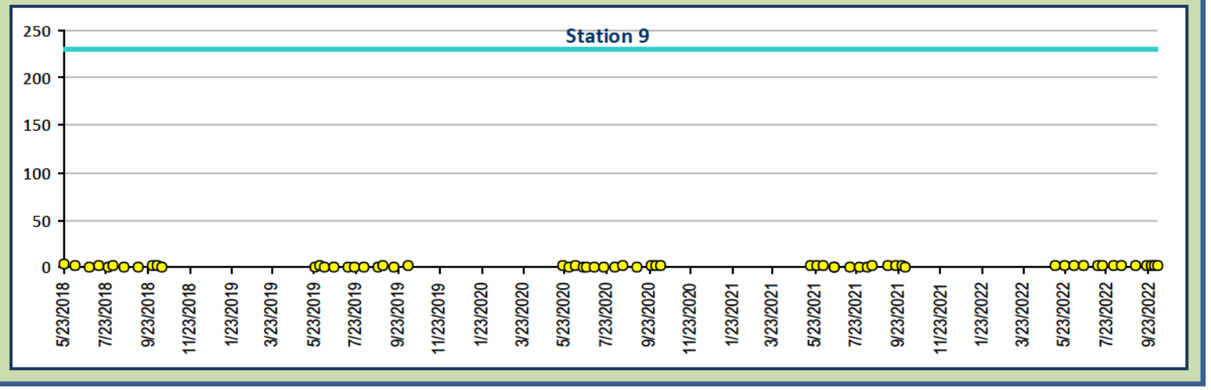








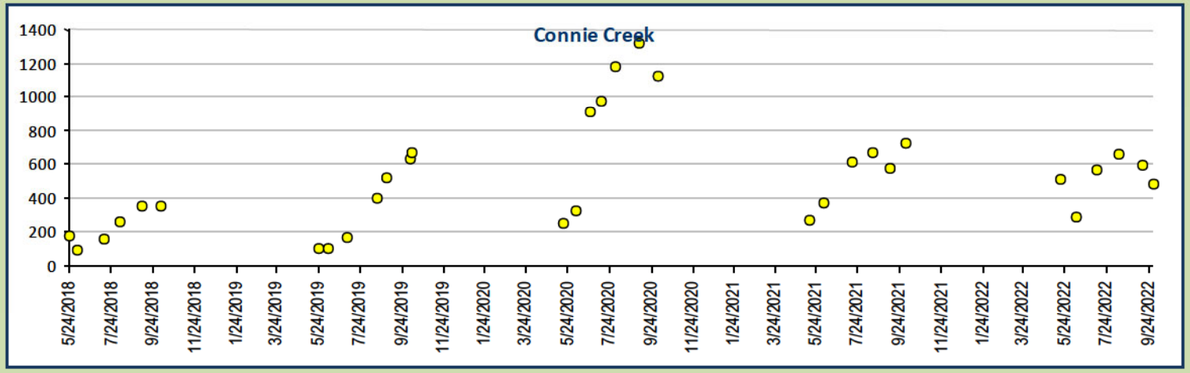


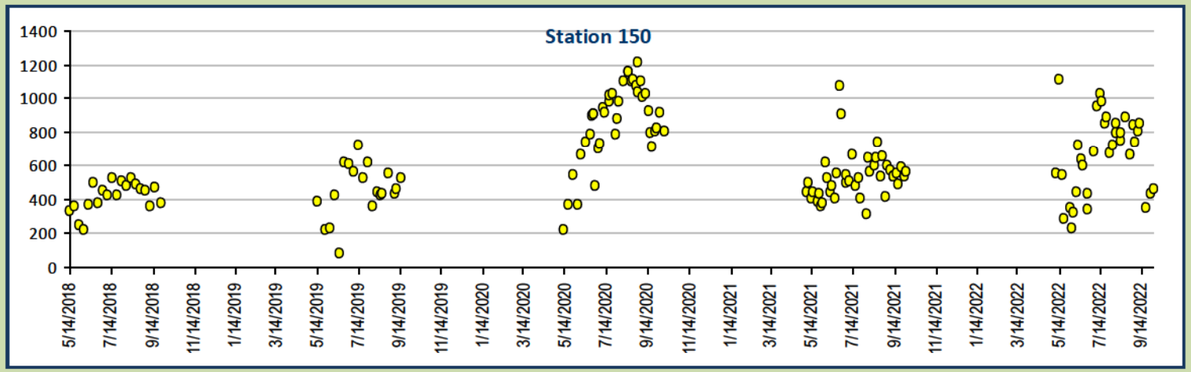


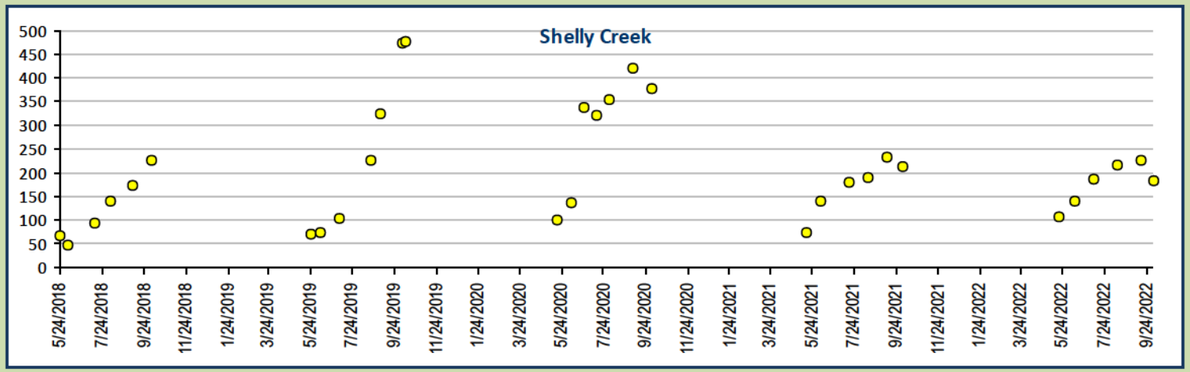
RED DOG MINE

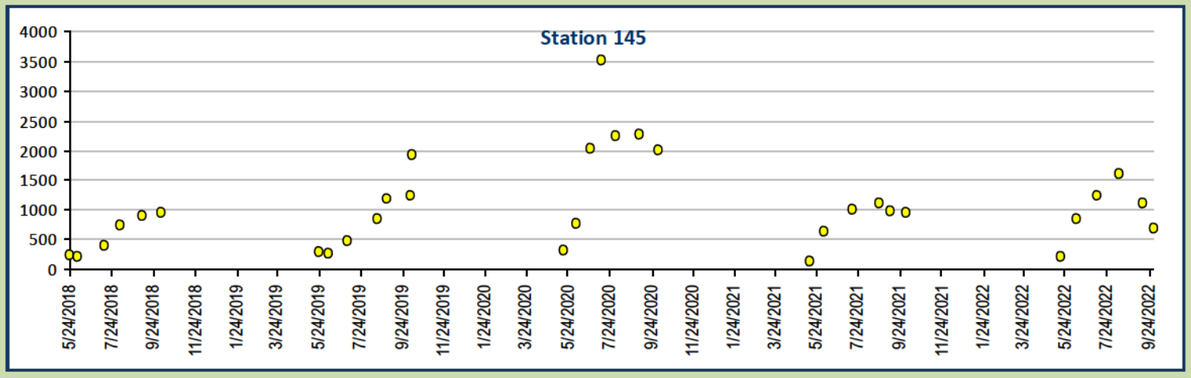
Water Monitoring Mine Drainage
Water Quality Profile I , 5-Year Trend Charts

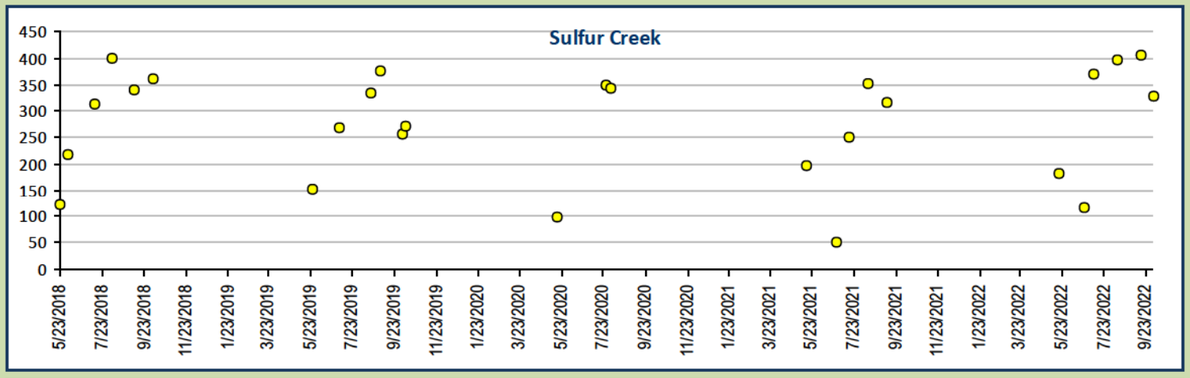
Conductivity, units uS/cm

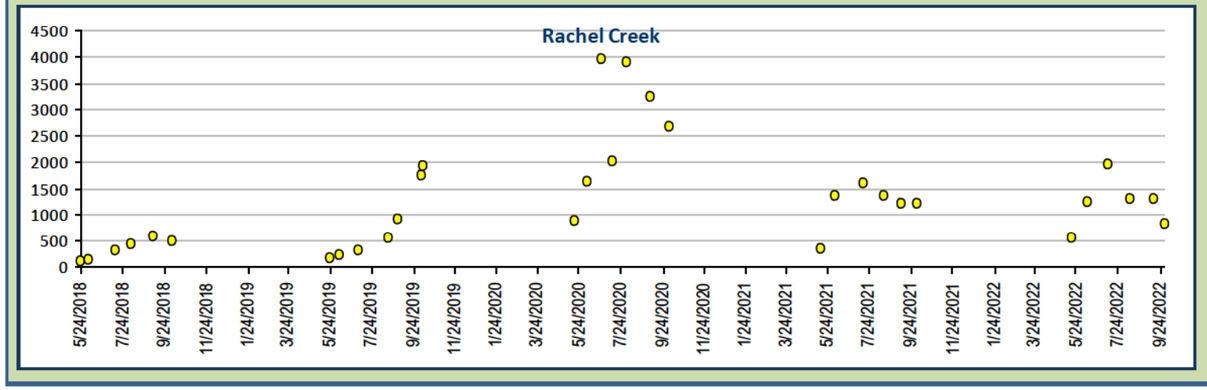


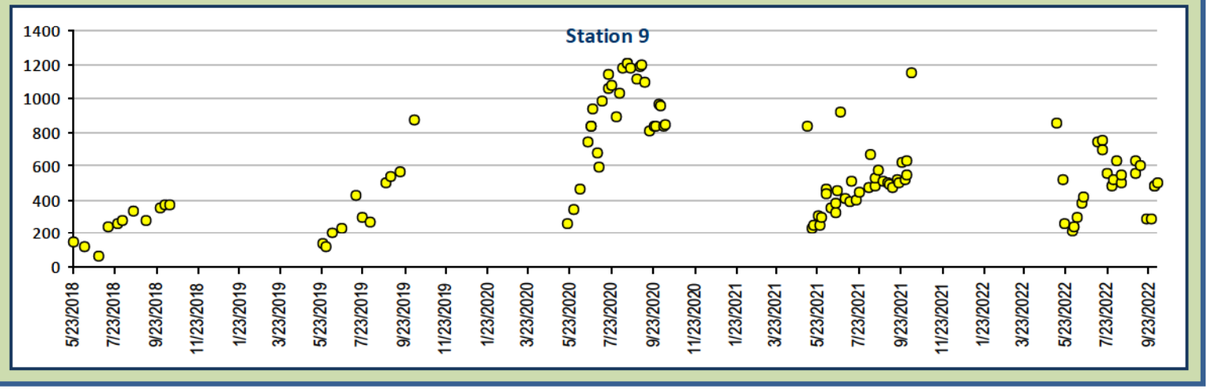












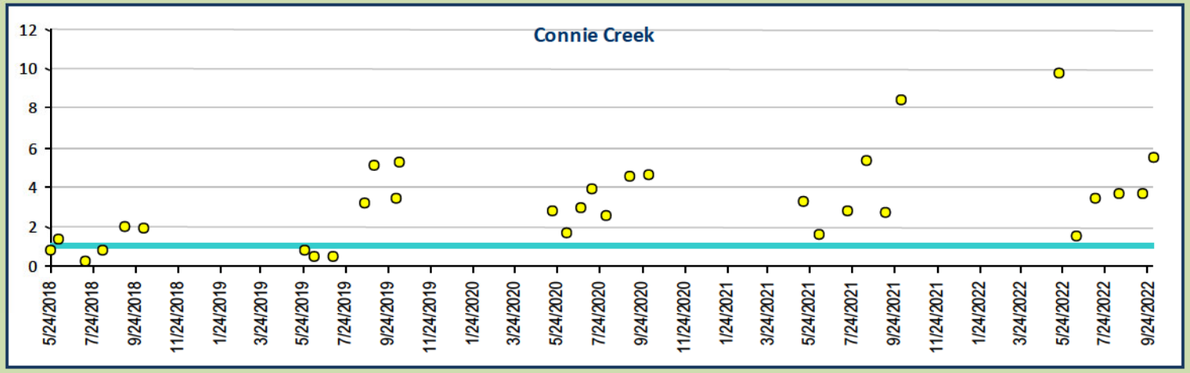
RED DOG MINE

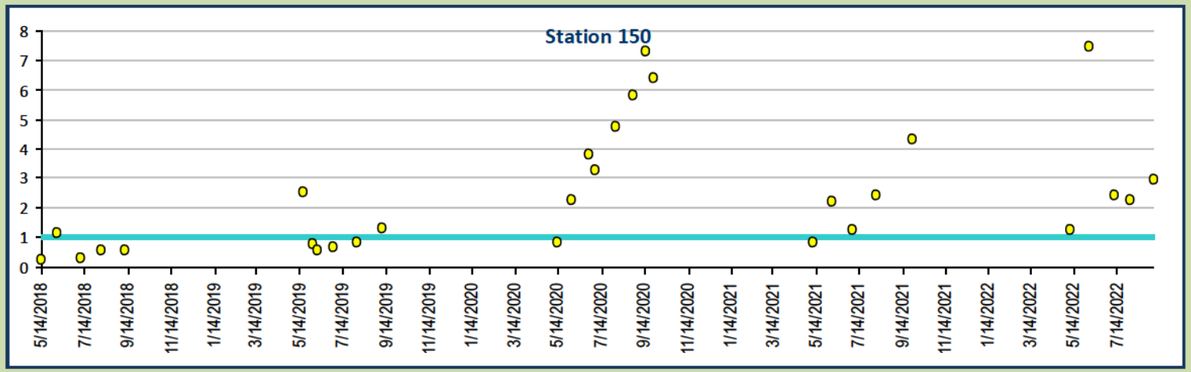
Water Monitoring Mine Drainage
Water Quality Profile I , 5-Year Trend Charts

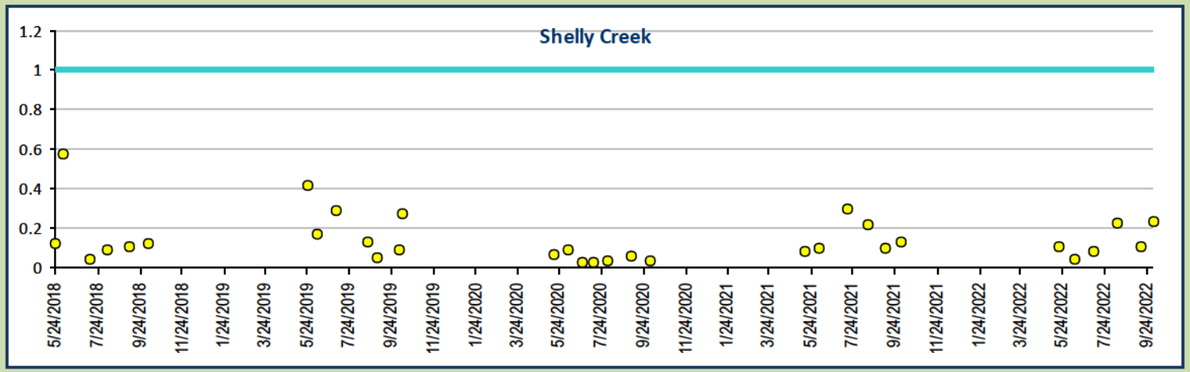
Iron, Total Recoverable, units mg/L

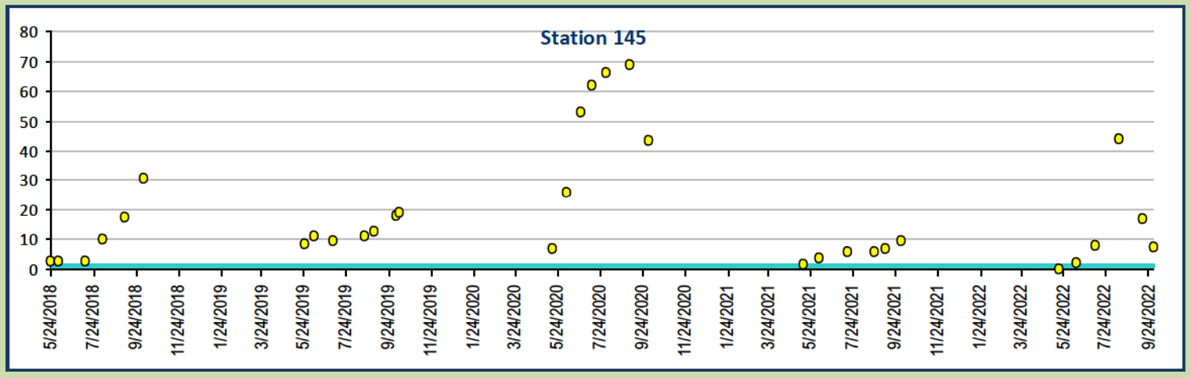
Aquatic Life - Fresh Water Chronic WQS mg/L

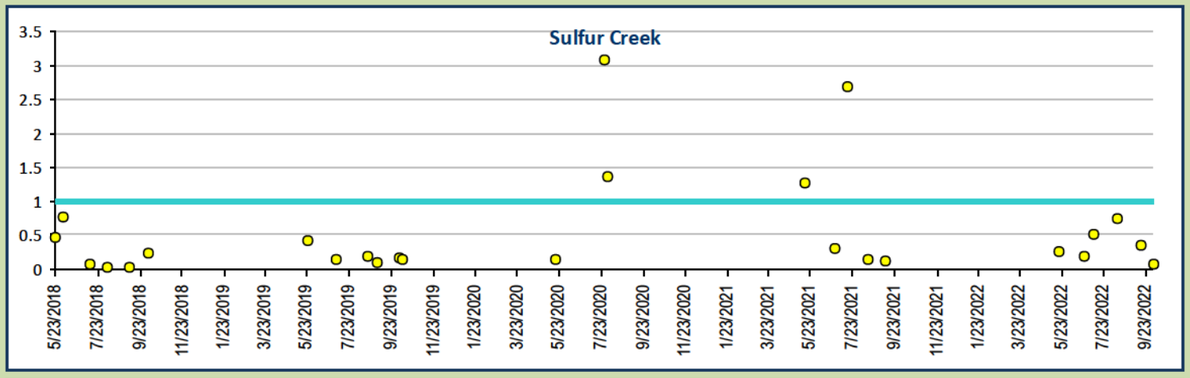
1.0 mg/L

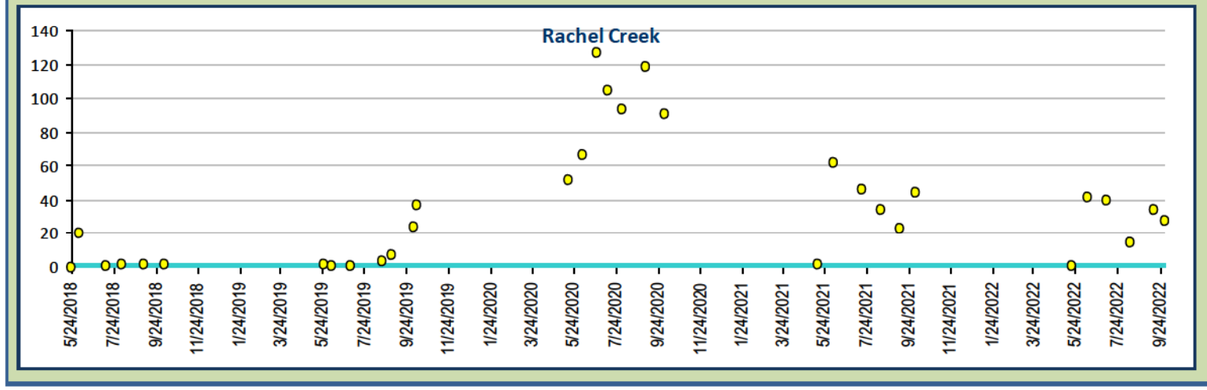


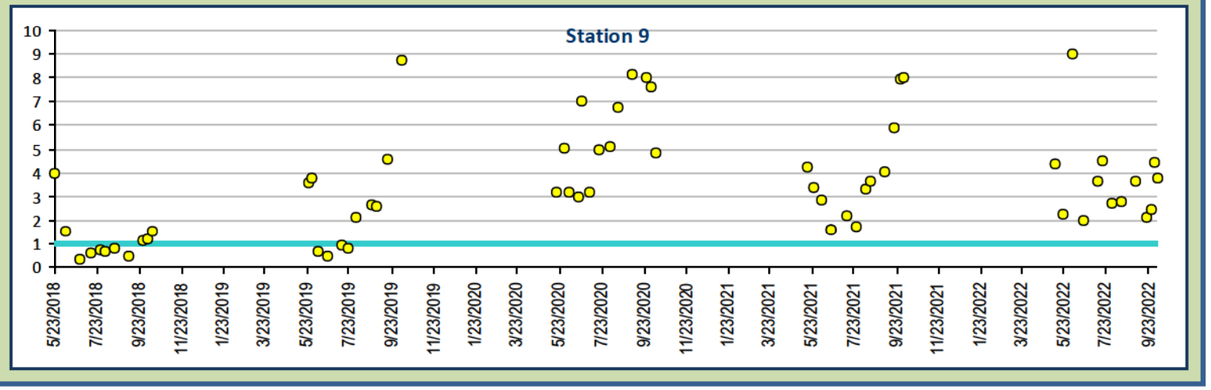








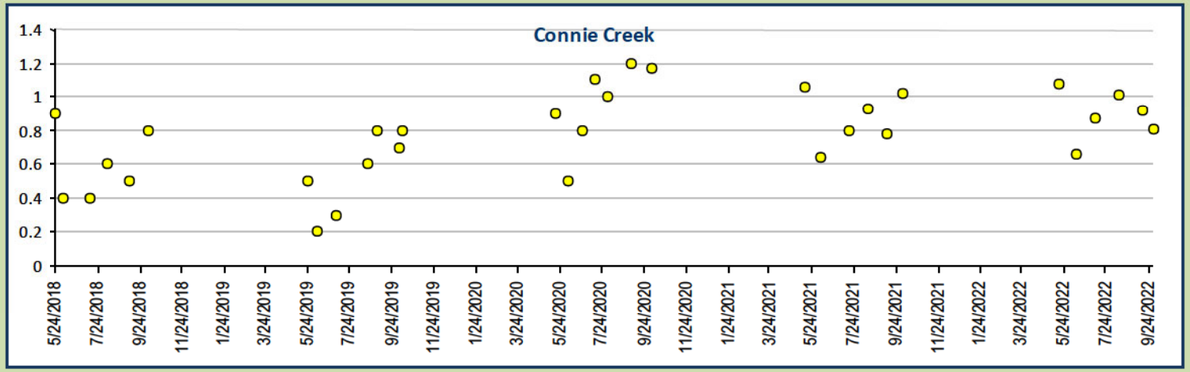


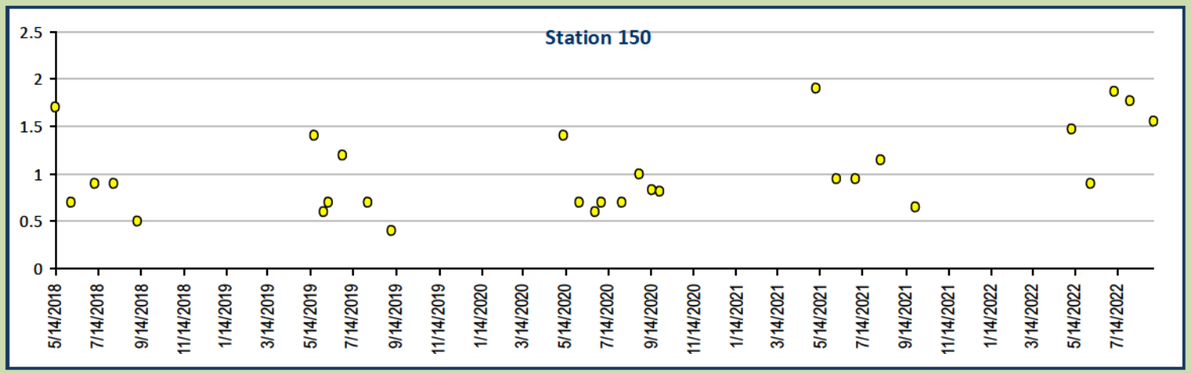


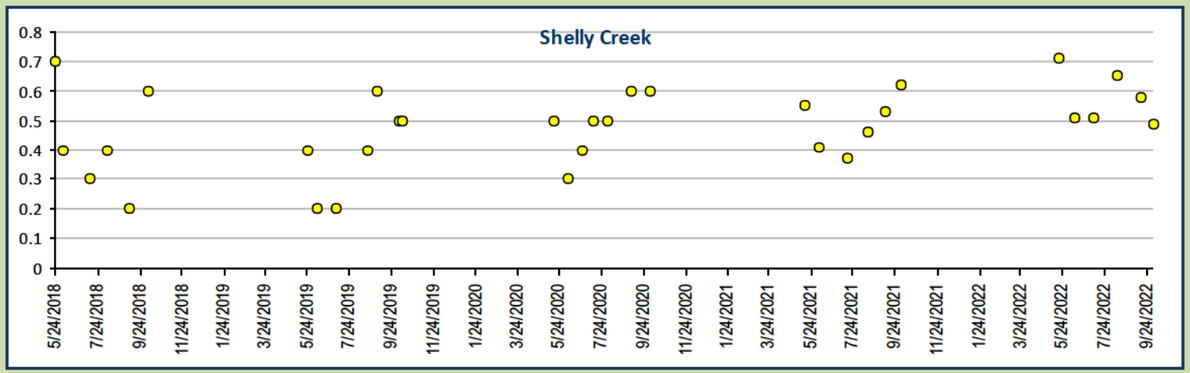
RED DOG MINE

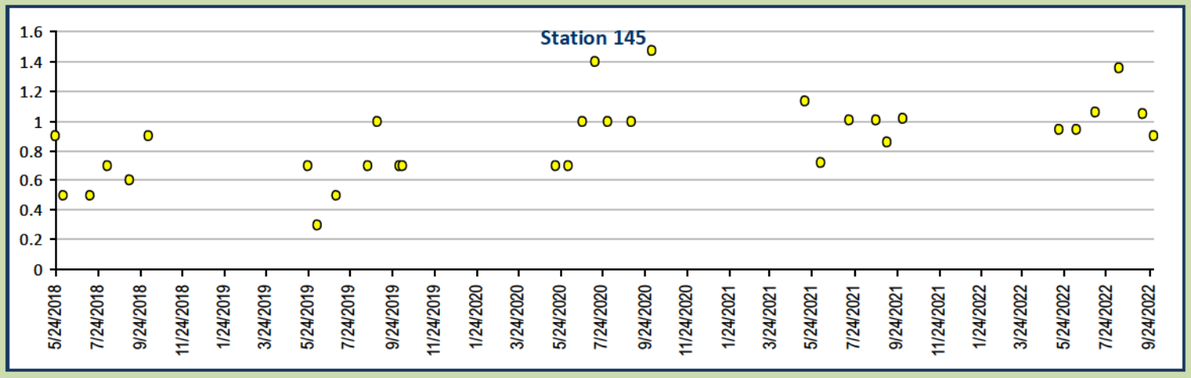
Water Monitoring Mine Drainage
Water Quality Profile I , 5-Year Trend Charts

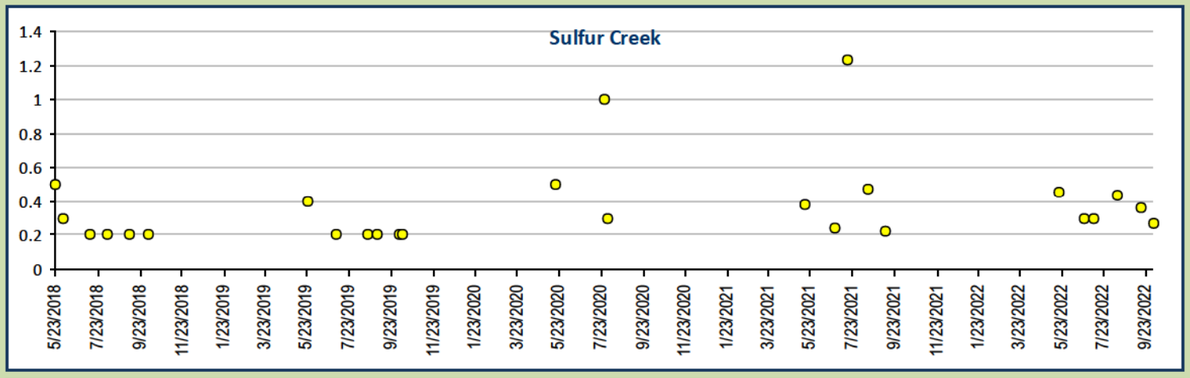
Potassium, Total Recoverable, units mg/L

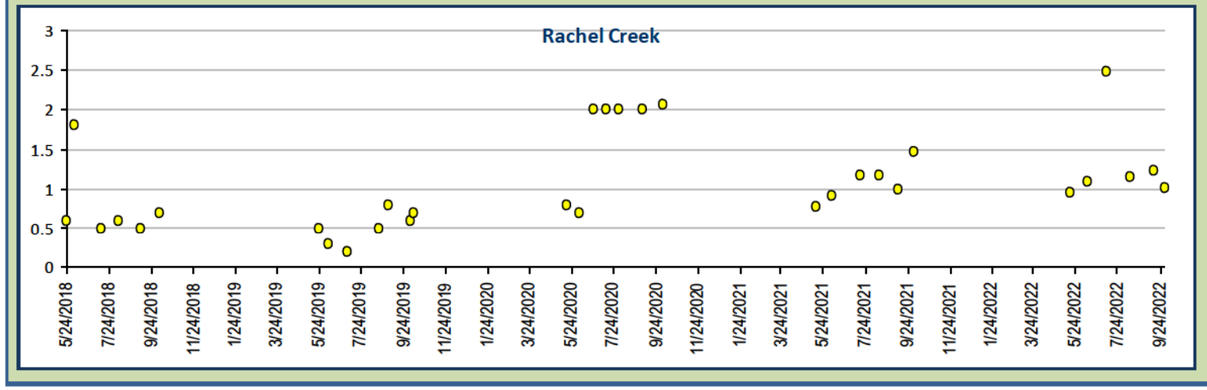


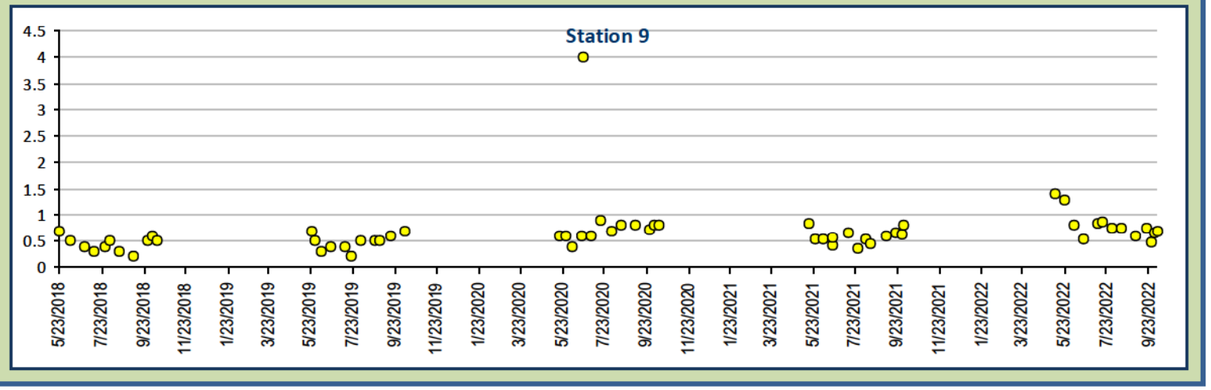








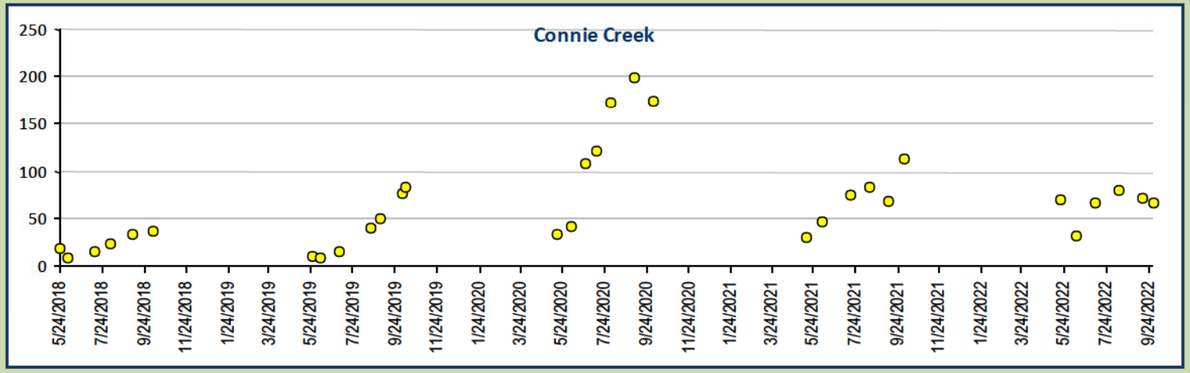


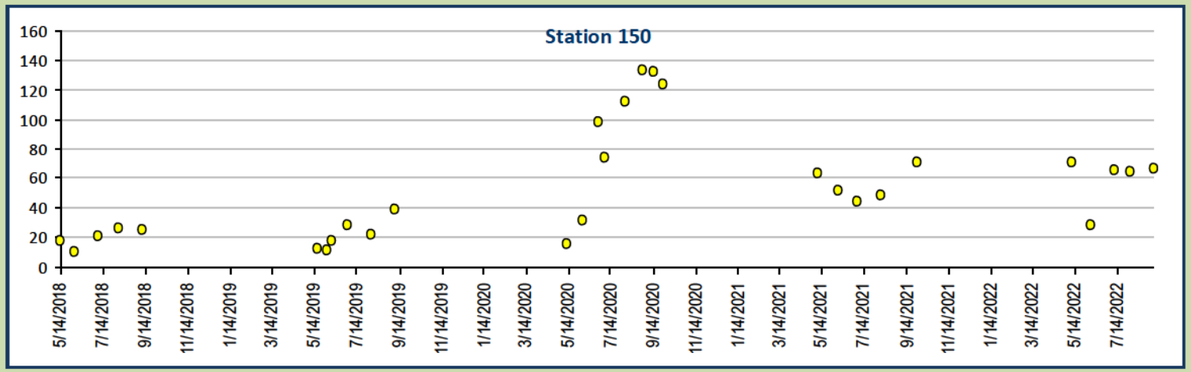


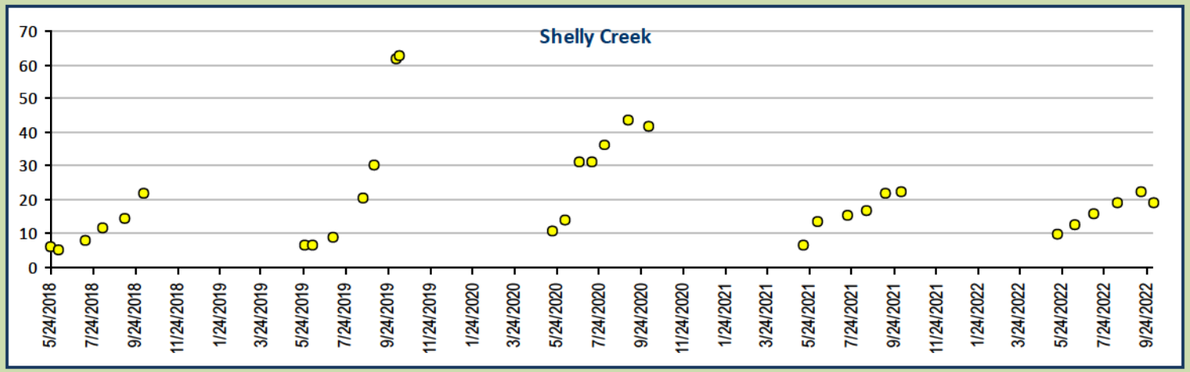
RED DOG MINE

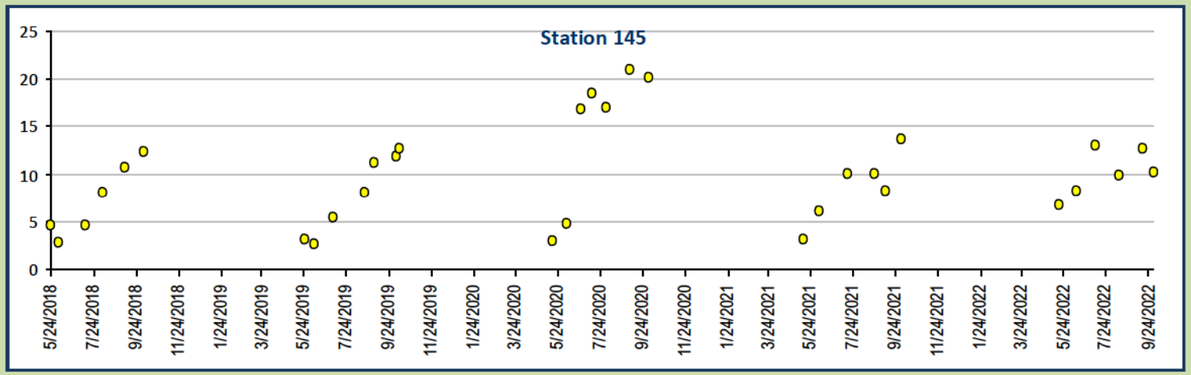
Water Monitoring Mine Drainage
Water Quality Profile I , 5-Year Trend Charts

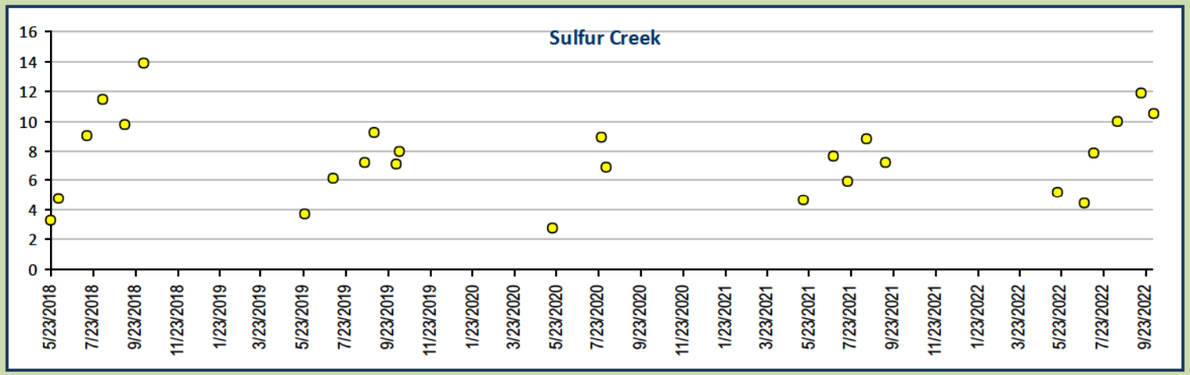
Magnesium, Total Recoverable, units mg/L

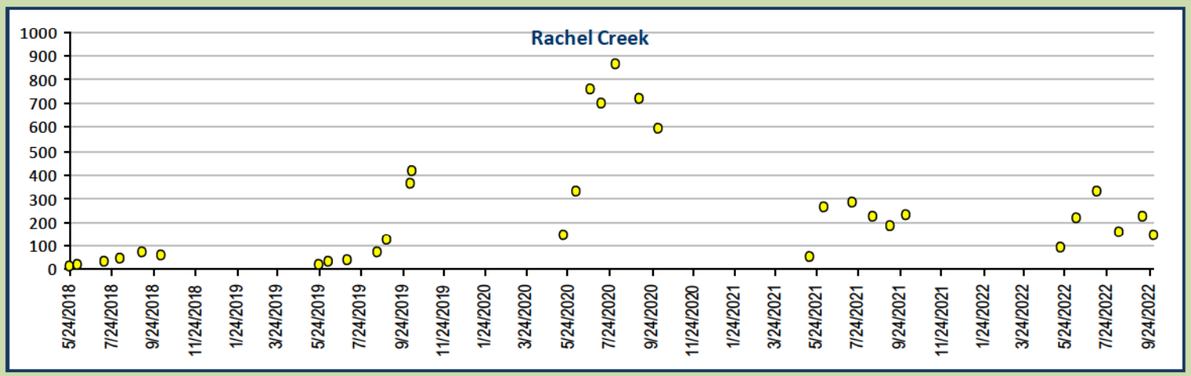


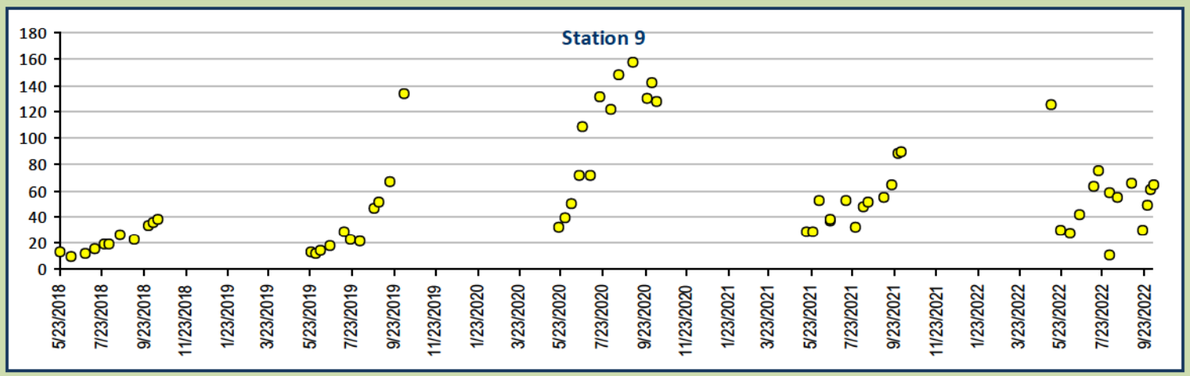








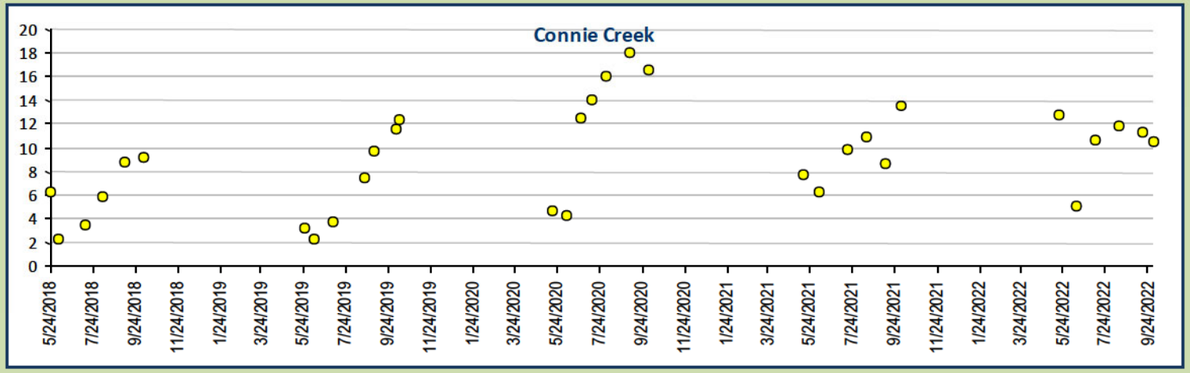


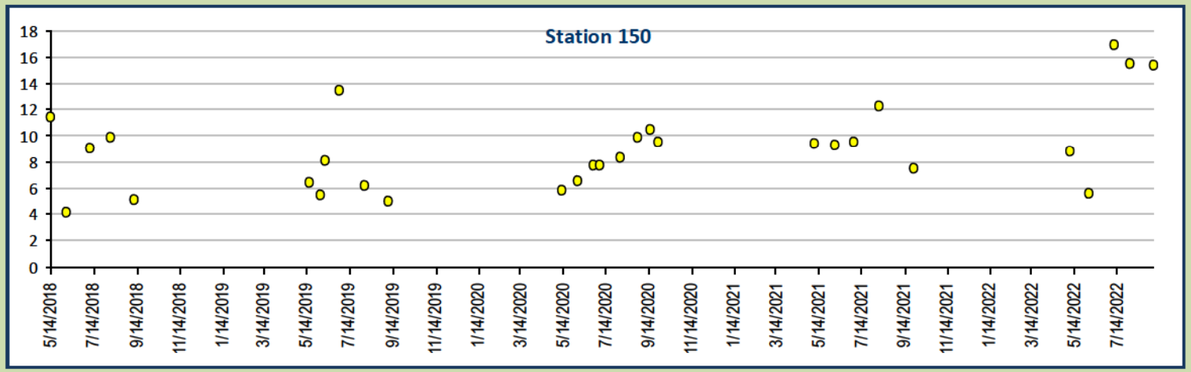


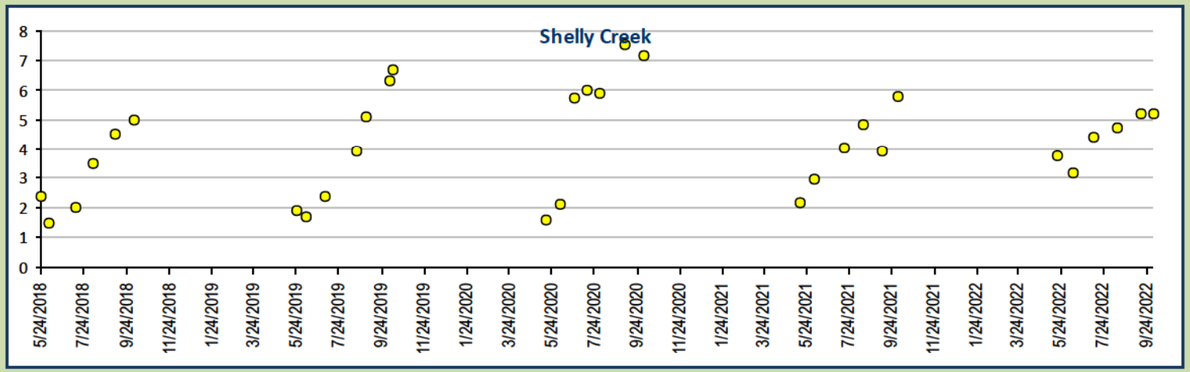
RED DOG MINE

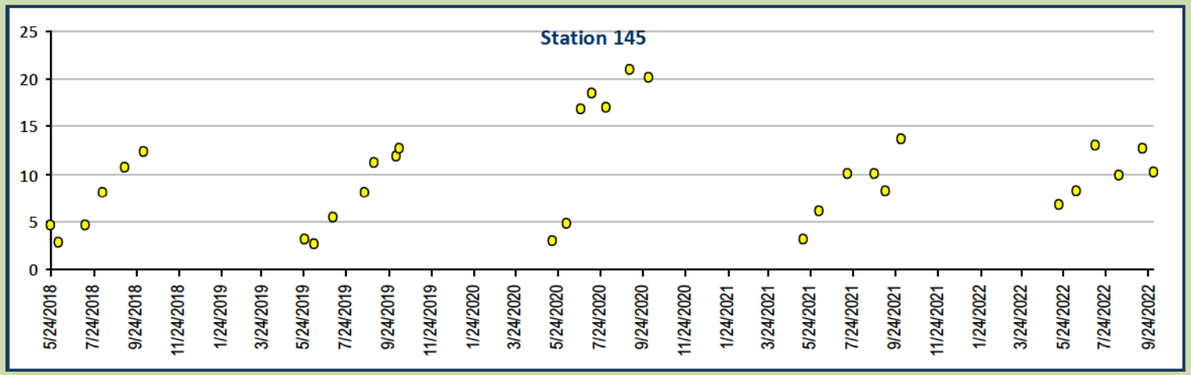
Water Monitoring Mine Drainage
Water Quality Profile I , 5-Year Trend Charts

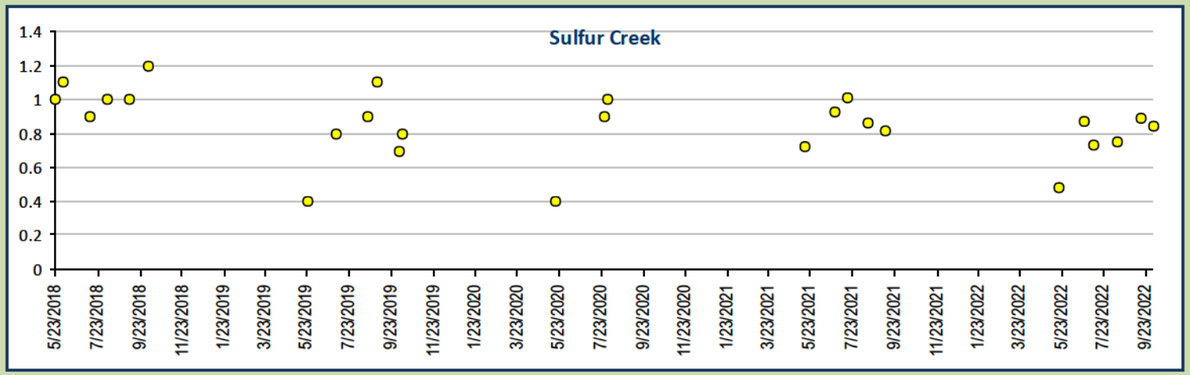
Sodium, Total Recoverable, units mg/L

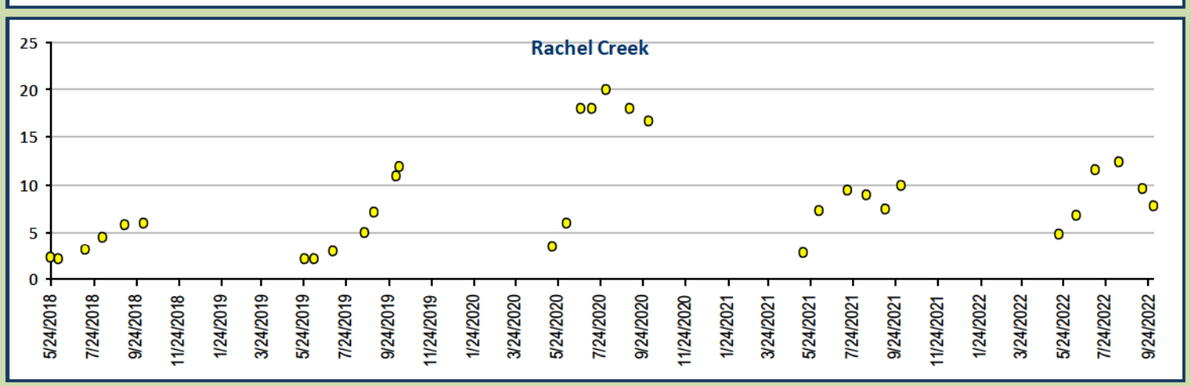


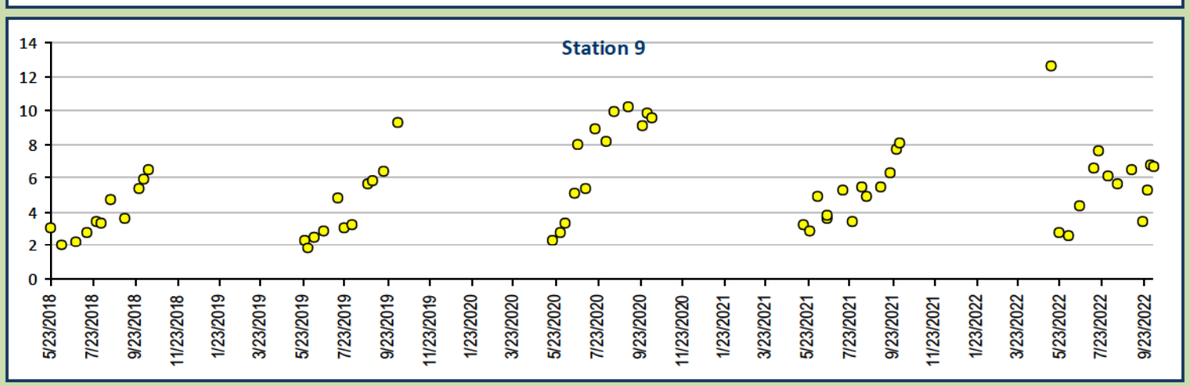












RED DOG MINE

Water Monitoring Mine Drainage
Water Quality Profile I , 5-Year Trend Charts

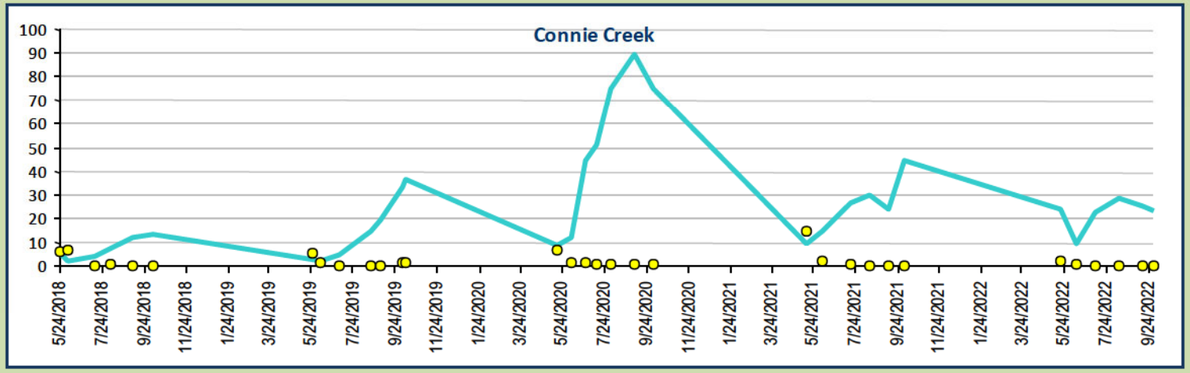
Lead, Total Recoverable, units ug/L

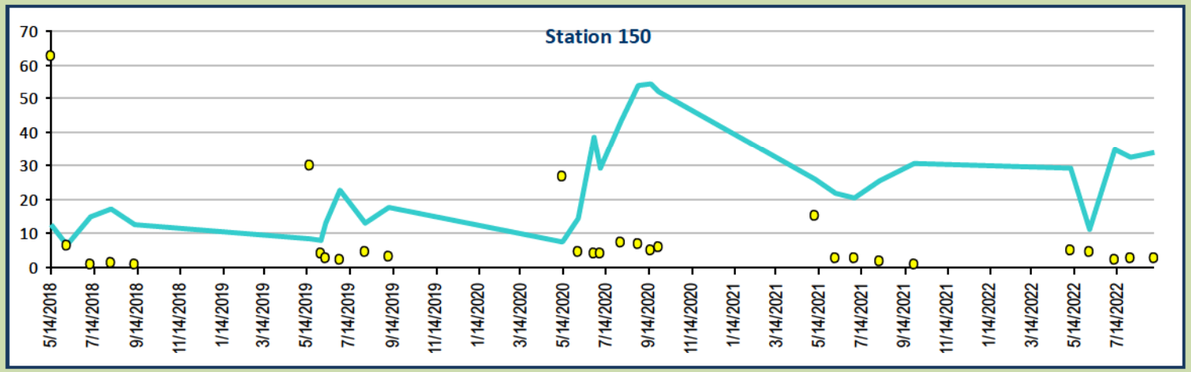
Aquatic Life - Fresh Water Chronic WQS ug/L

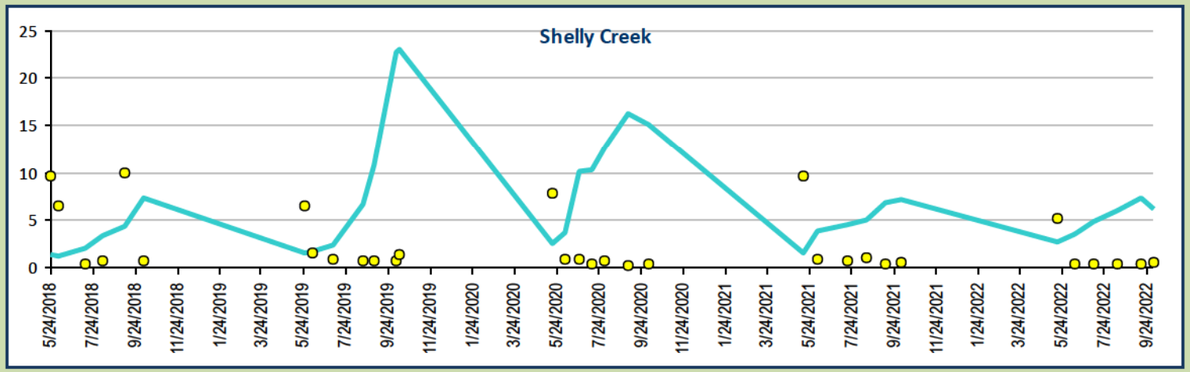
Hardness Dependent Calculation

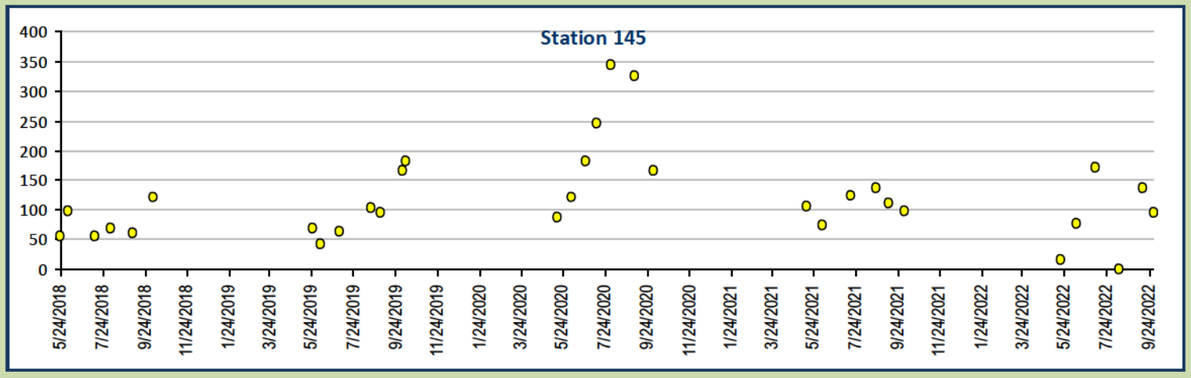
=EXP(1.273*(LN(calc *hardness))-4.705)

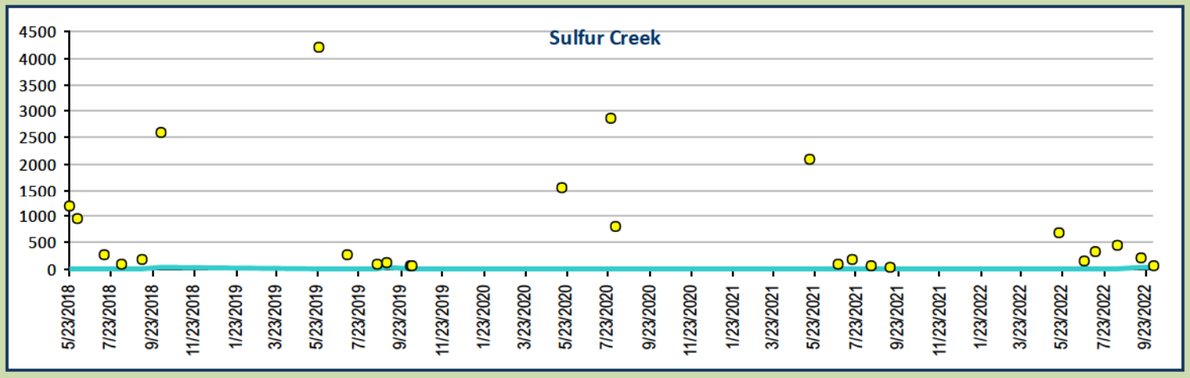
* Calculated using Standard Methods 2340B

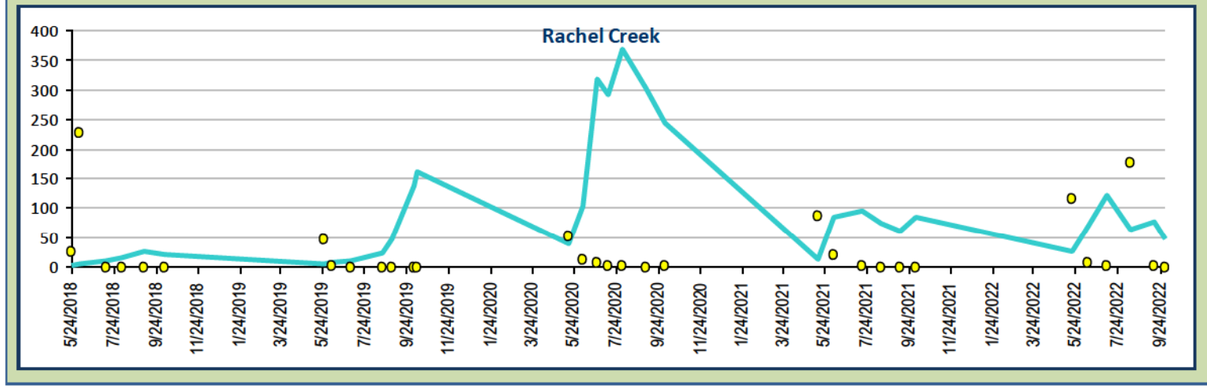


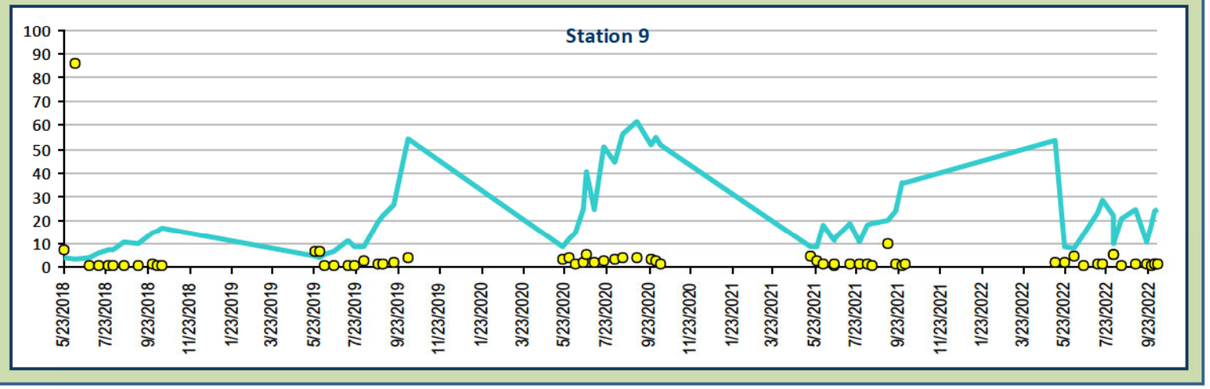










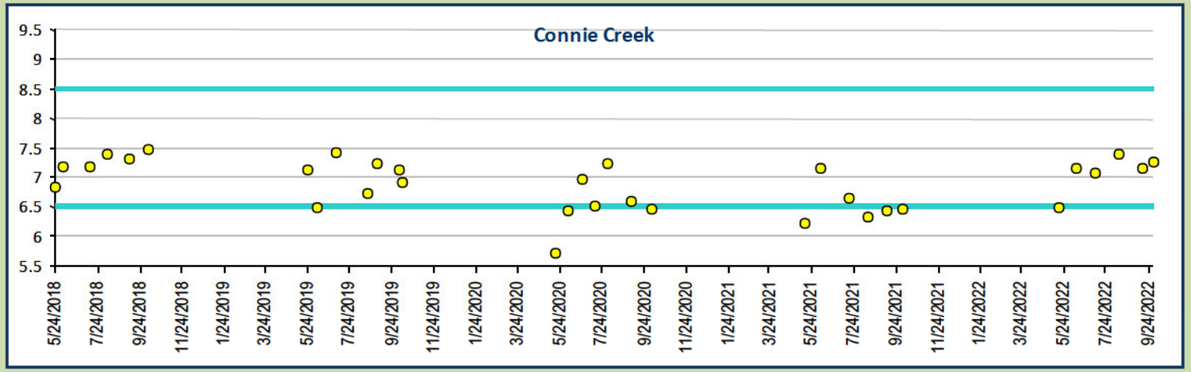


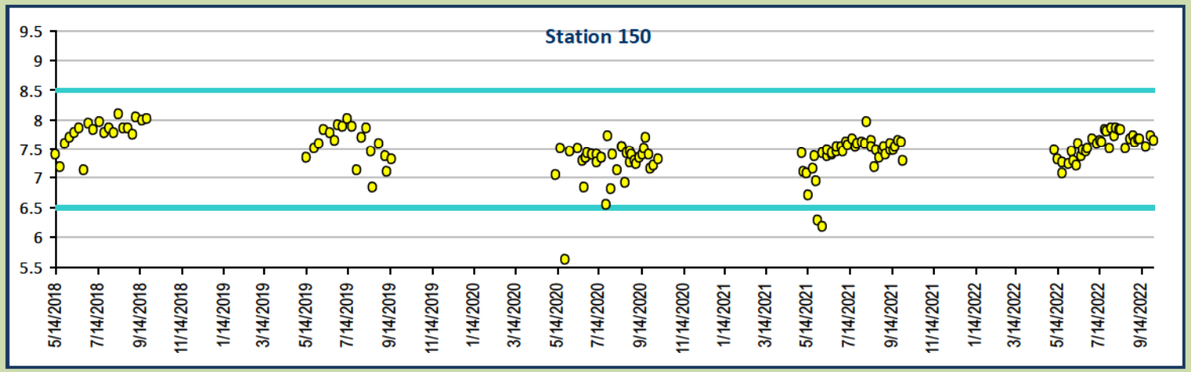
RED DOG MINE

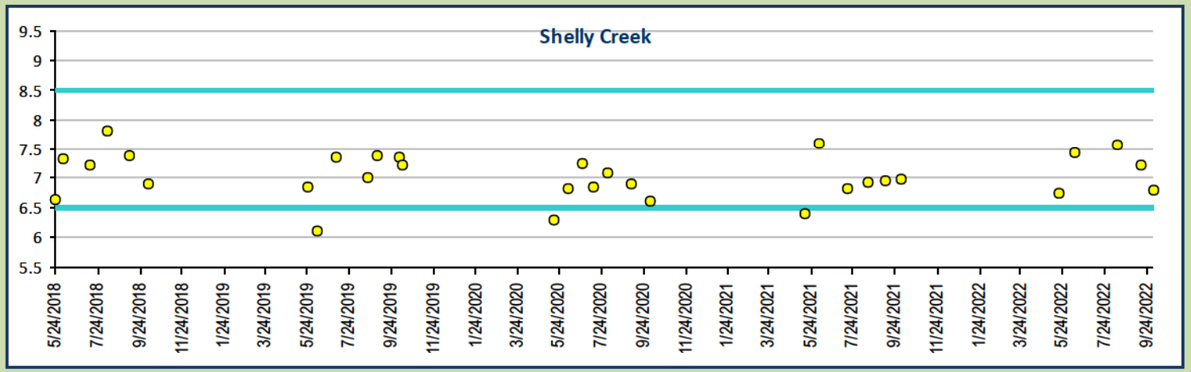
Water Monitoring Mine Drainage
Water Quality Profile I , 5-Year Trend Charts

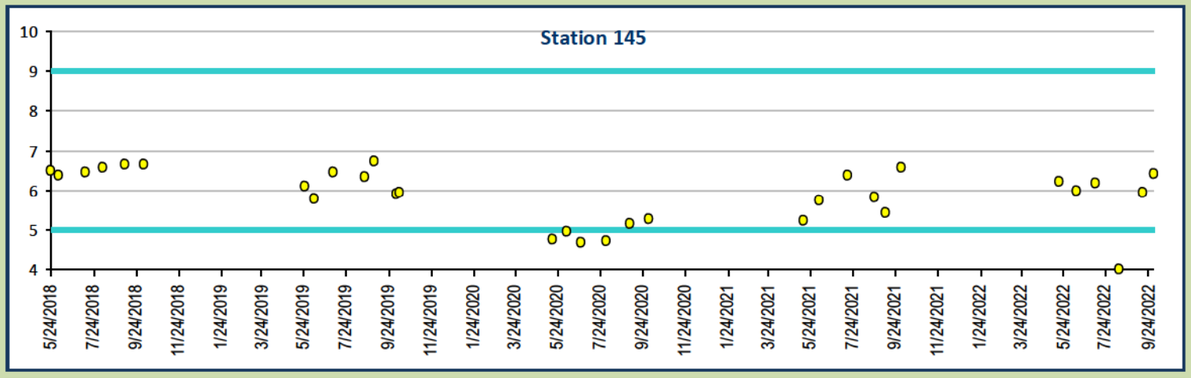
pH

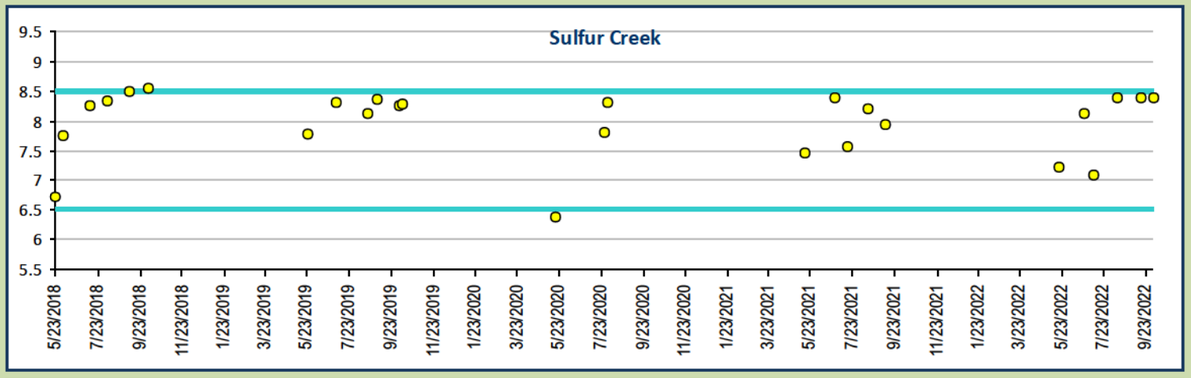
Site Specific WQS pH units

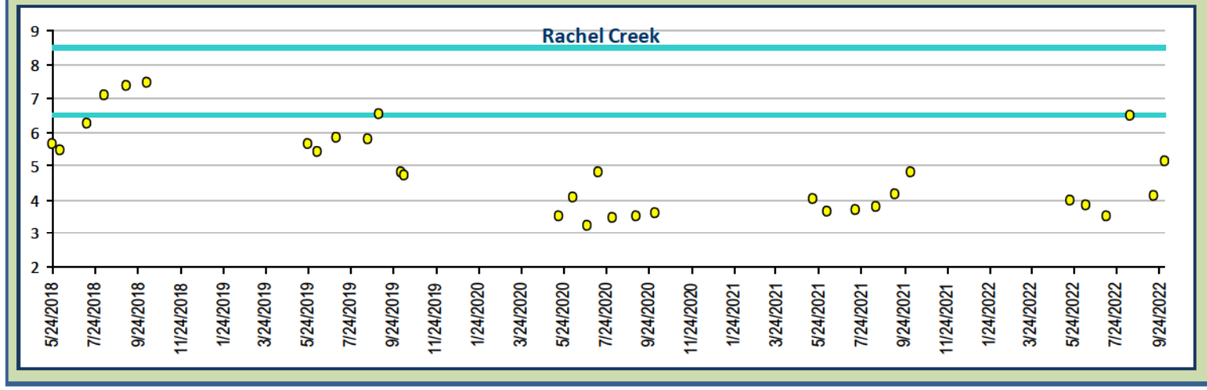


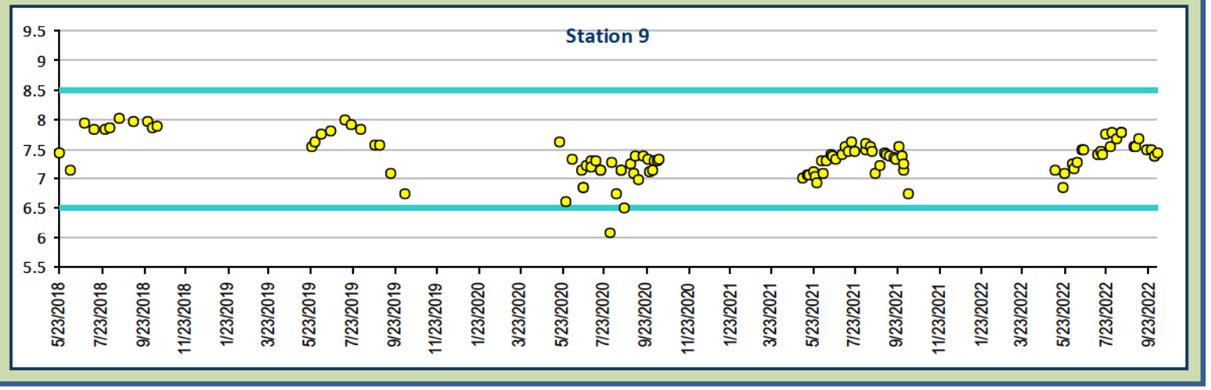












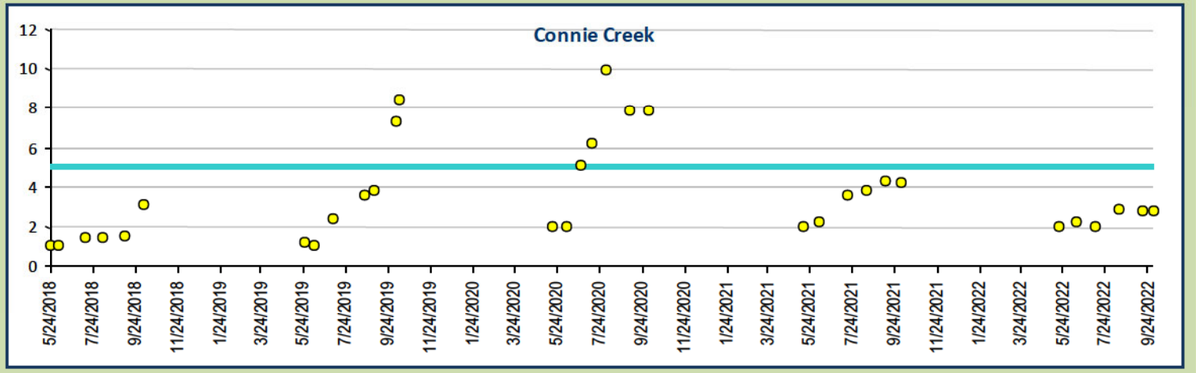
RED DOG MINE

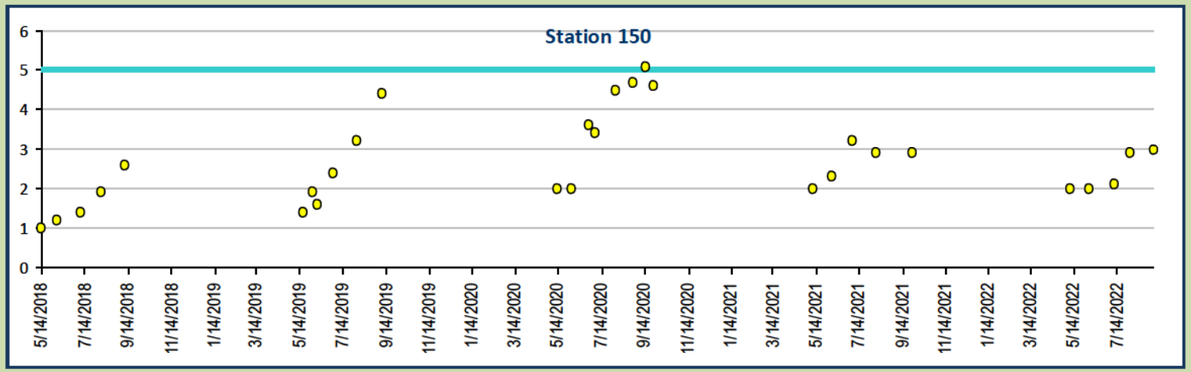
Water Monitoring Mine Drainage
Water Quality Profile I , 5-Year Trend Charts

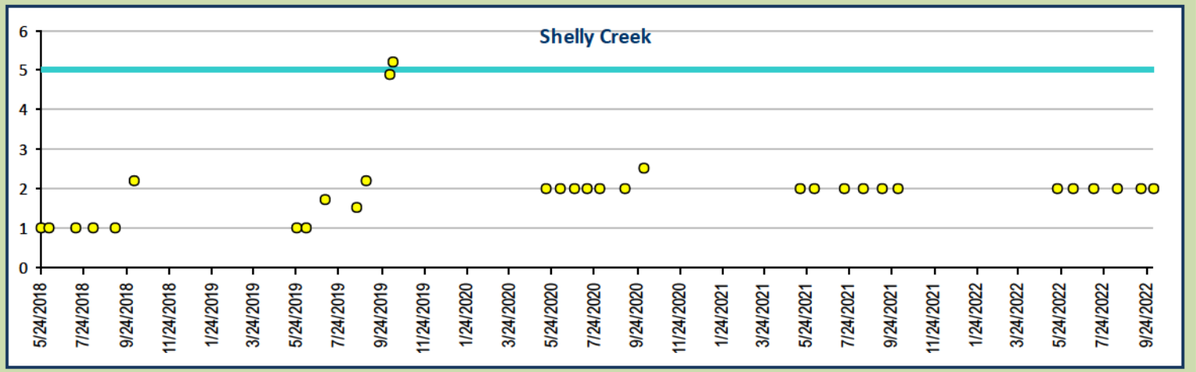
Selenium, Total Recoverable, units ug/L

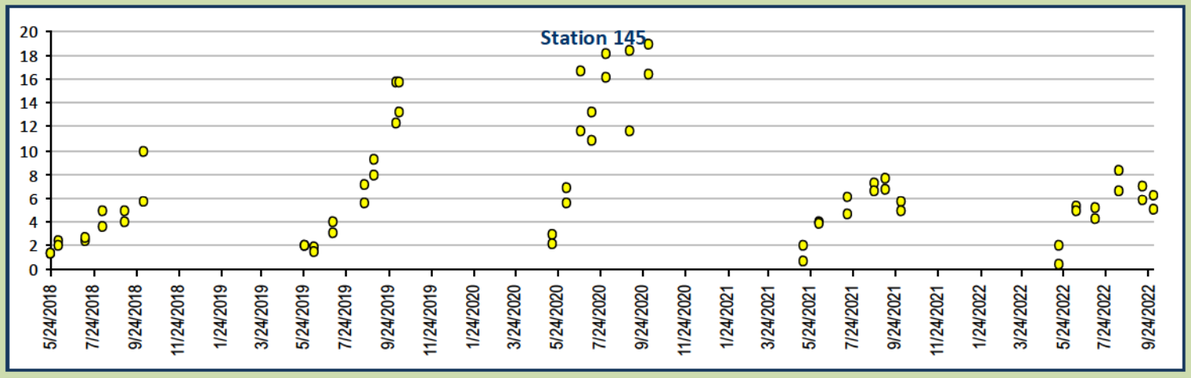
Aquatic Life - Fresh Water Chronic WQS ug/L

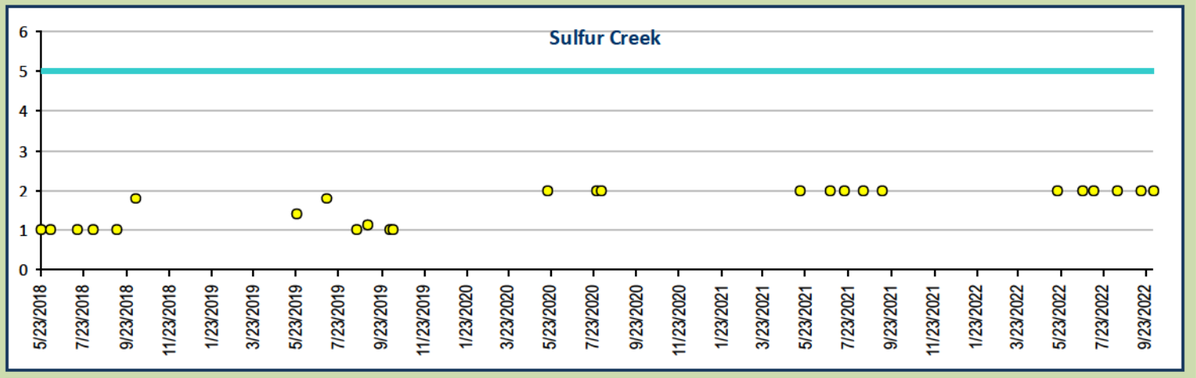
5 ug/L

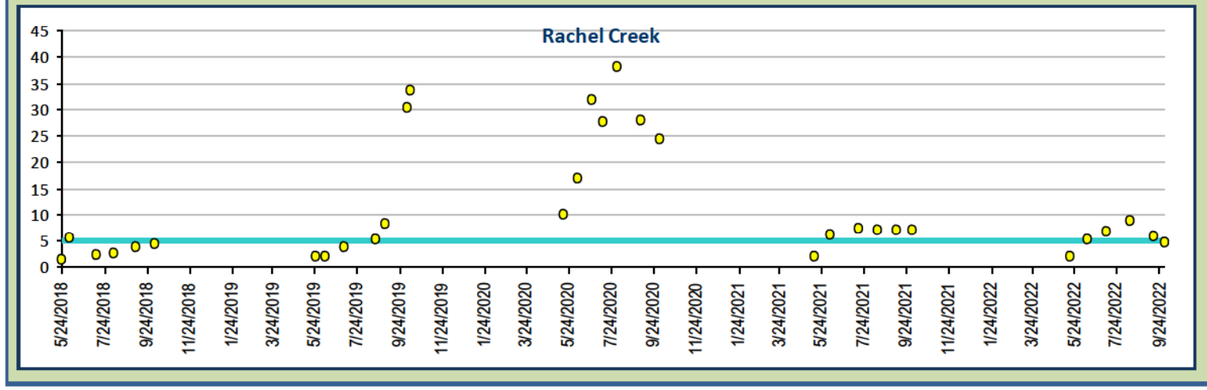


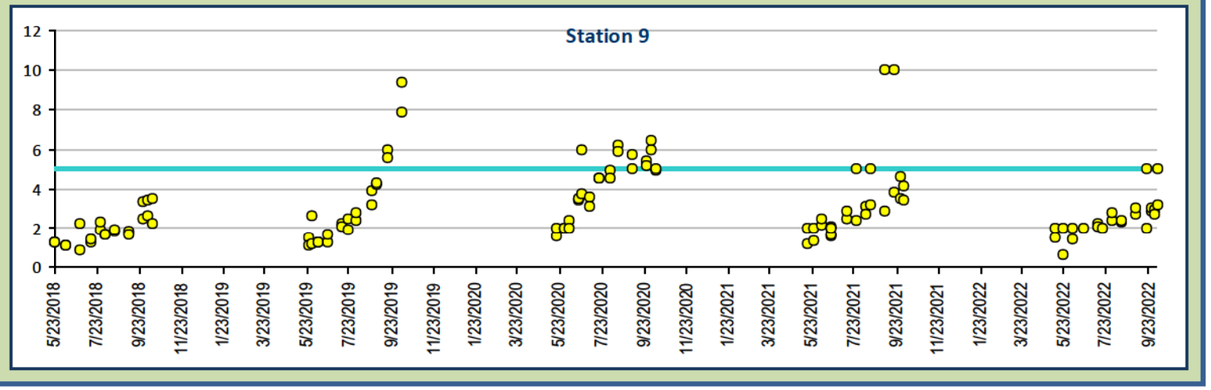








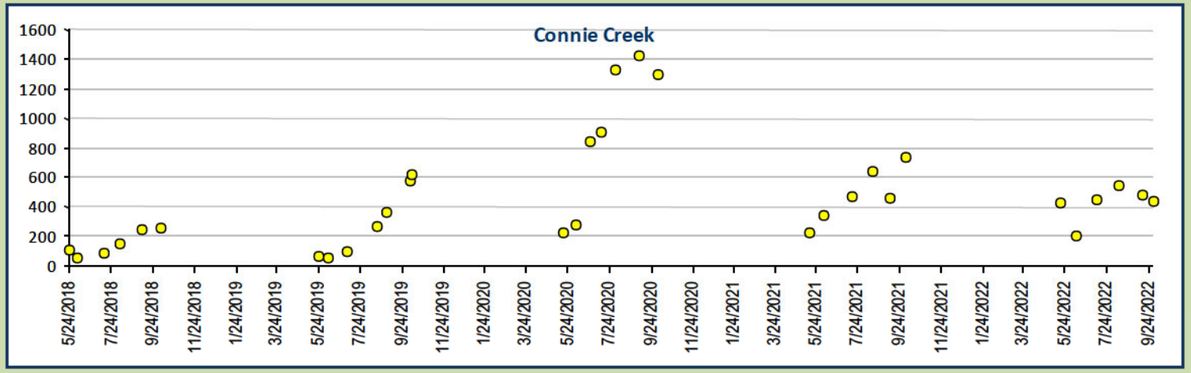


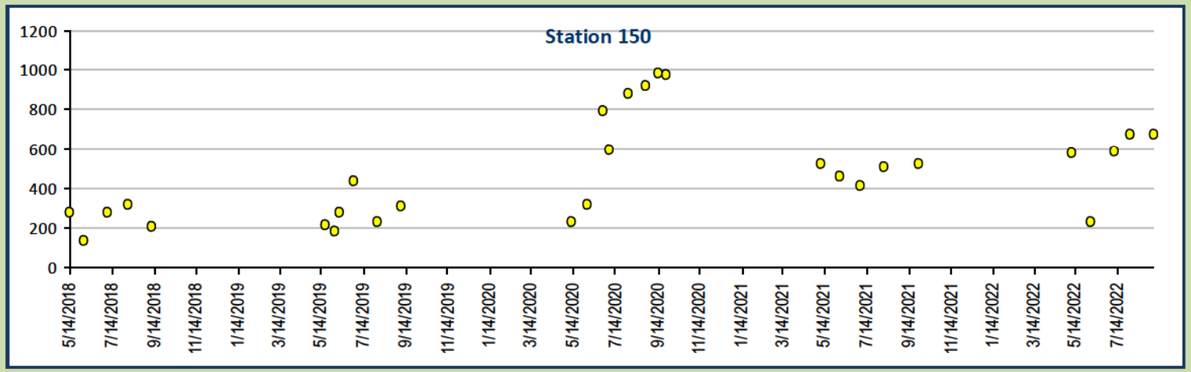


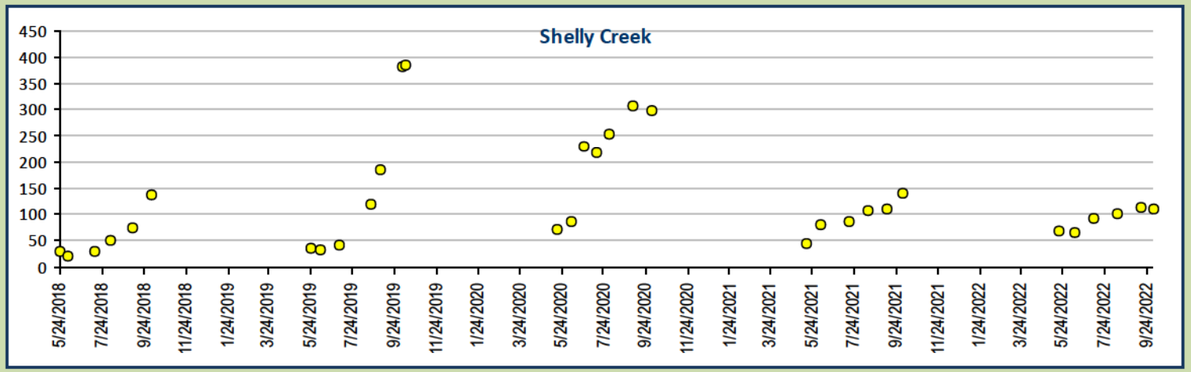
RED DOG MINE

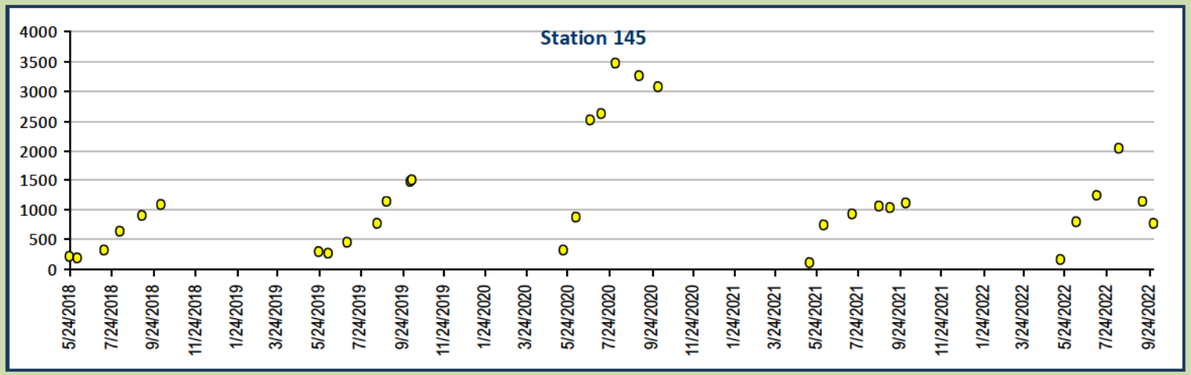
Water Monitoring Mine Drainage
Water Quality Profile I , 5-Year Trend Charts

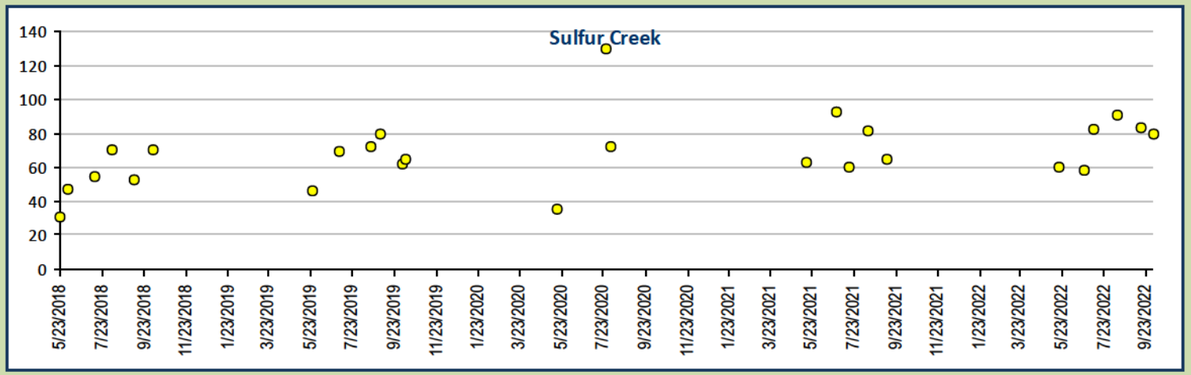
Sulfate, units mg/L

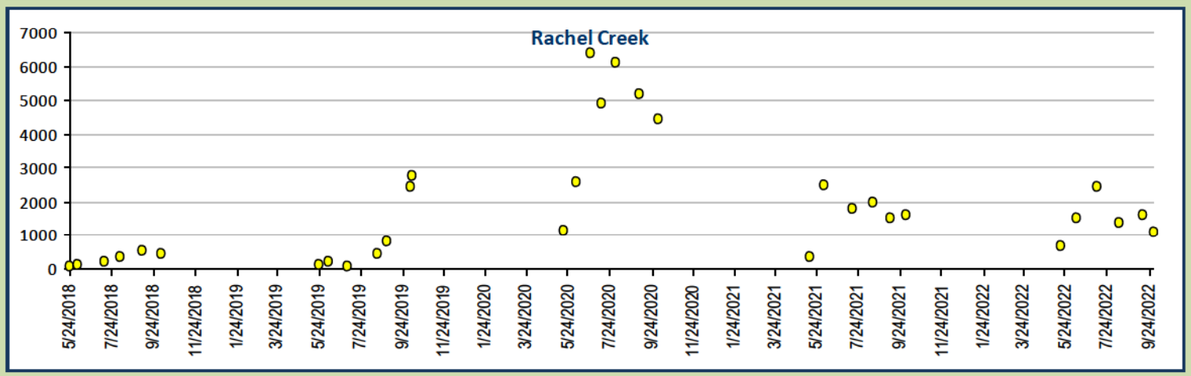


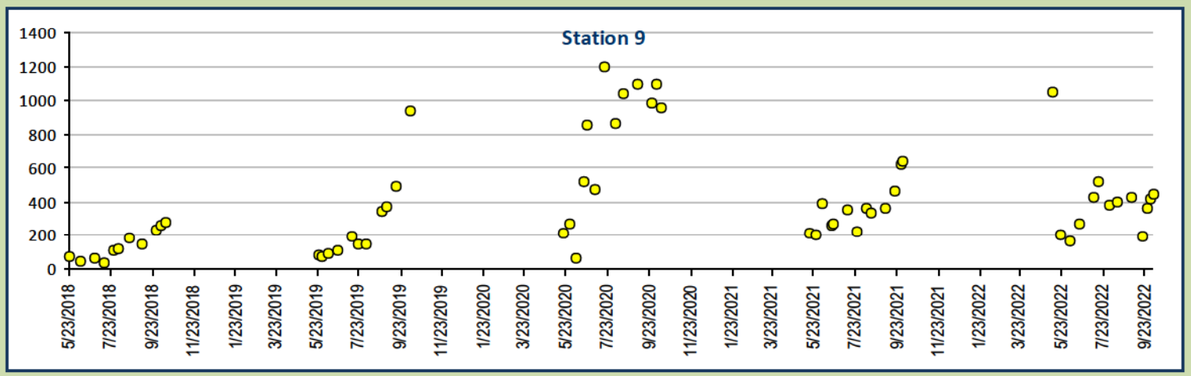












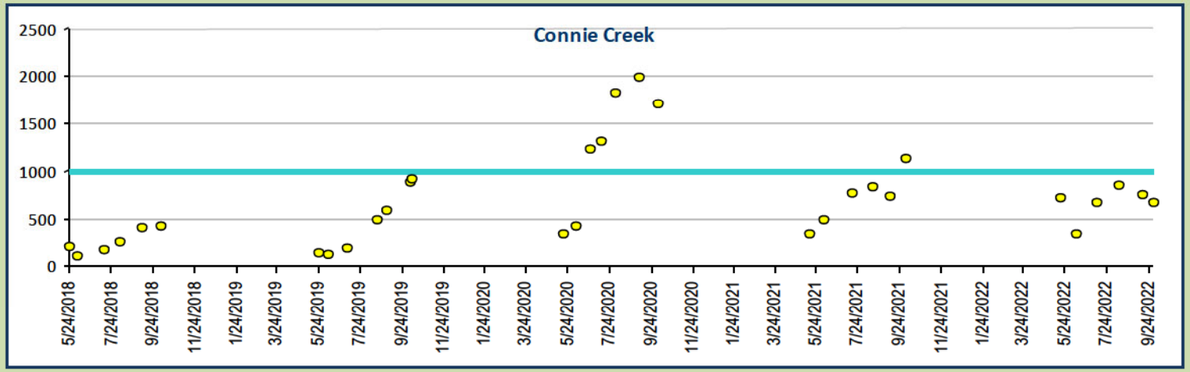
RED DOG MINE

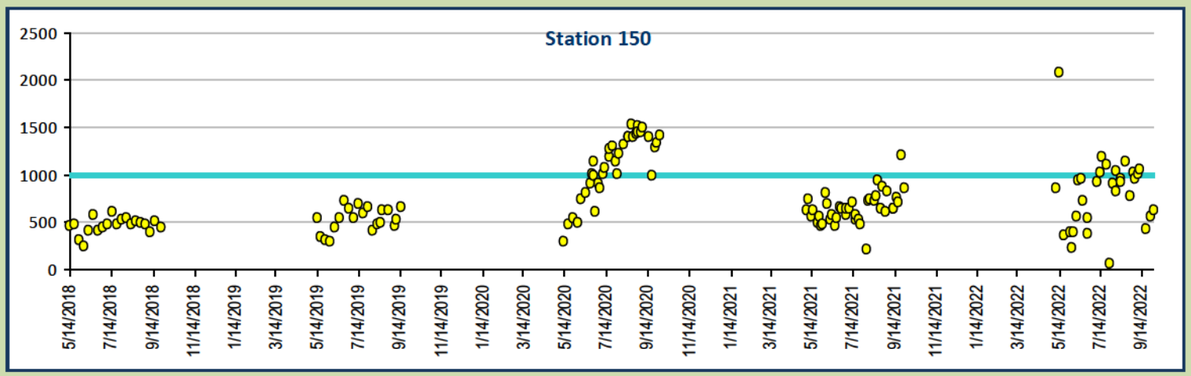
Water Monitoring Mine Drainage
Water Quality Profile I , 5-Year Trend Charts

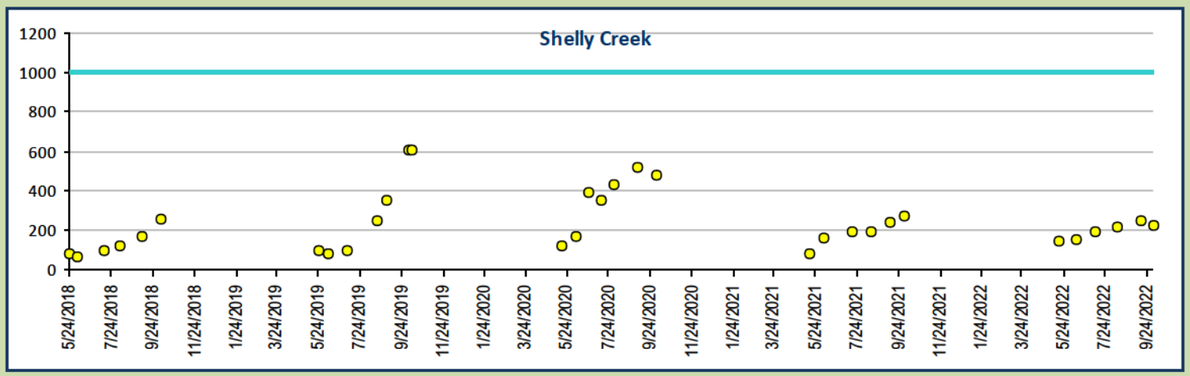
Total Dissolved Solids, units mg/L

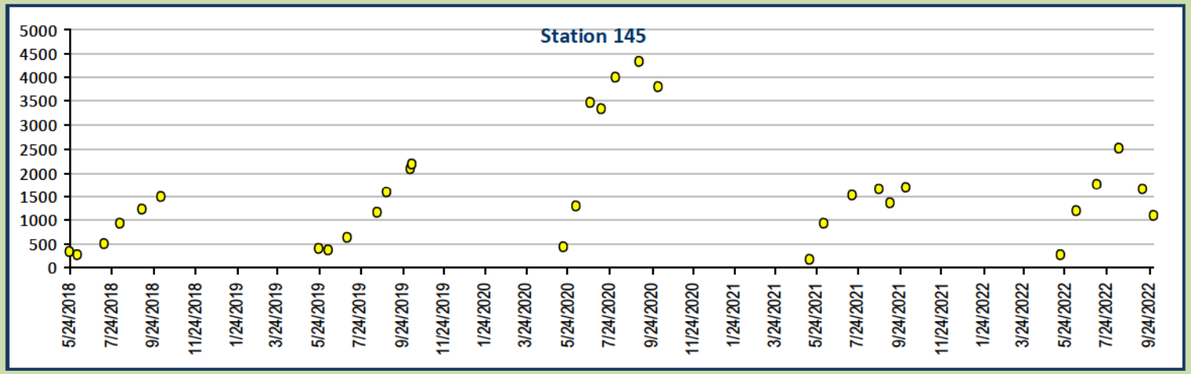
Site Specific WQS mg/L

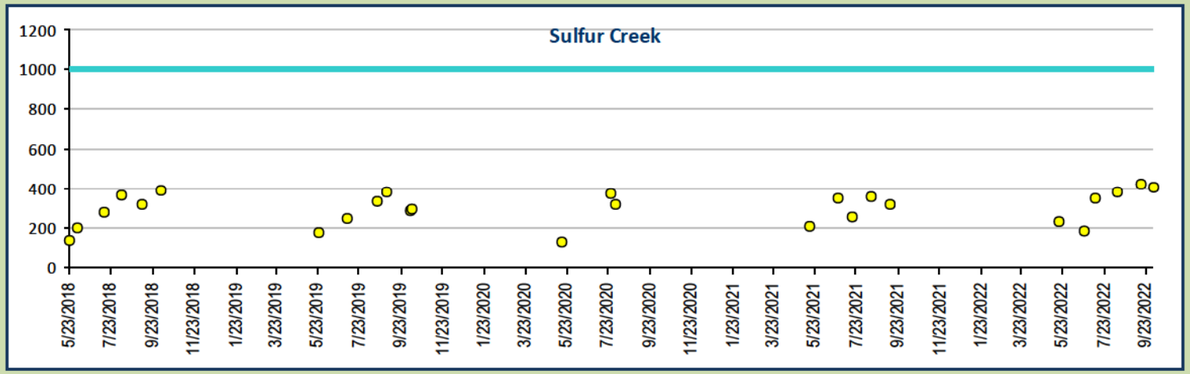
1000 mg/L

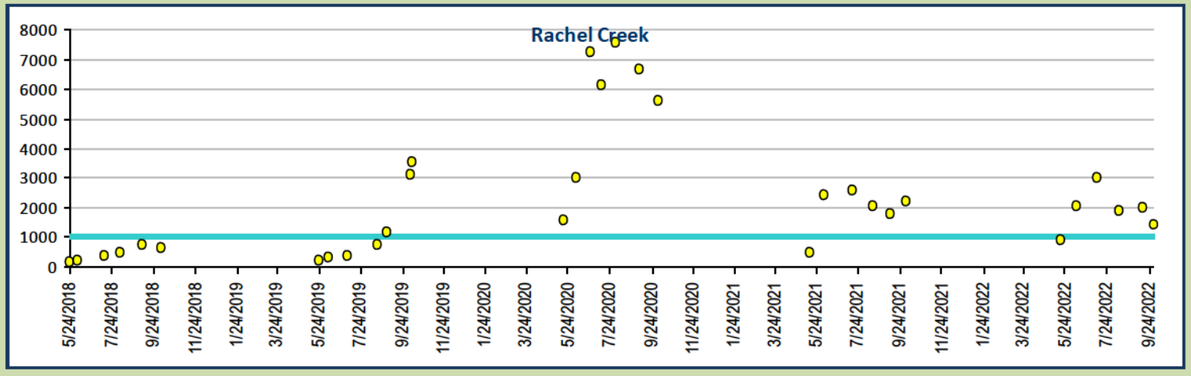


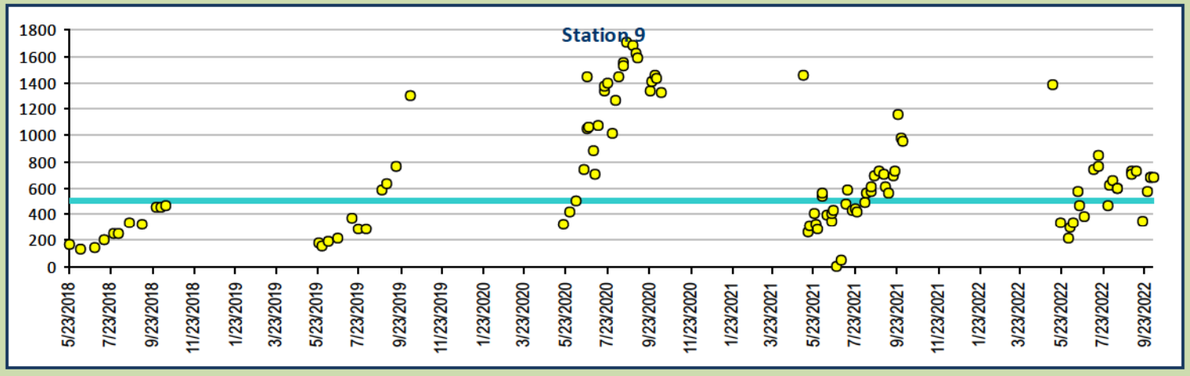












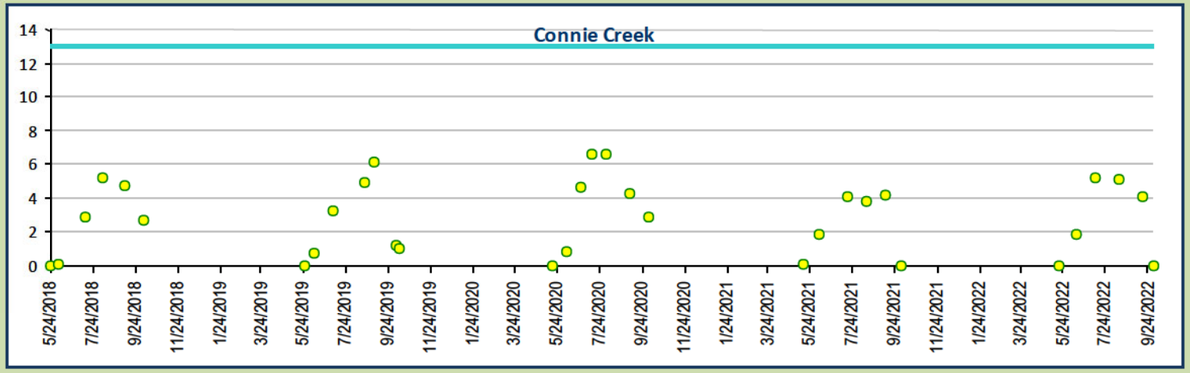
RED DOG MINE

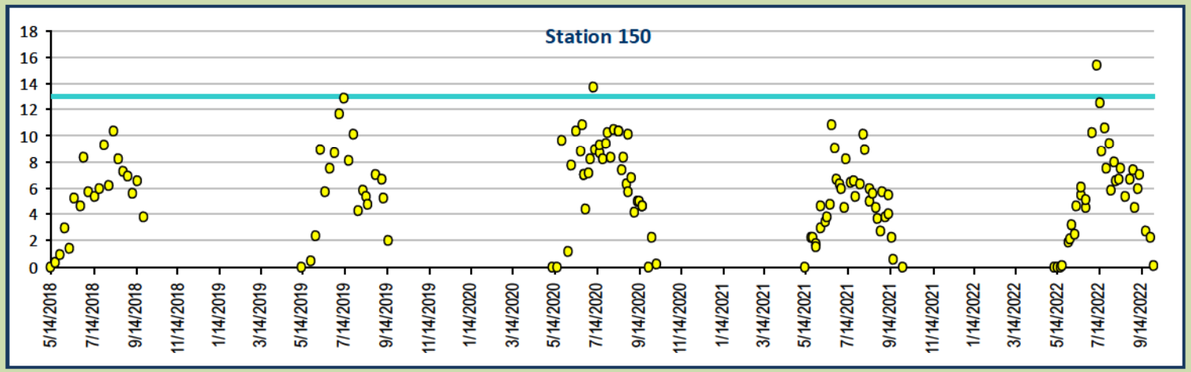
Water Monitoring Mine Drainage
Water Quality Profile I , 5-Year Trend Charts

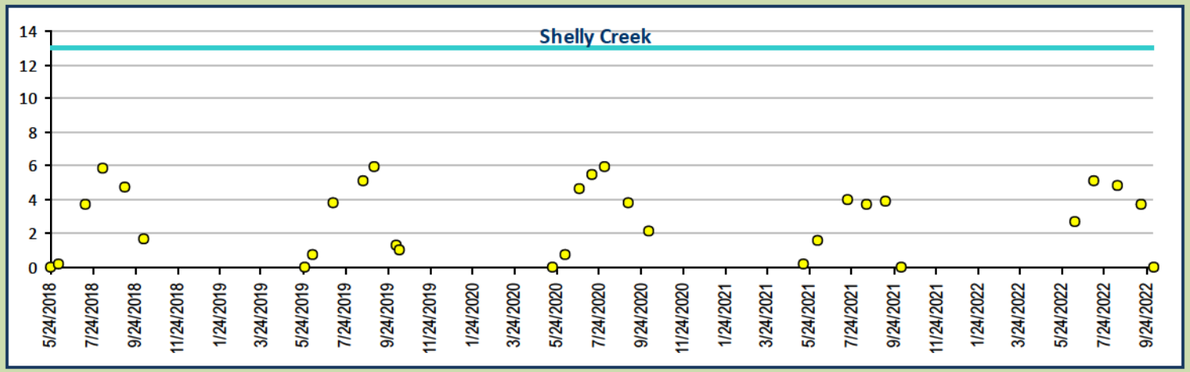
Temperature Field, Celsius

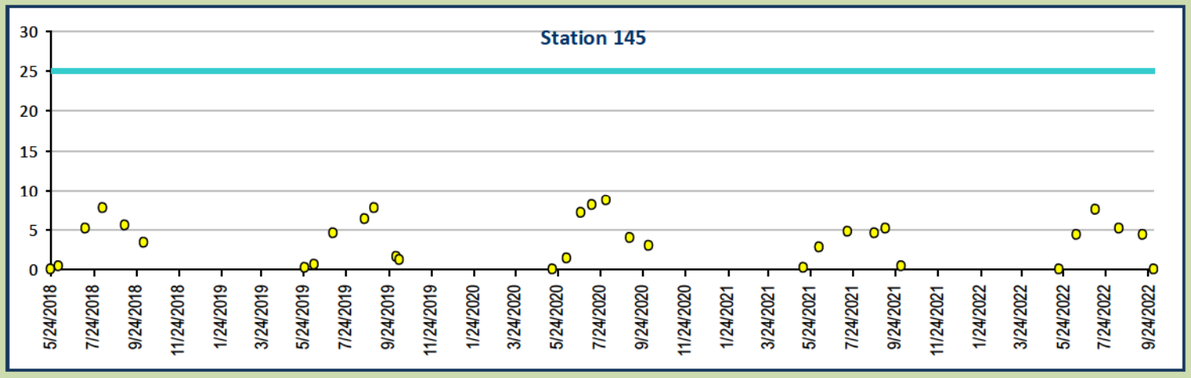
Site Specific WQS mg/L

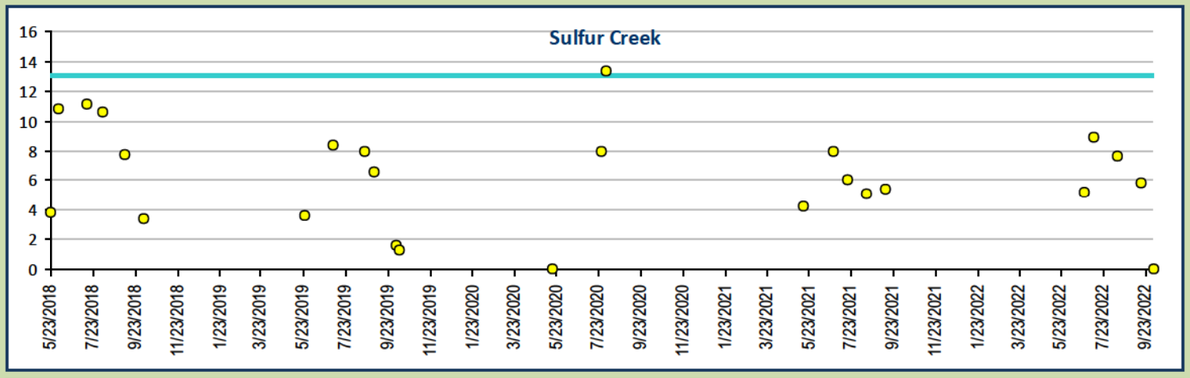
13 Celsius

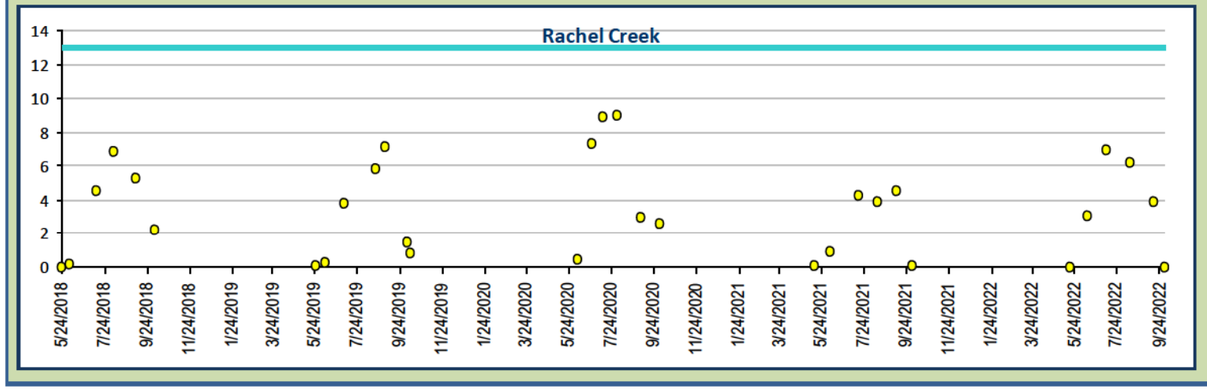


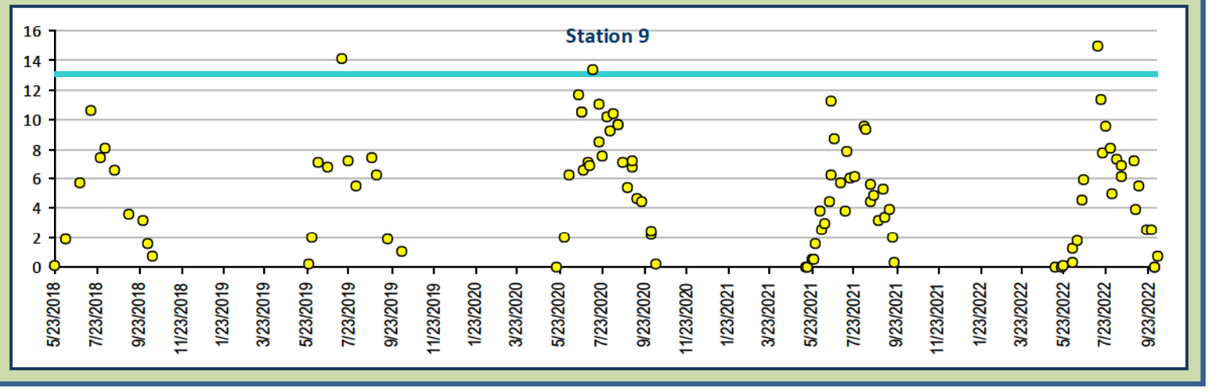








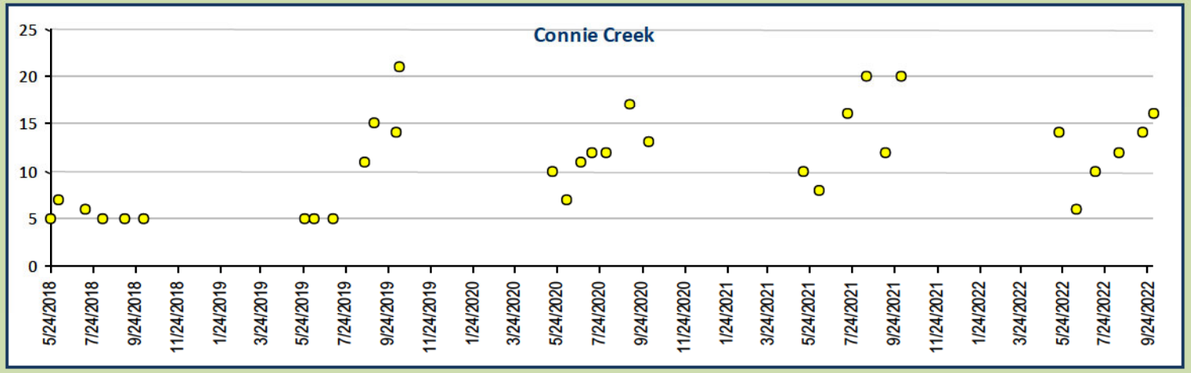


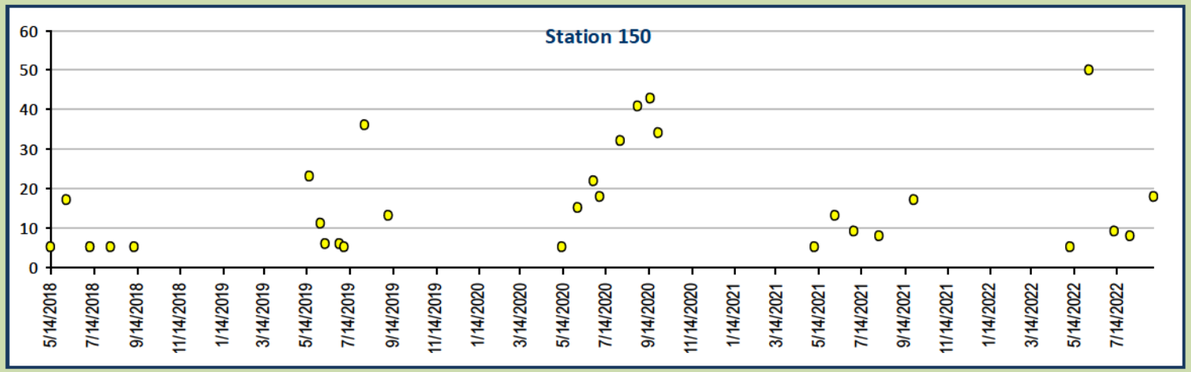


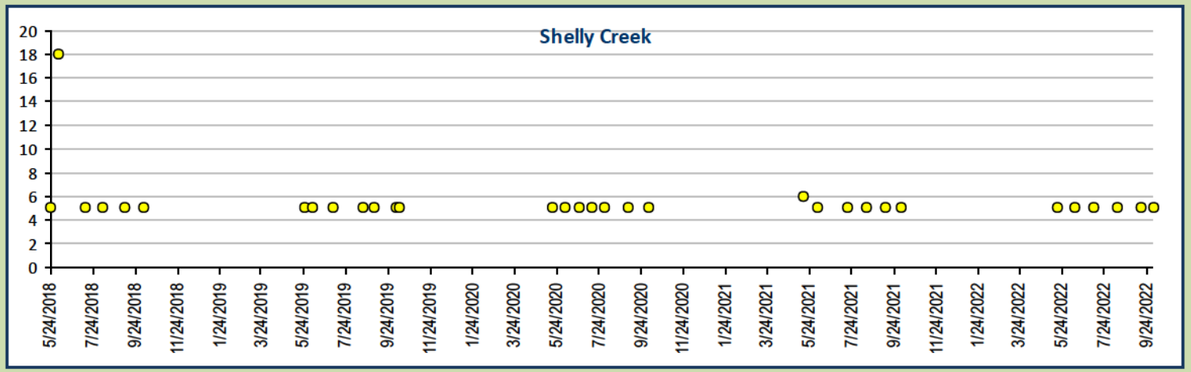
RED DOG MINE

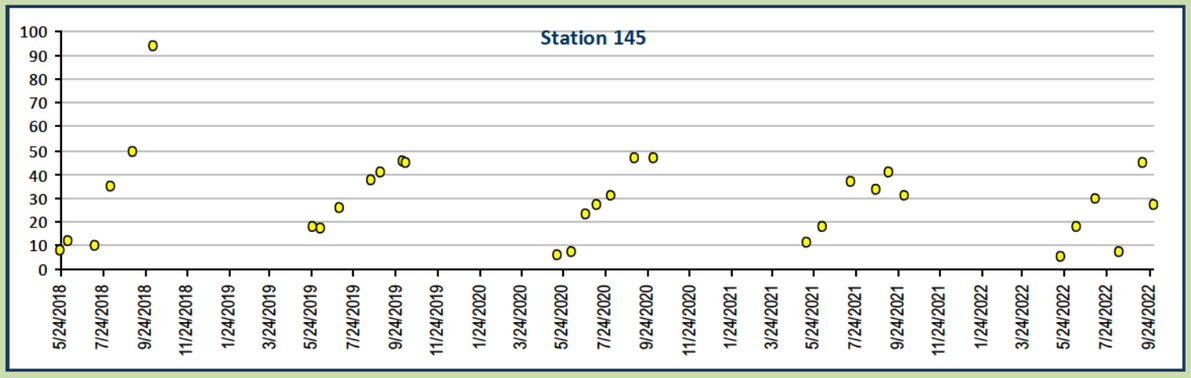
Water Monitoring Mine Drainage
Water Quality Profile I , 5-Year Trend Charts

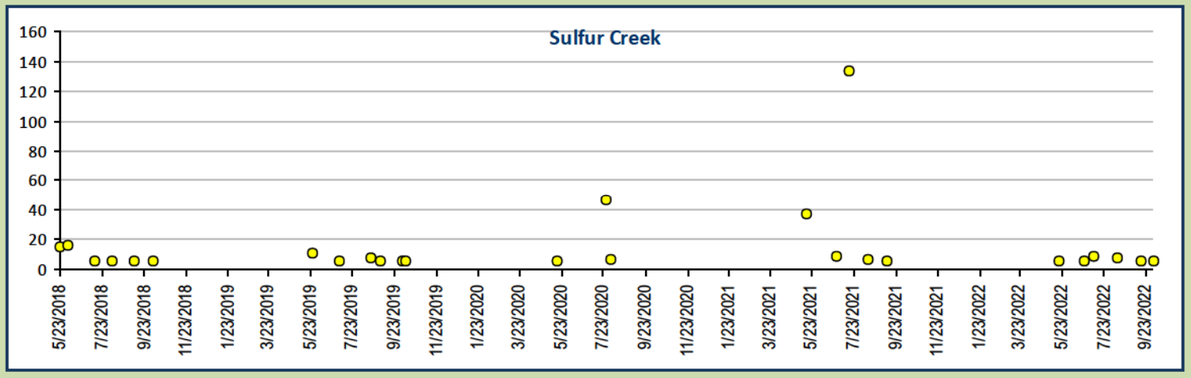
Total Suspended Solids, units mg/L

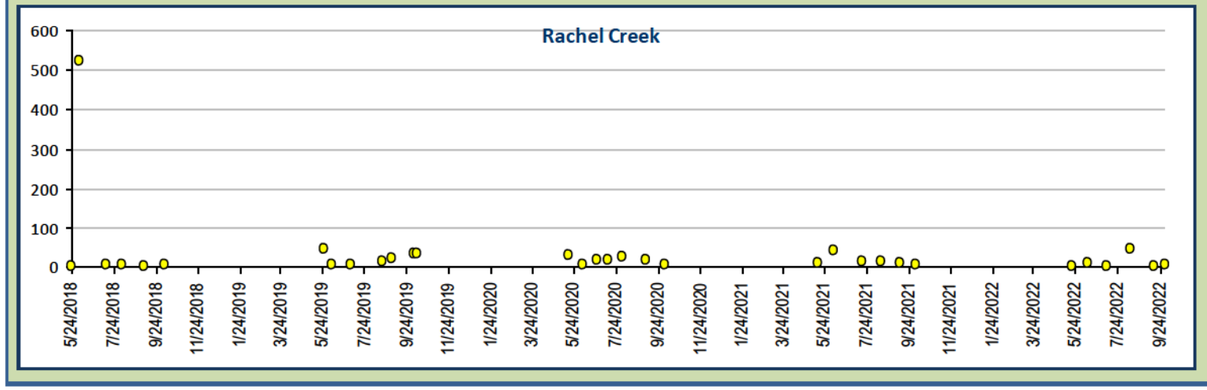


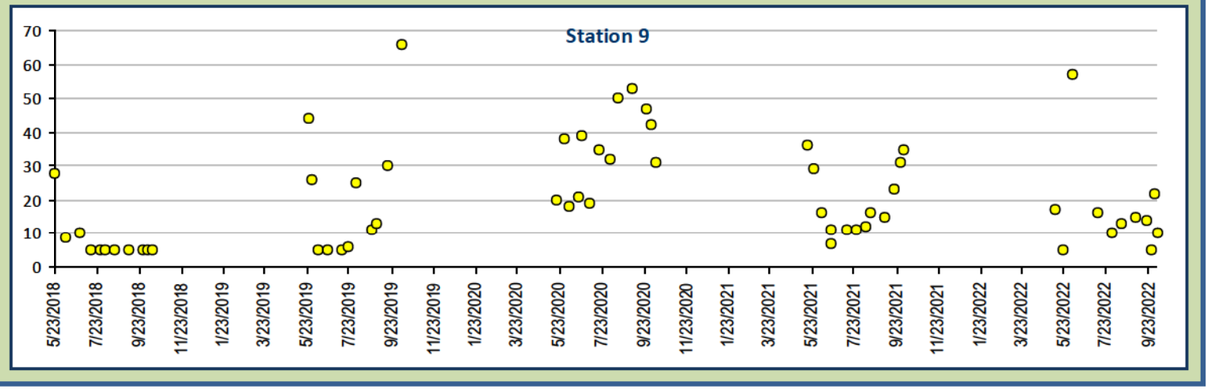












RED DOG MINE

Water Monitoring Drainage
Water Quality Profile I , 5-Year Trend Charts

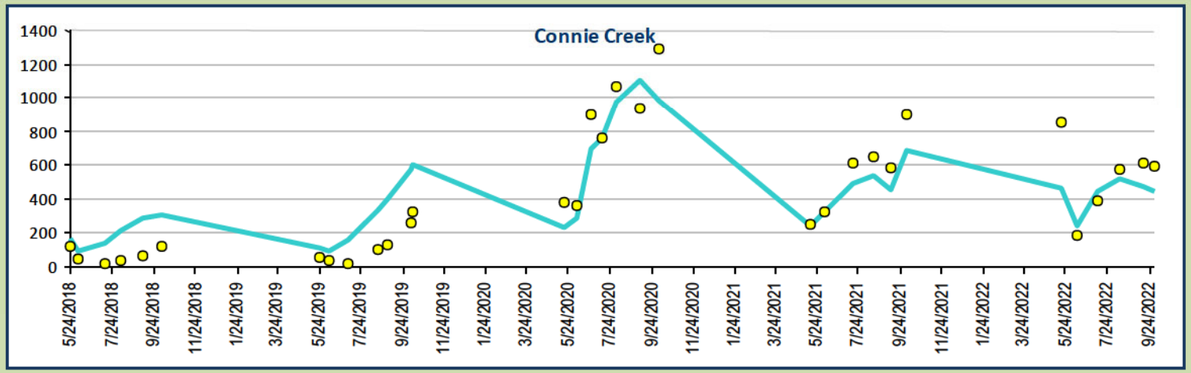
Zinc, Total Recoverable, units ug/L

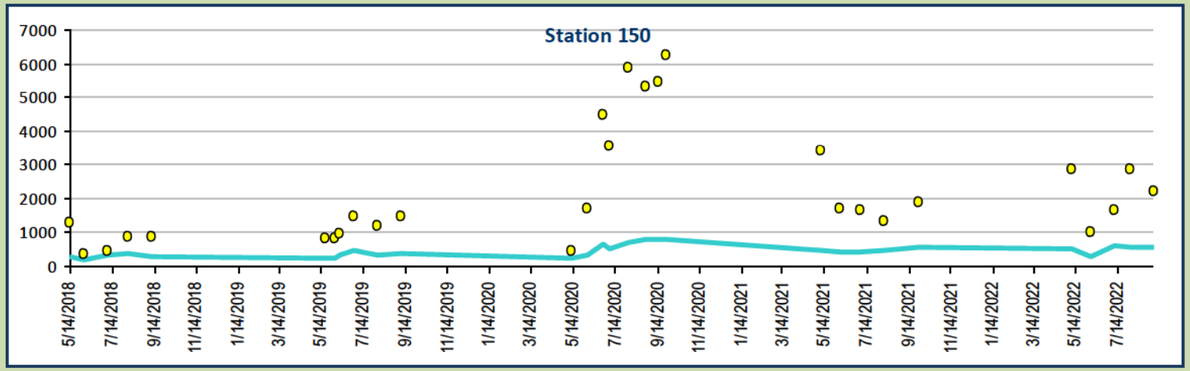
Aquatic Life - Fresh Water Acute WQS ug/L

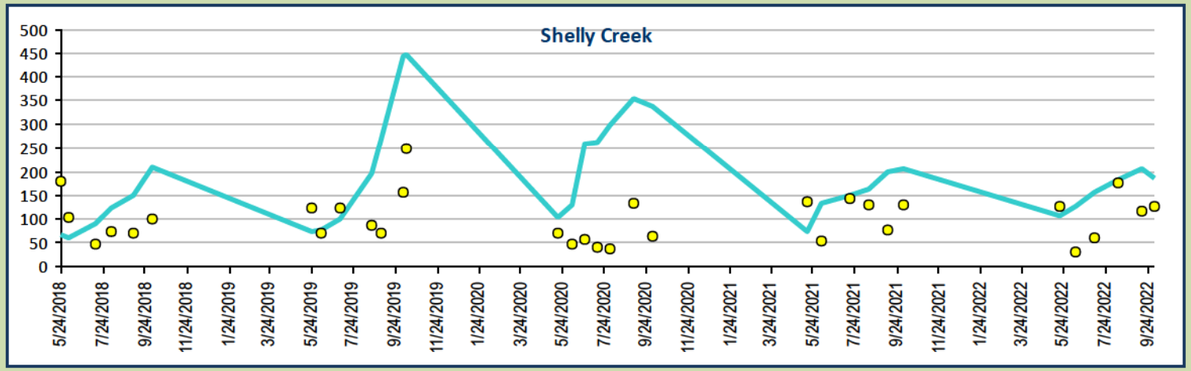
Hardness Dependent Calculation

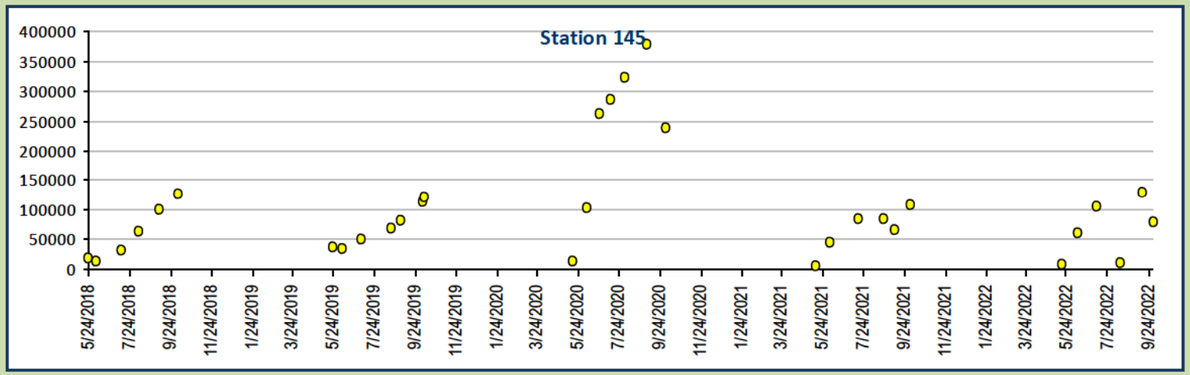
=EXP(0.8473*(LN(*hardness))+0.884)

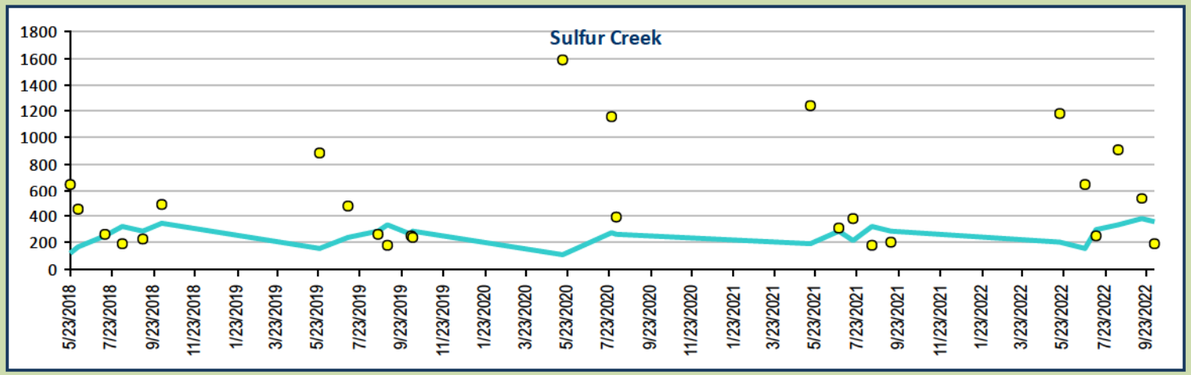
* Calculated using Standard Methods 2340B

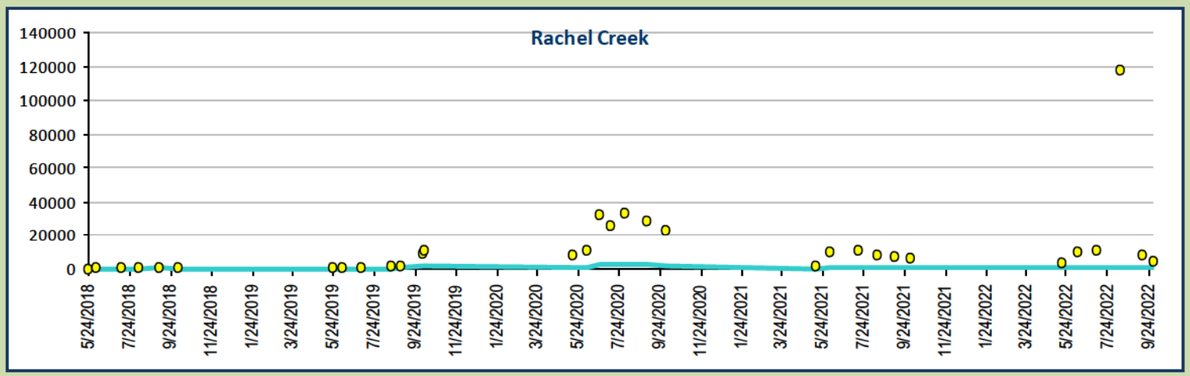


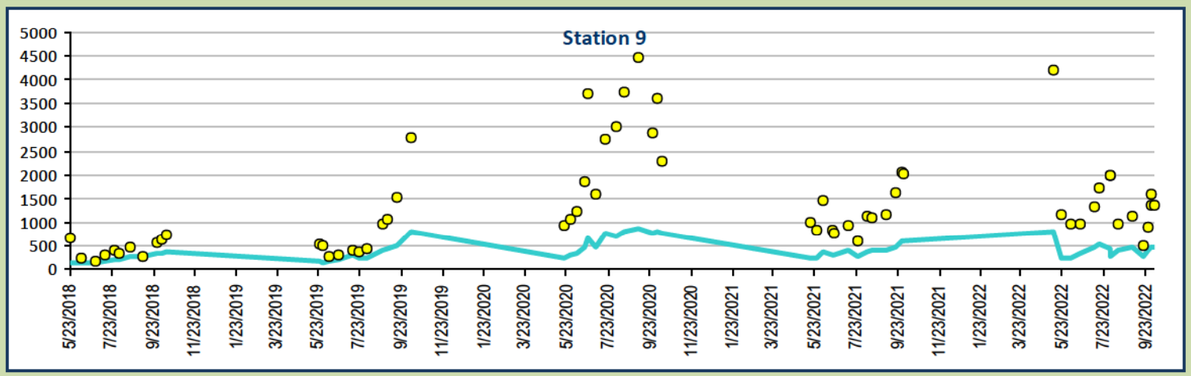












Appendix E: Water Quality Profile I Charts – Bons Creek Monitoring Stations

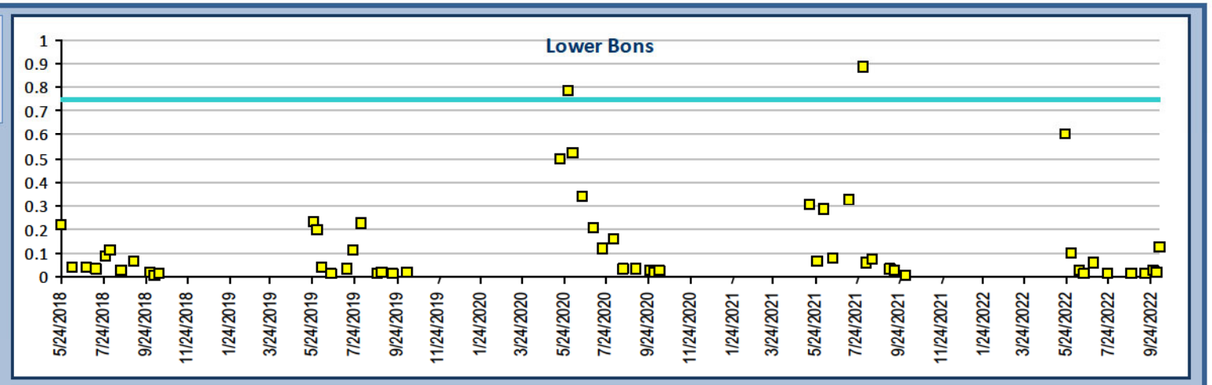
RED DOG MINE

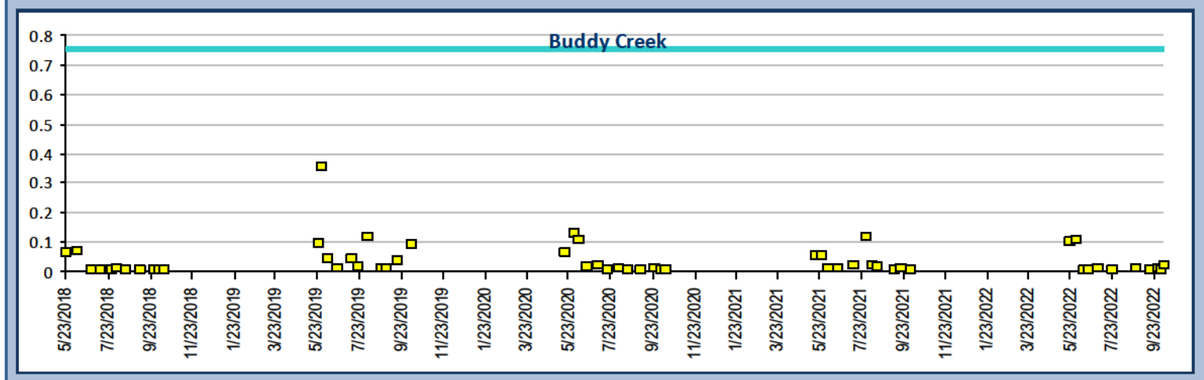
Water Monitoring Bons Creek Drainage
Water Quality Profile I , 5-Year Trend Charts

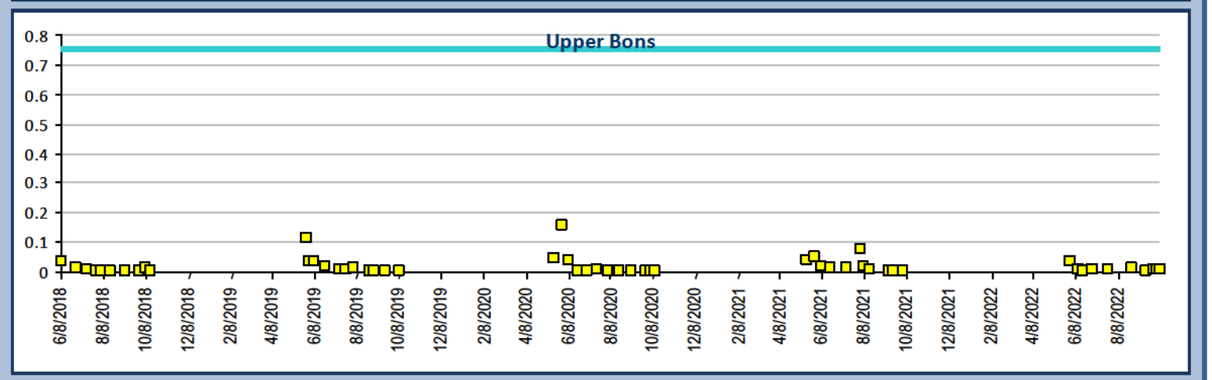
Aluminum, Total Recoverable, units mg/L

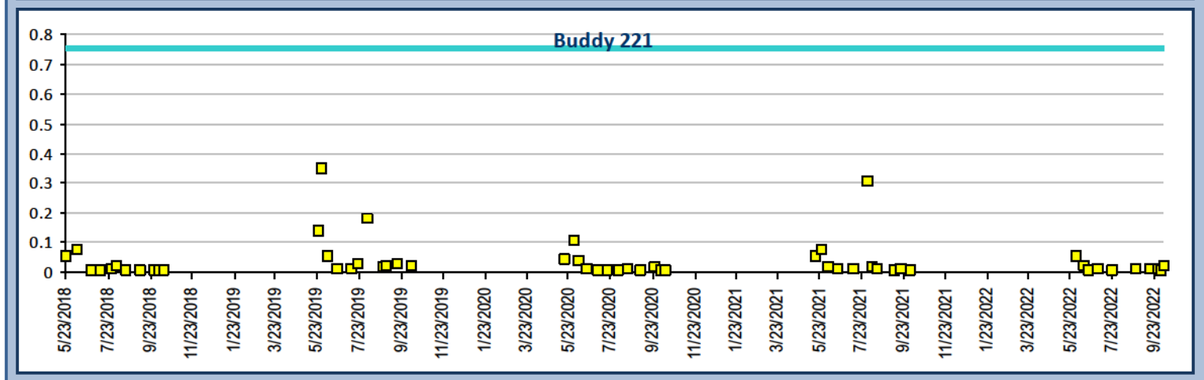
Aquatic Life - Fresh Water Chronic WQS mg/L

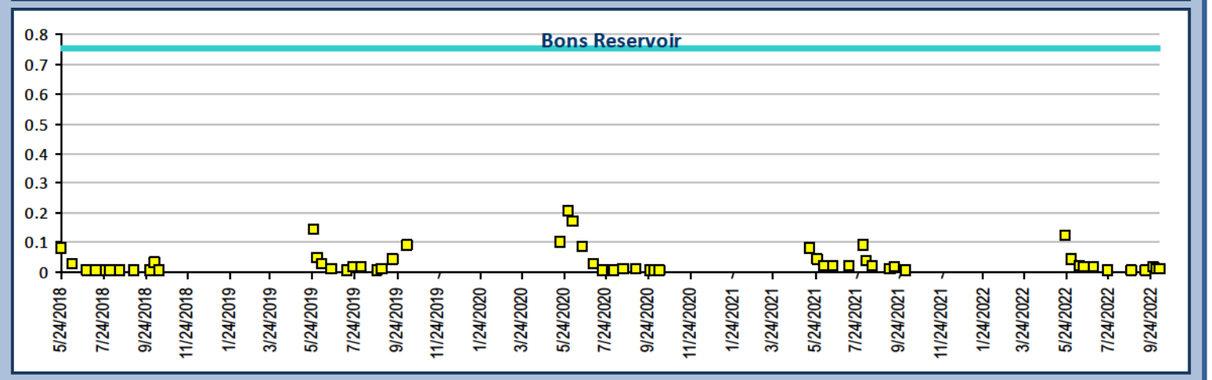
If pH > 7 and hardness > 50. then WQS = 0.75mg/l

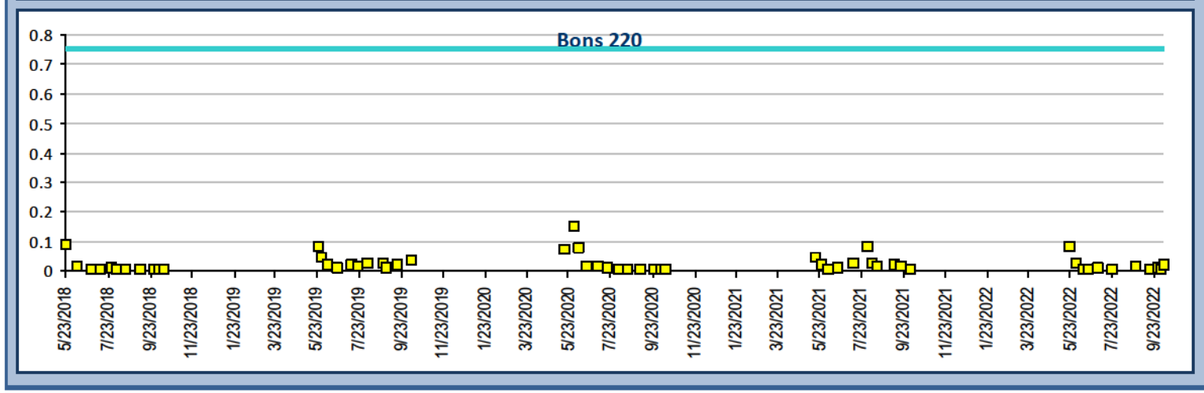


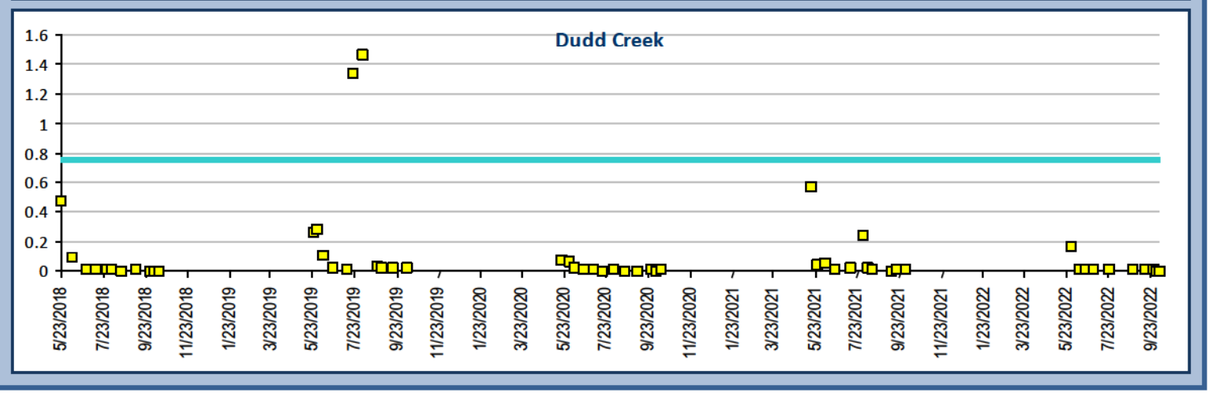












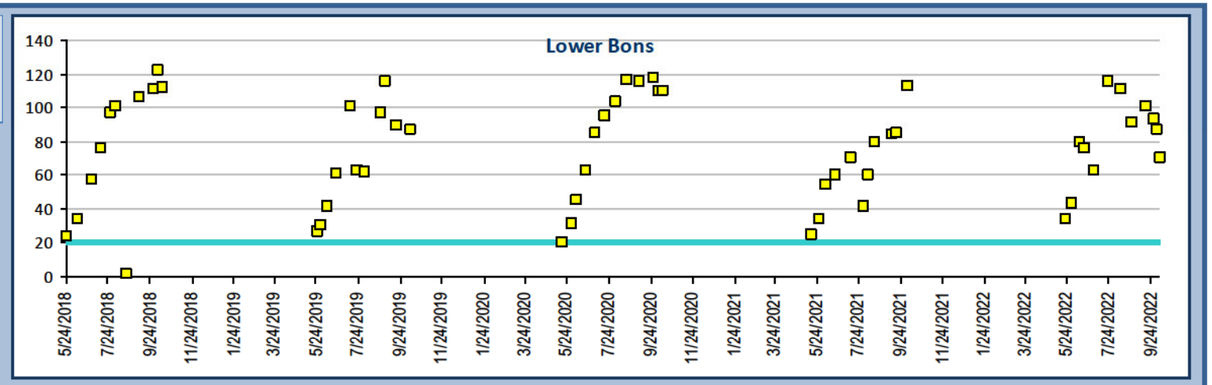
RED DOG MINE

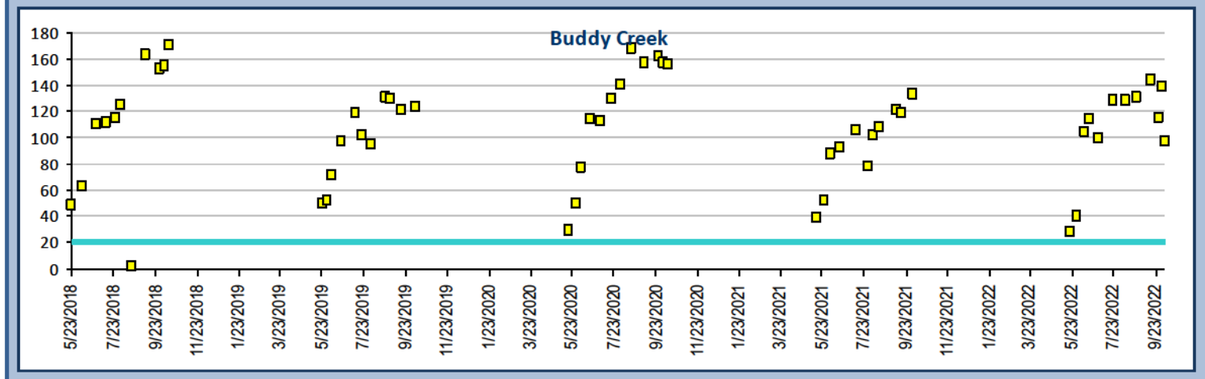
Water Monitoring Bons Creek Drainage
Water Quality Profile I , 5-Year Trend Charts

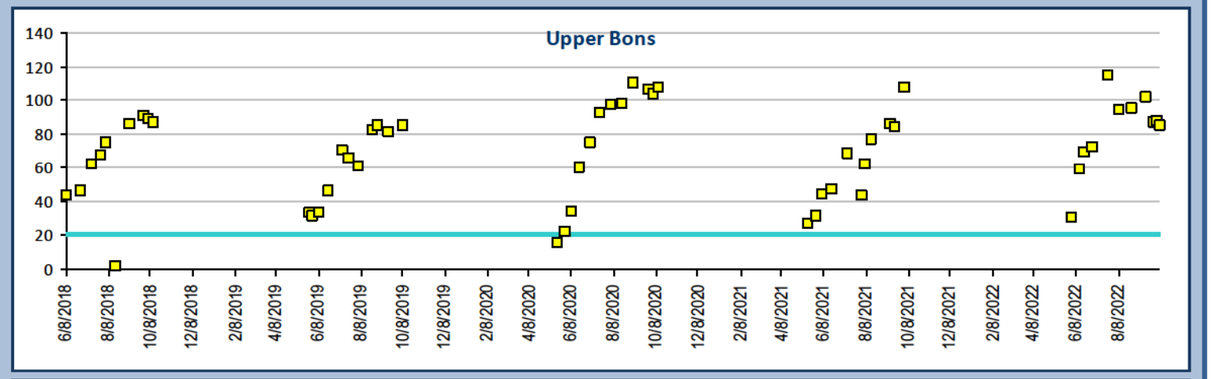
Alkalinity (as CaCO3), units mg/L

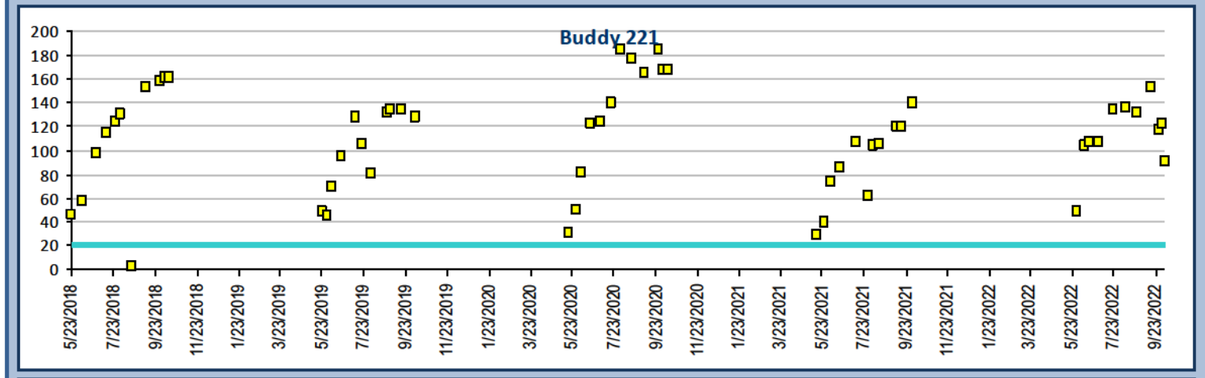
Aquatic Life - Fresh Water Chronic WQS mg/L

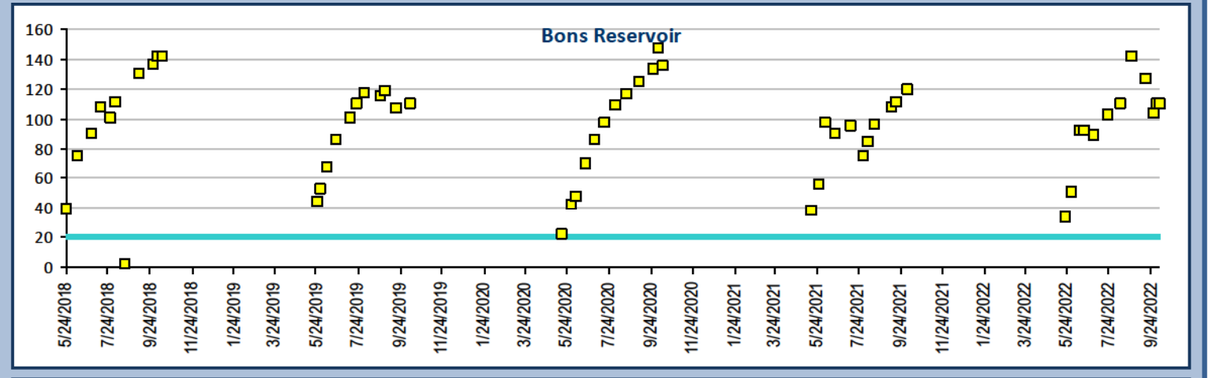
20 mg/L minimum

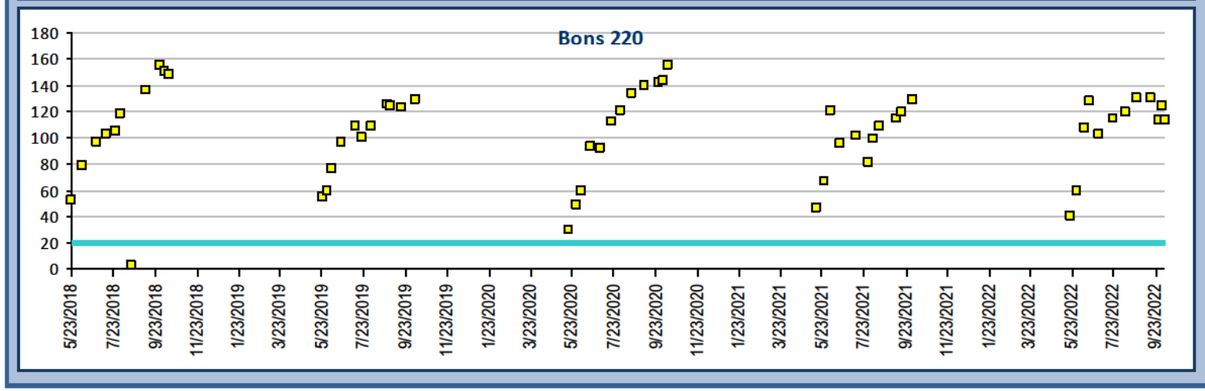


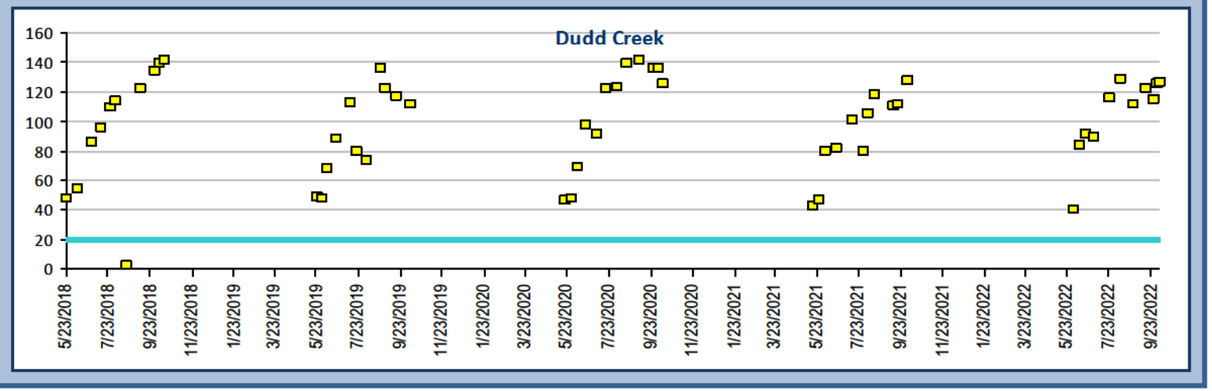








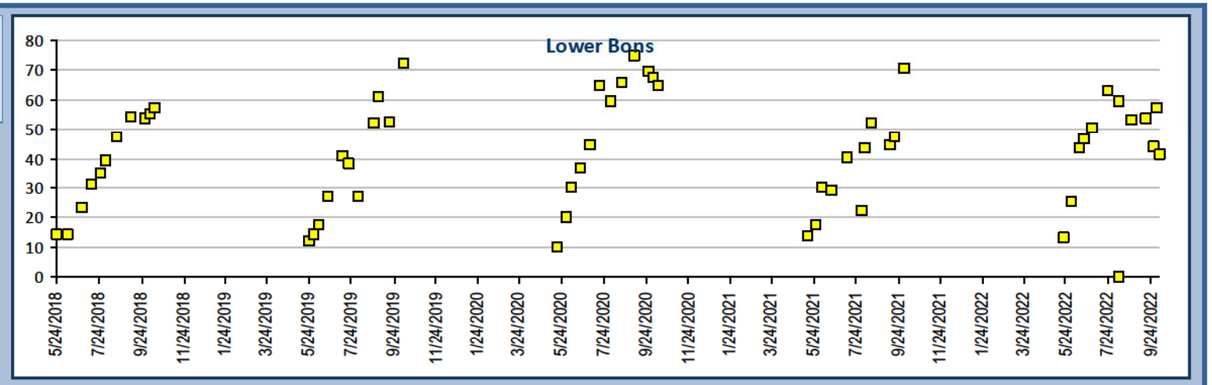


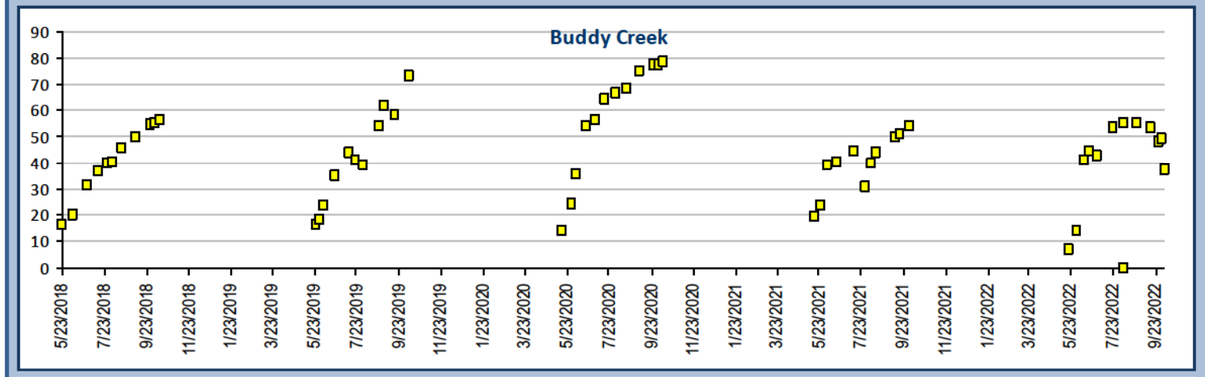


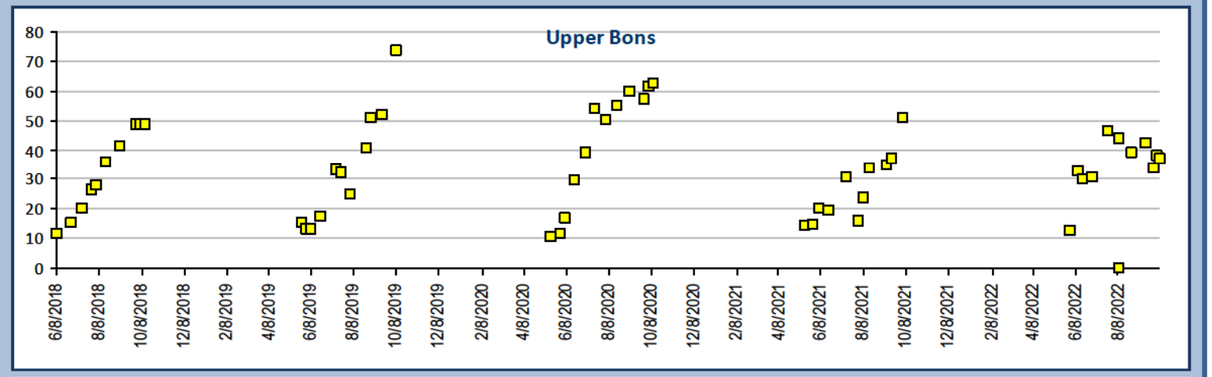
RED DOG MINE

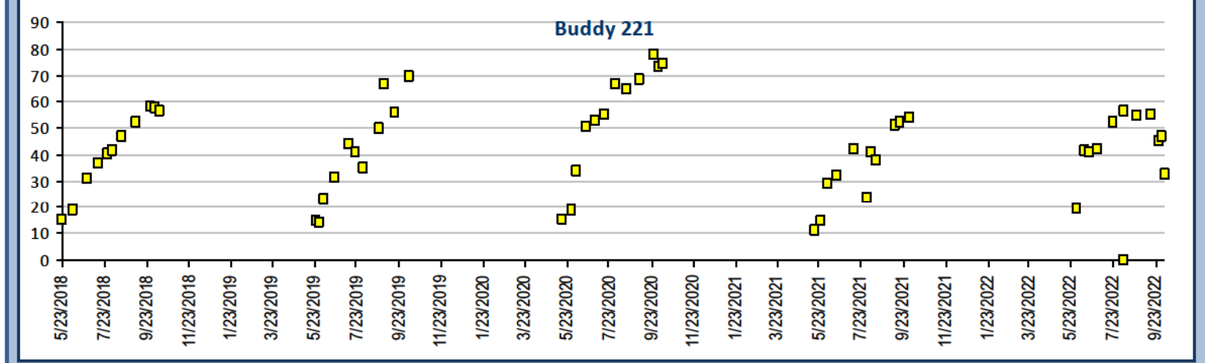
Water Monitoring Bons Creek Drainage
Water Quality Profile I , 5-Year Trend Charts

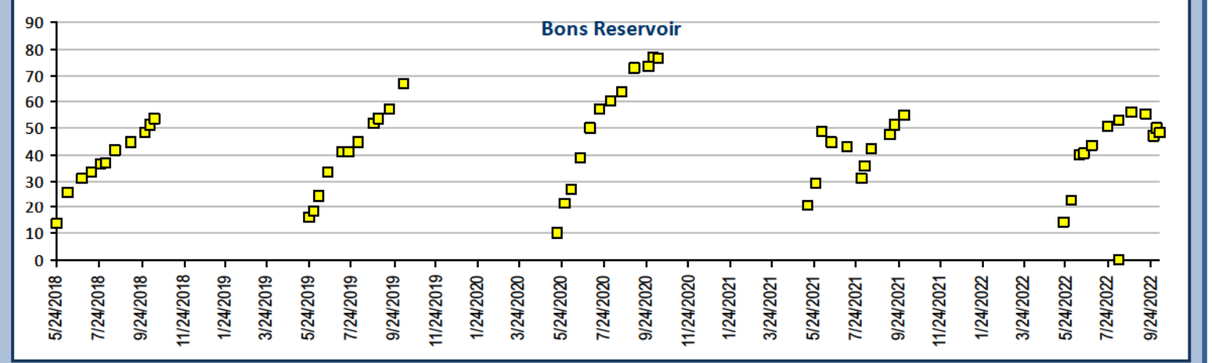
Calcium, Total Recoverable, units mg/L

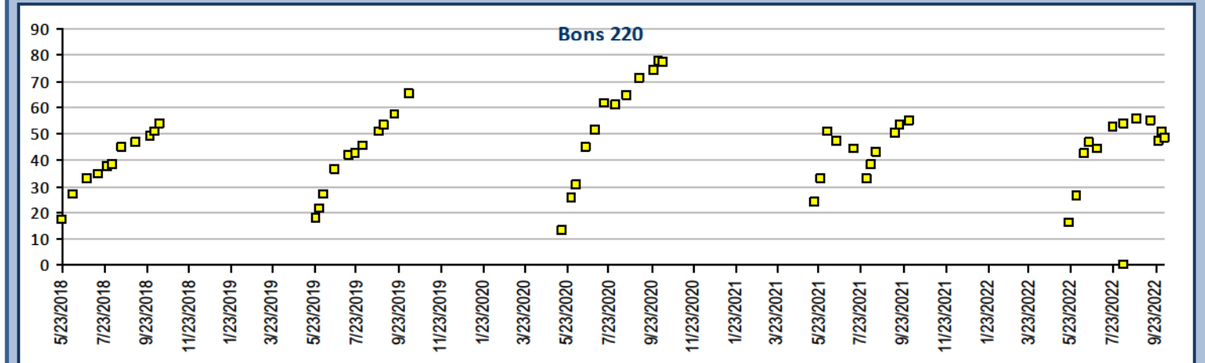


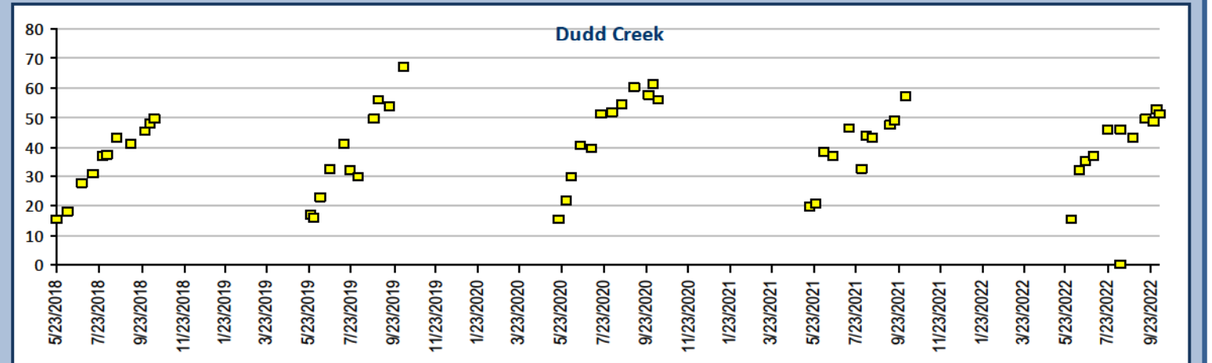












RED DOG MINE

Water Monitoring Bons Creek Drainage
Water Quality Profile I , 5-Year Trend Charts

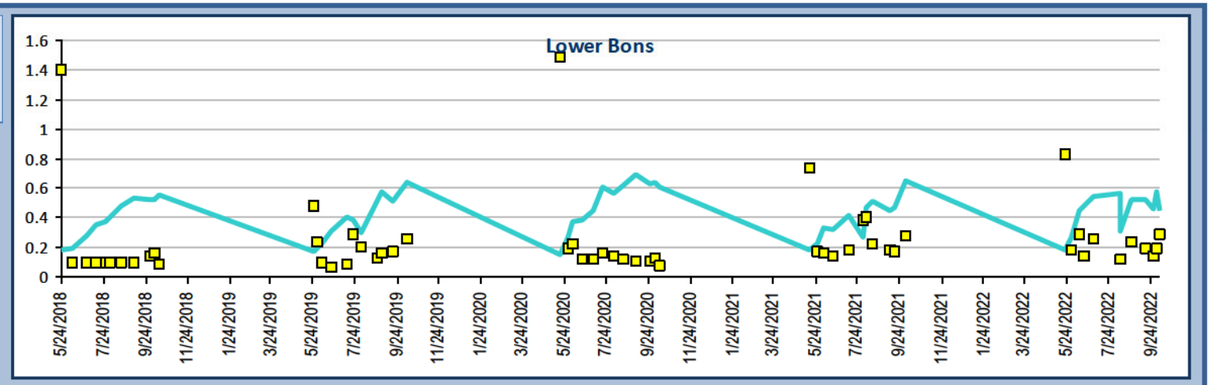
Cadmium, Total Recoverable, units ug/L

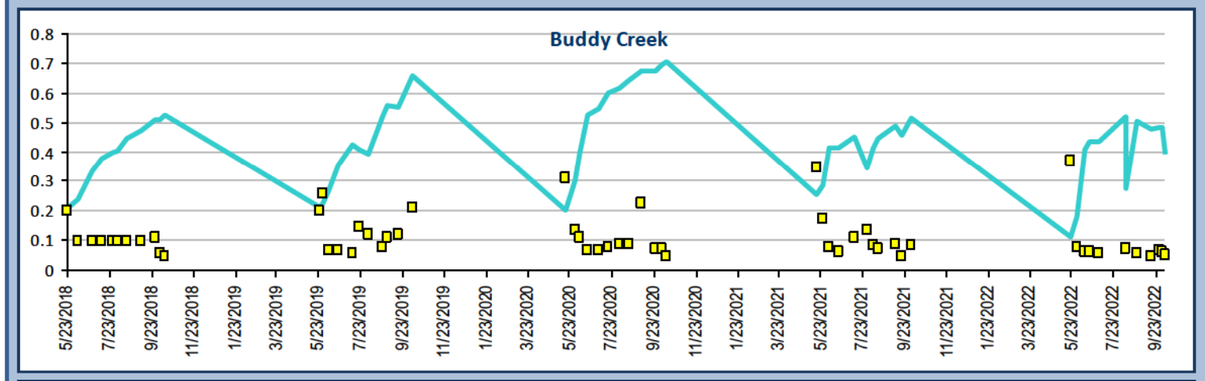
Aquatic Life - Fresh Water Chronic WQS ug/L

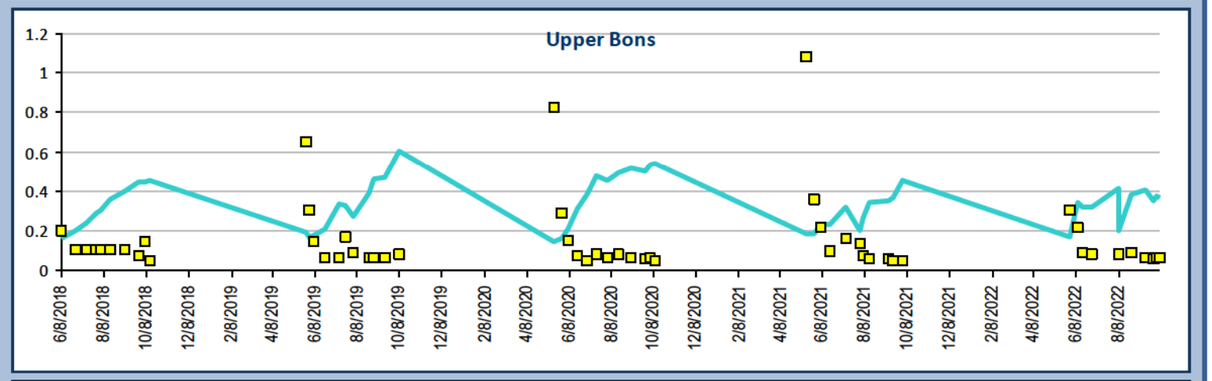
Hardness Dependent Calculation

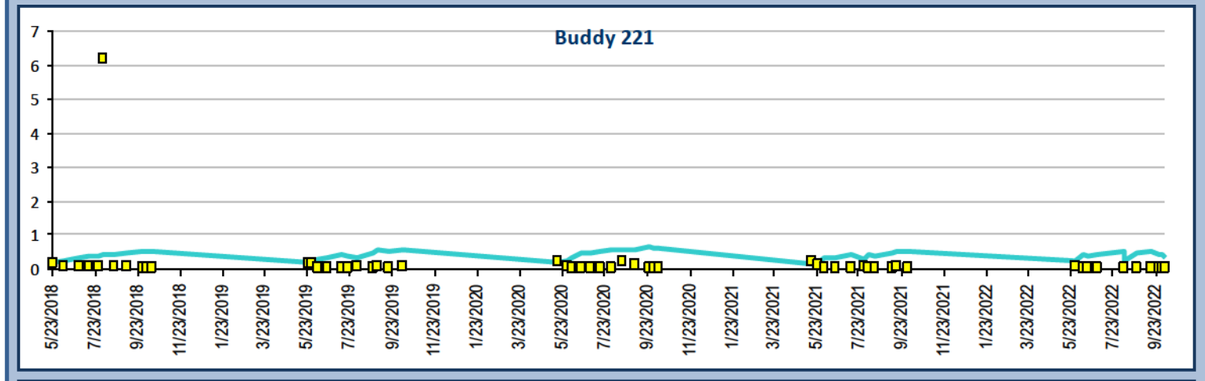
=EXP(0.7409*(LN(calc *hardness))-4.719)

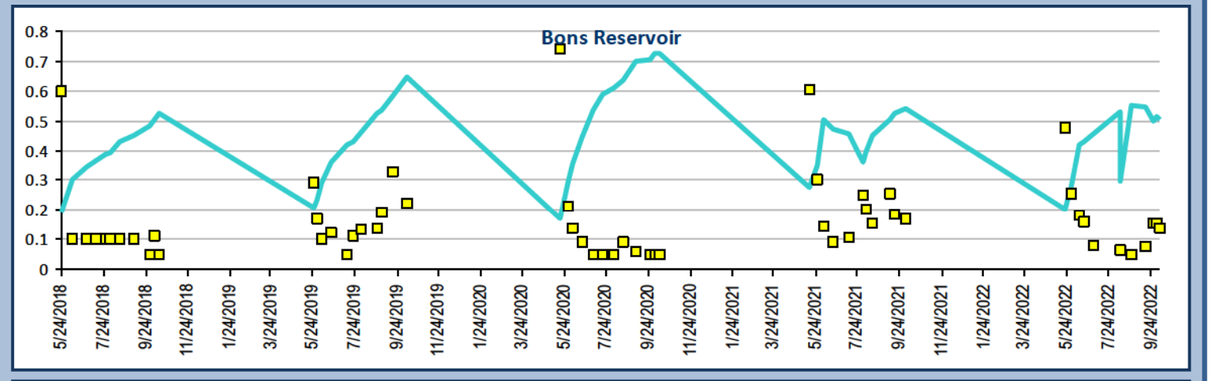
* Calculated using Standard Methods 2340B

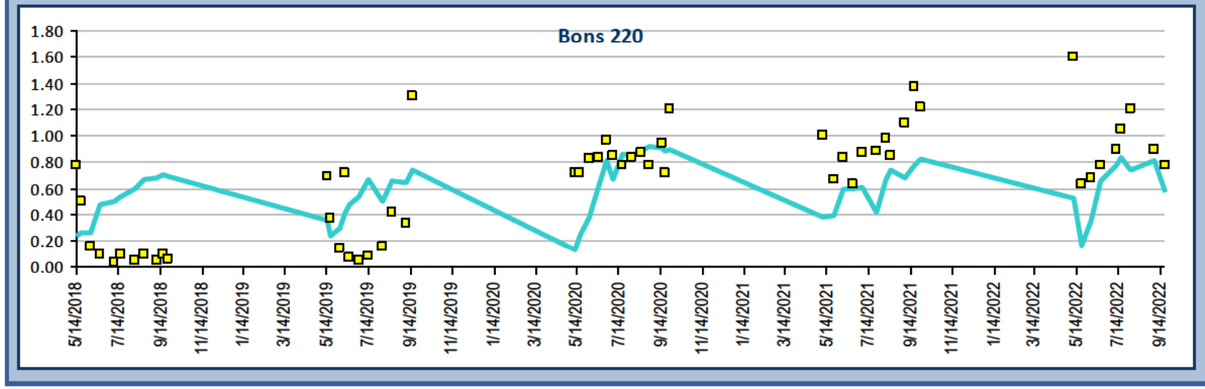


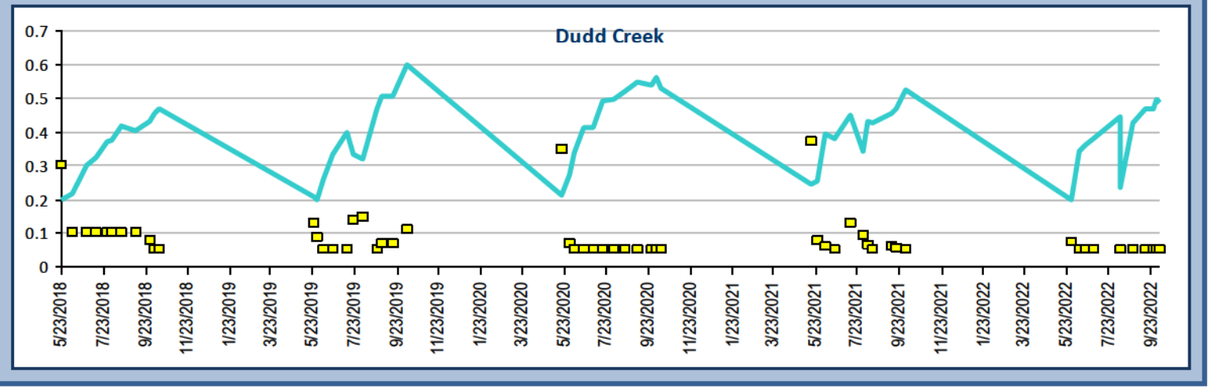








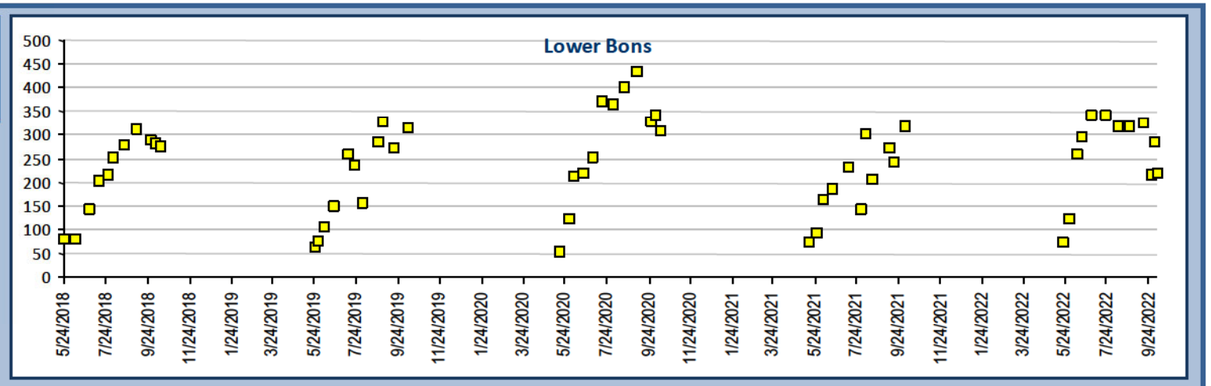


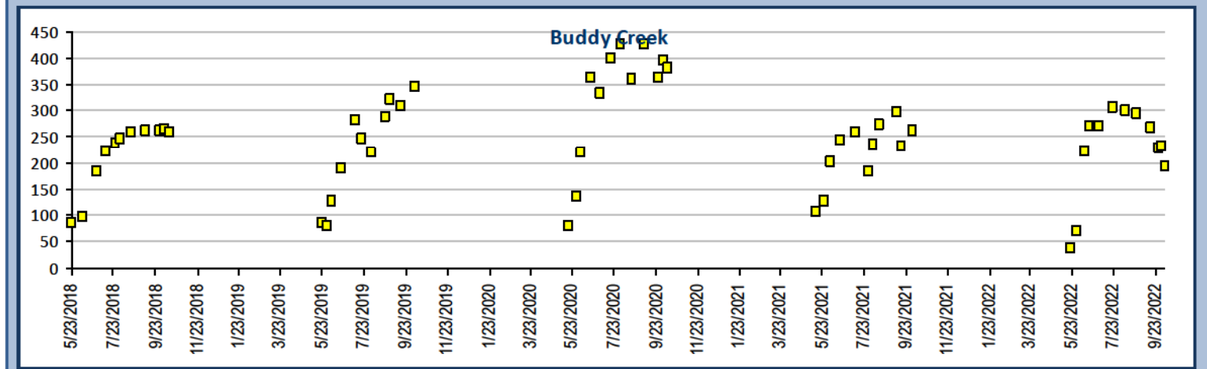


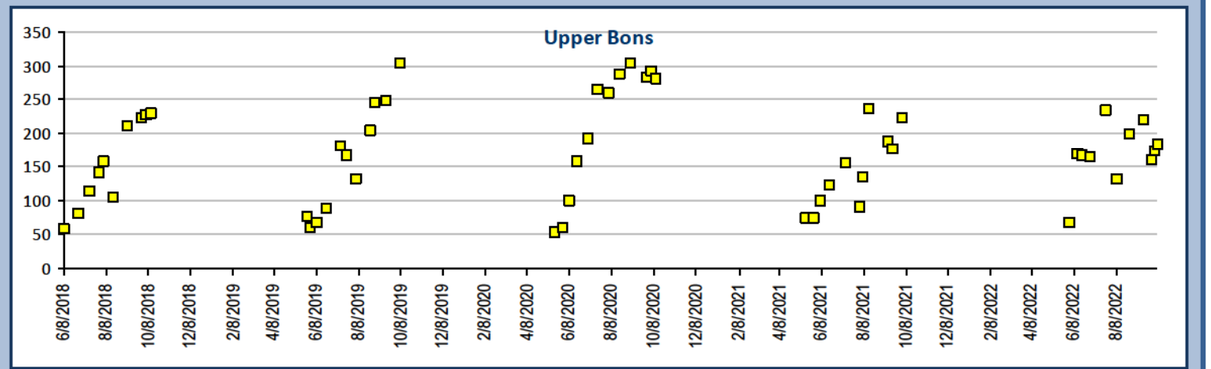
RED DOG MINE

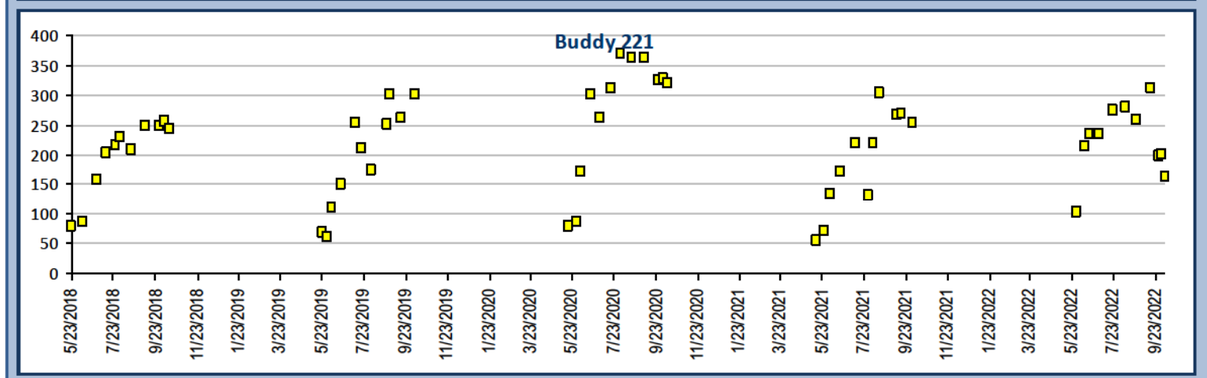
Water Monitoring Bons Creek Drainage
Water Quality Profile I , 5-Year Trend Charts

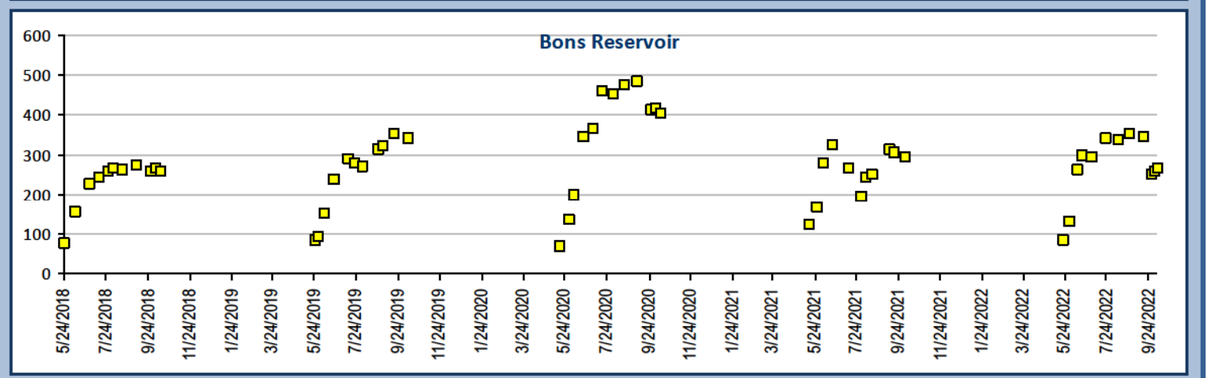
Conductivity, units uS/cm

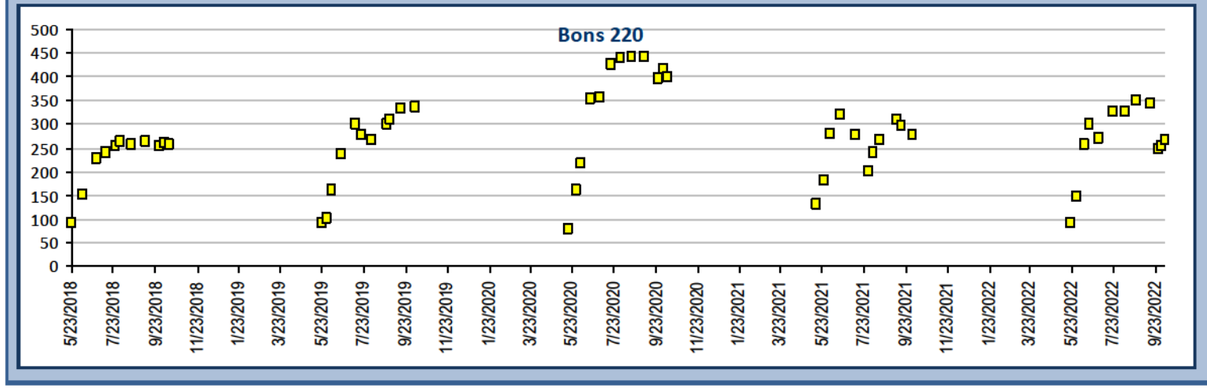


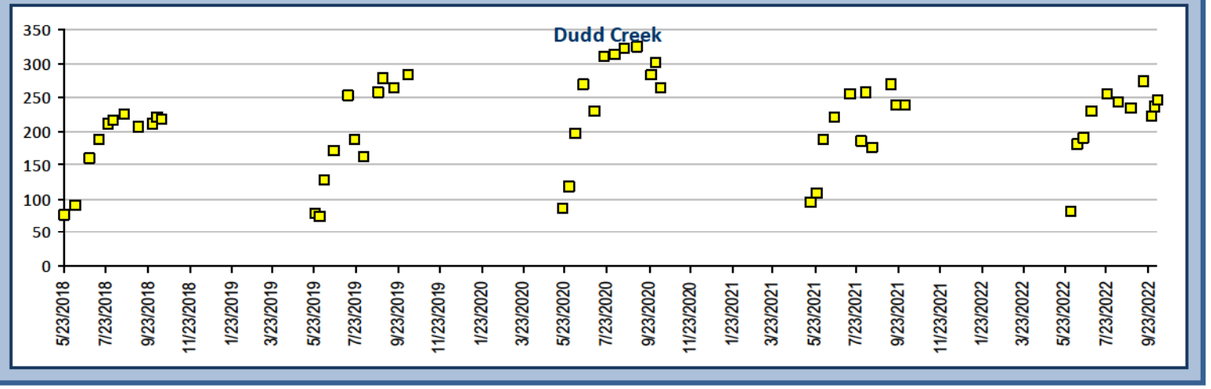








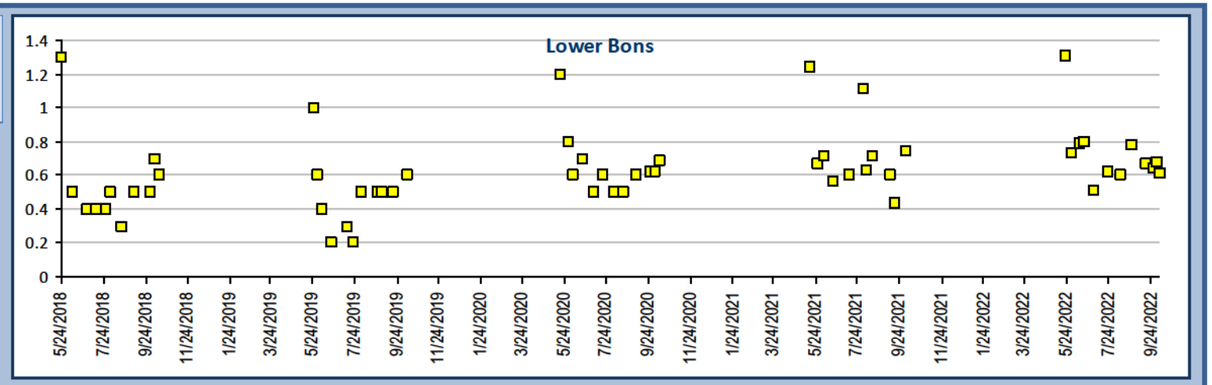


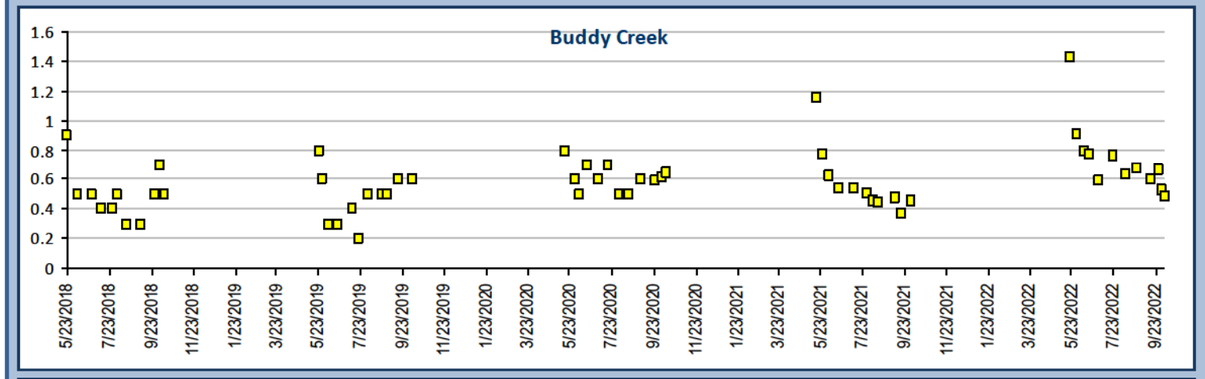


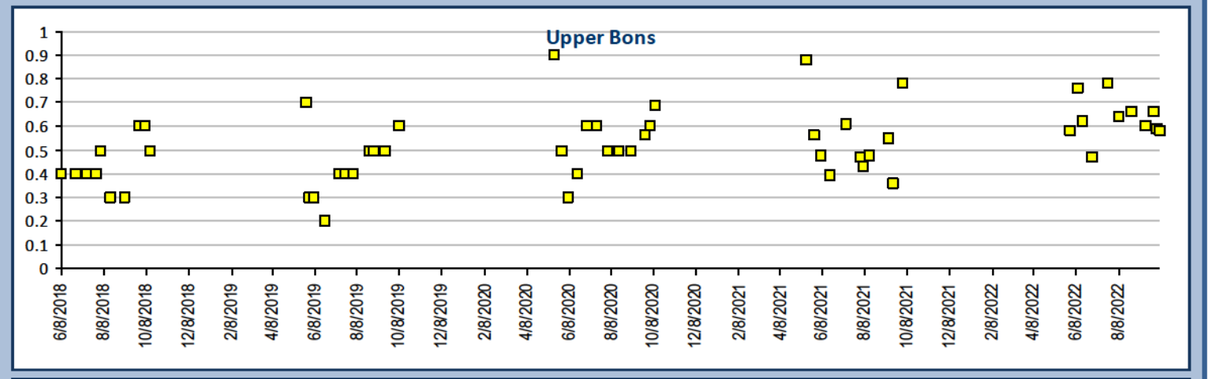
RED DOG MINE

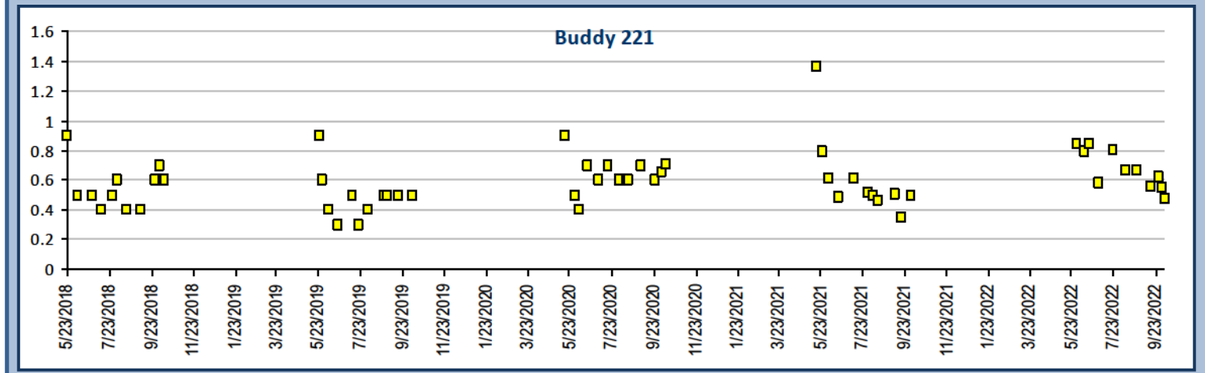
Water Monitoring Bons Creek Drainage
Water Quality Profile I , 5-Year Trend Charts

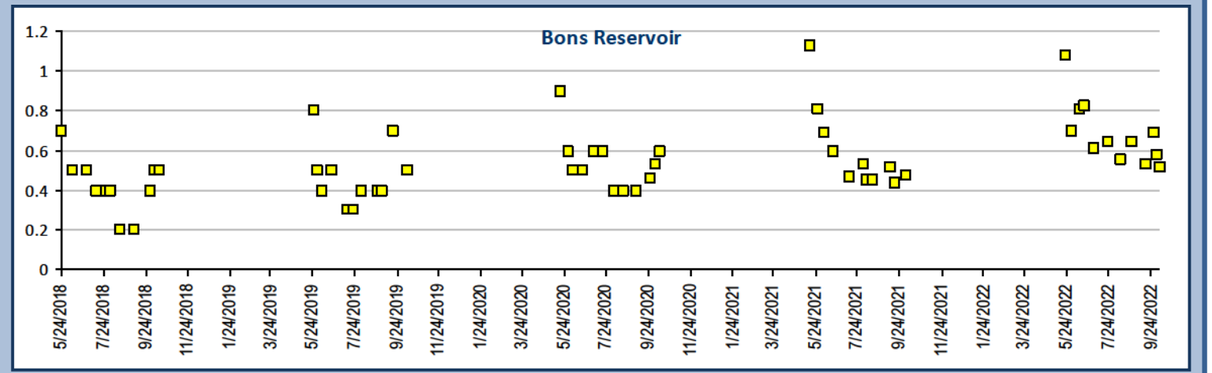
Potassium, Total Recoverable, units mg/L

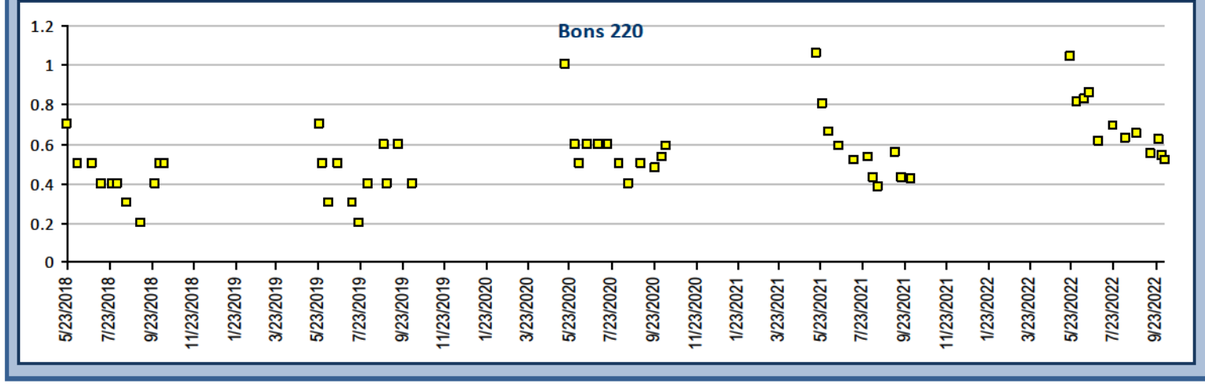


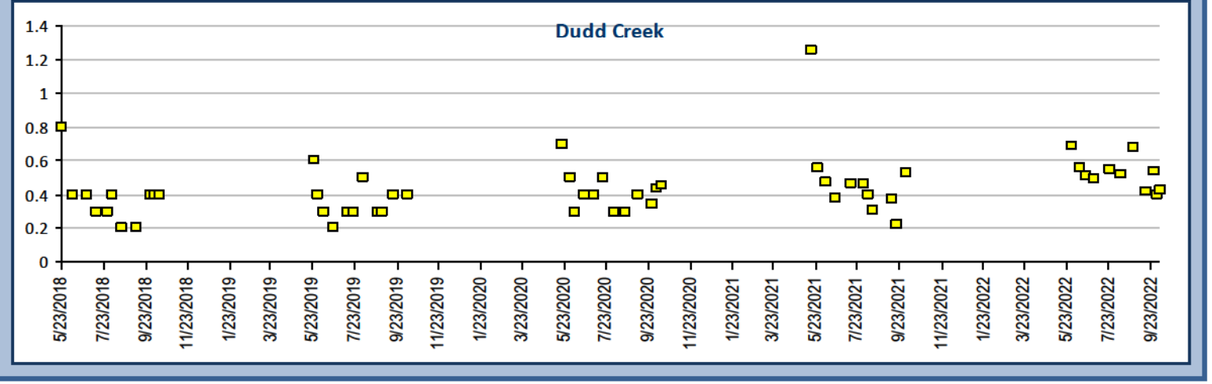








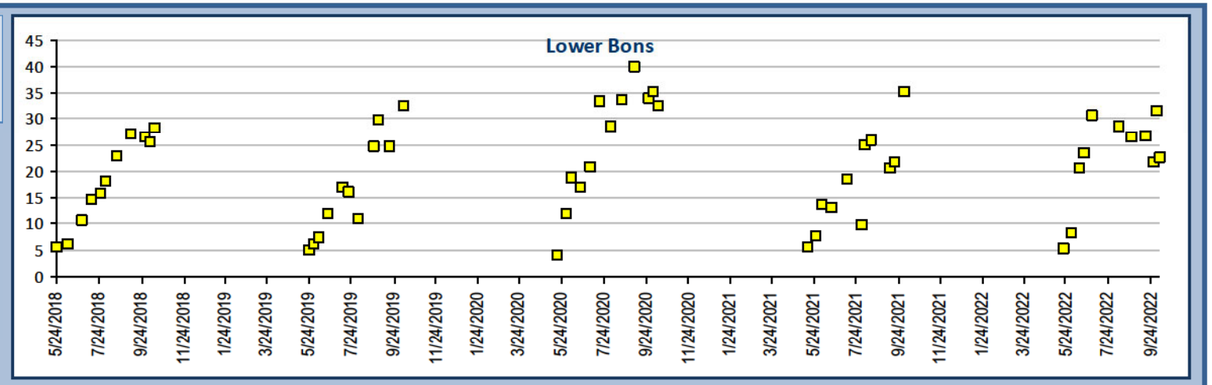


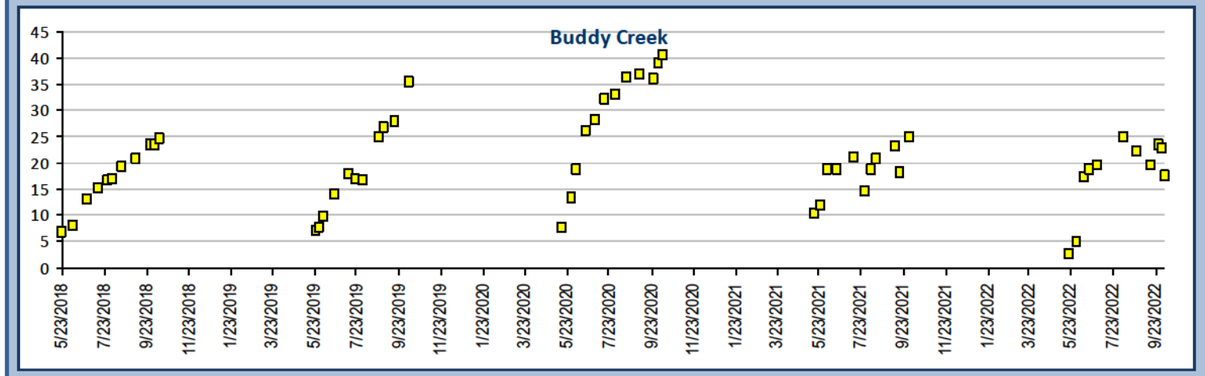


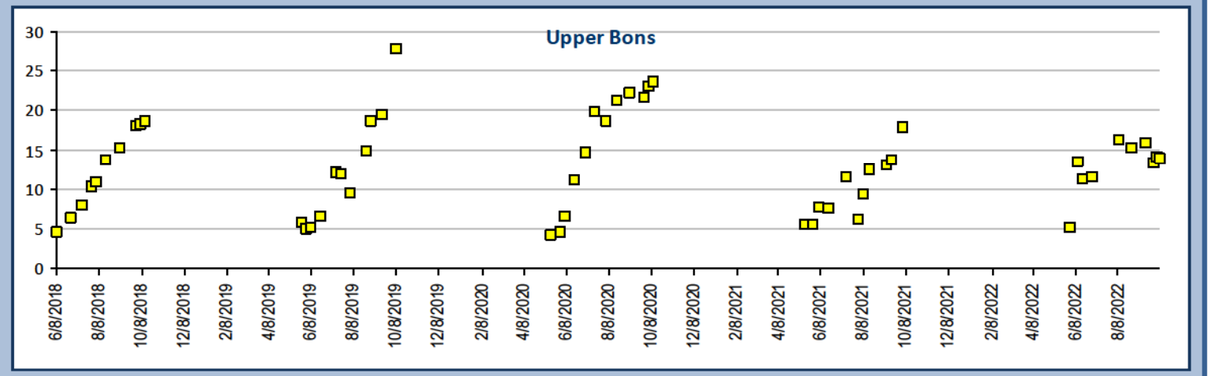
RED DOG MINE

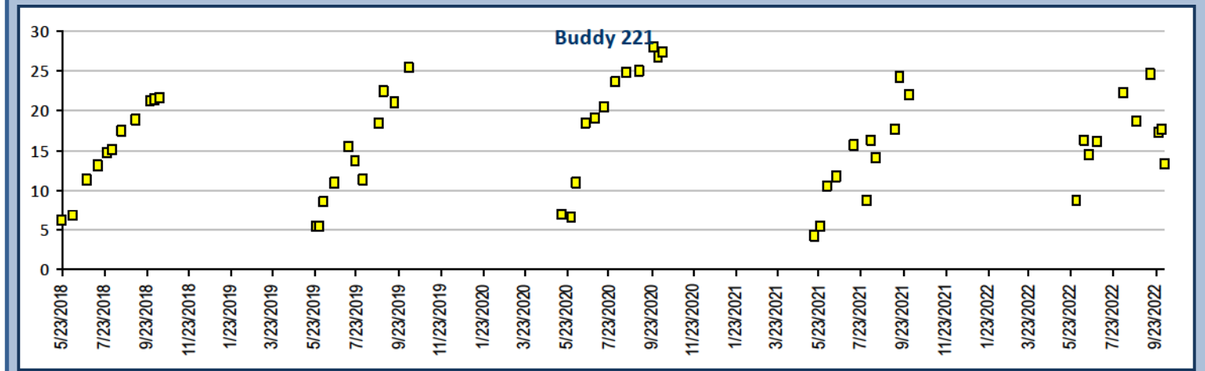
Water Monitoring Bons Creek Drainage
Water Quality Profile I , 5-Year Trend Charts

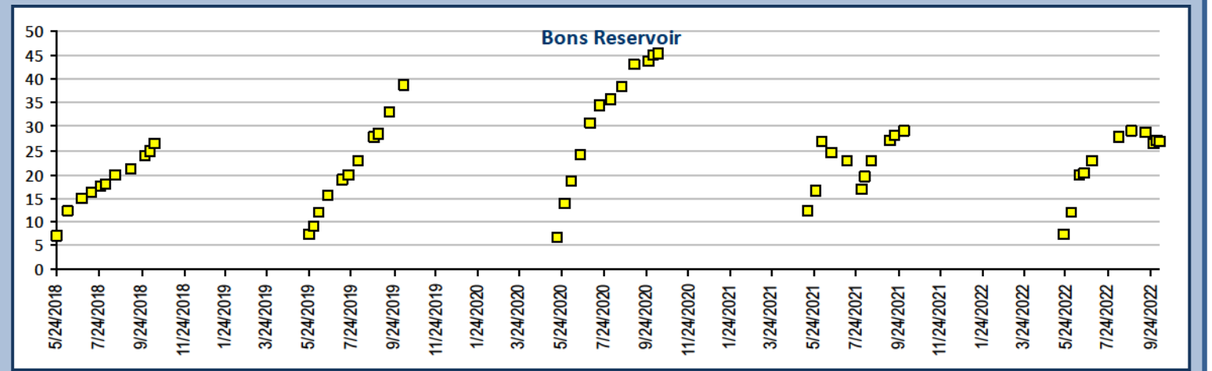
Magnesium, Total Recoverable, units mg/L

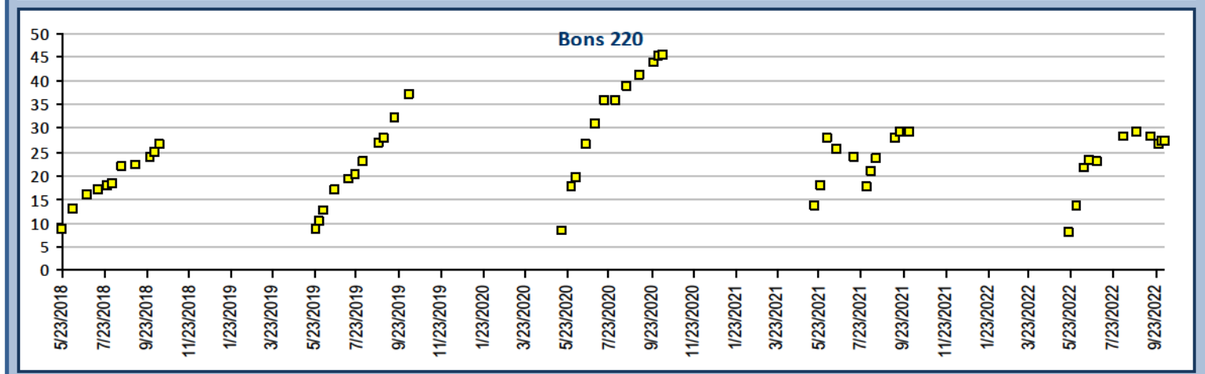


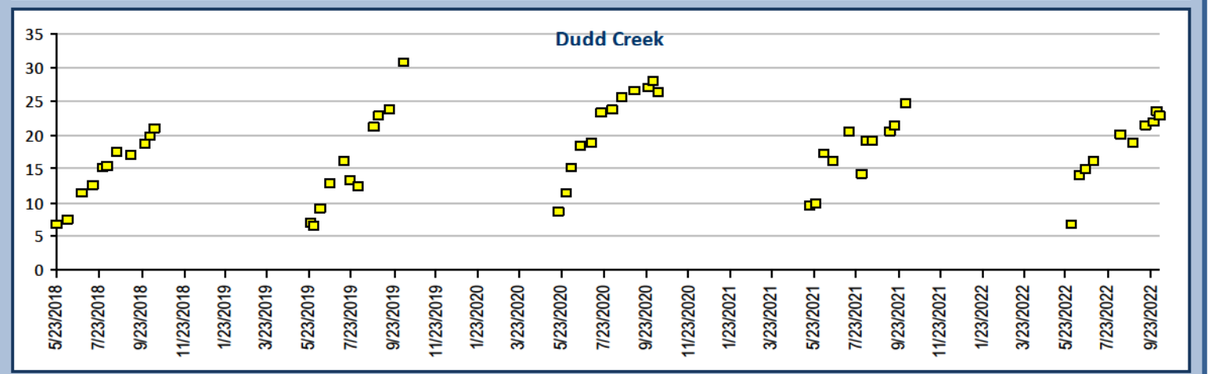








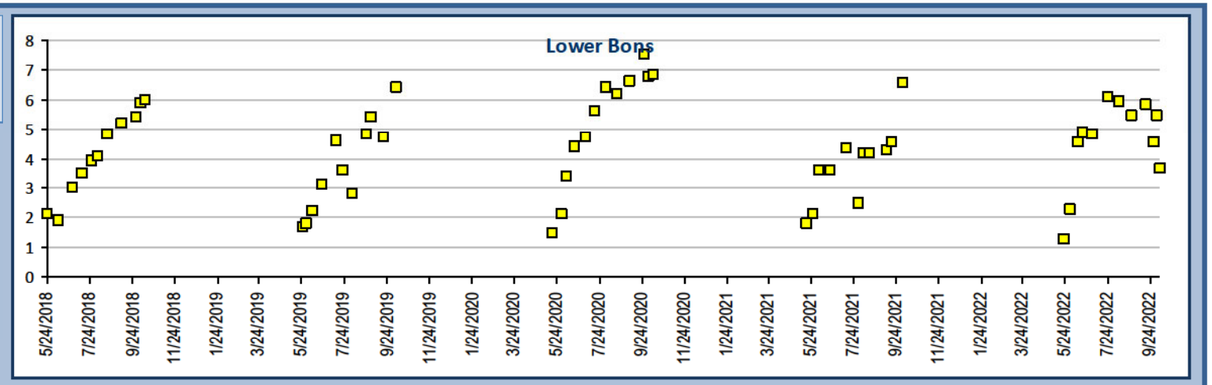


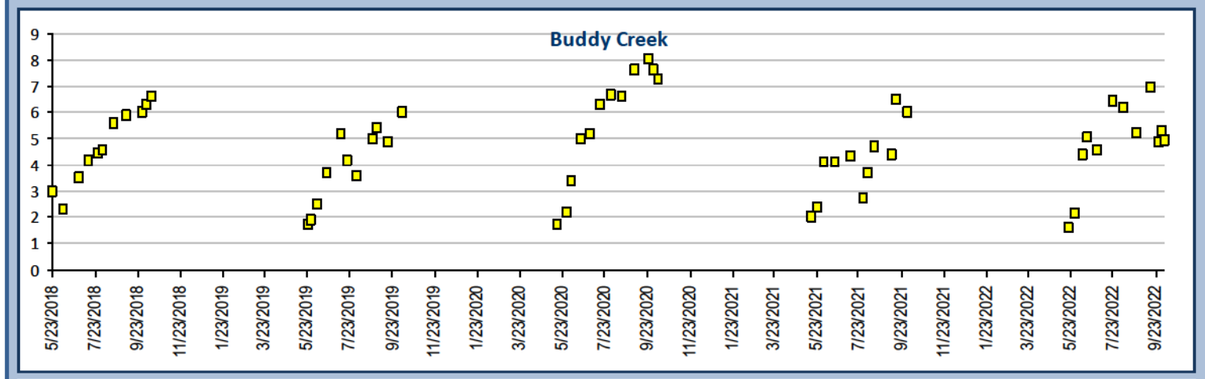


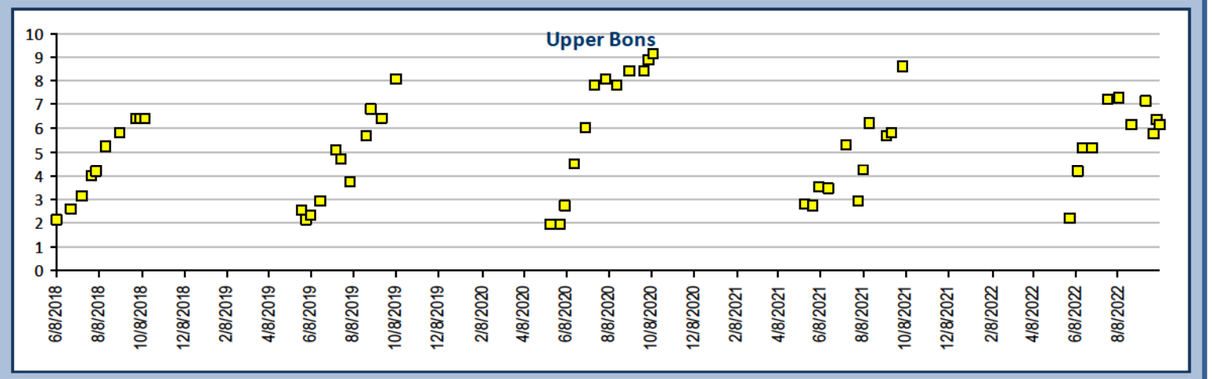
RED DOG MINE

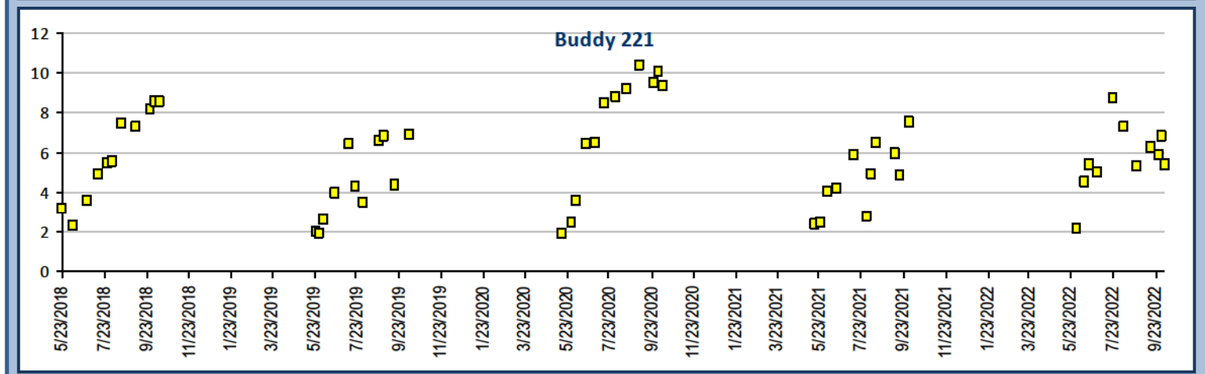
Water Monitoring Bons Creek Drainage
Water Quality Profile I , 5-Year Trend Charts

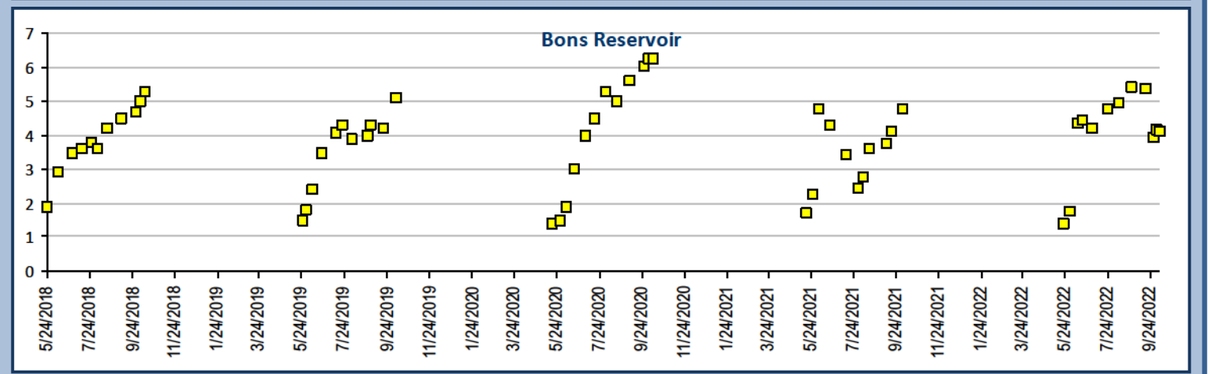
Sodium, Total Recoverable, units mg/L

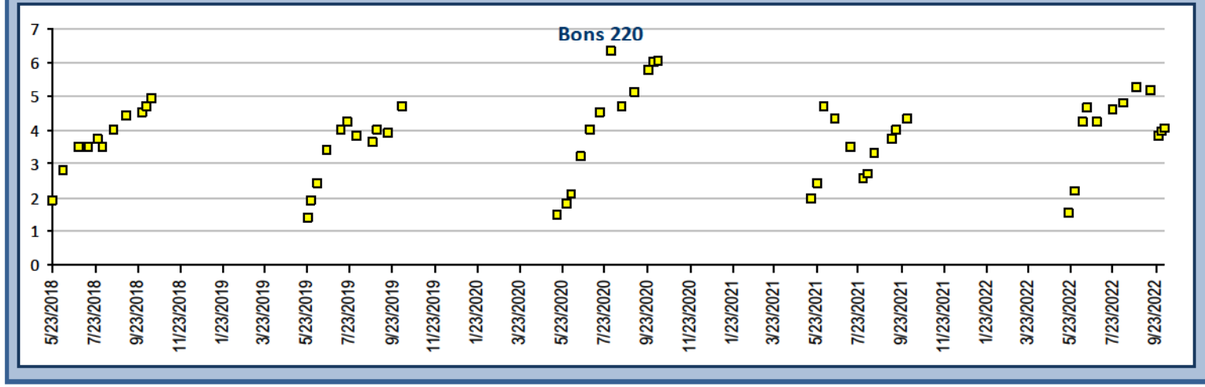


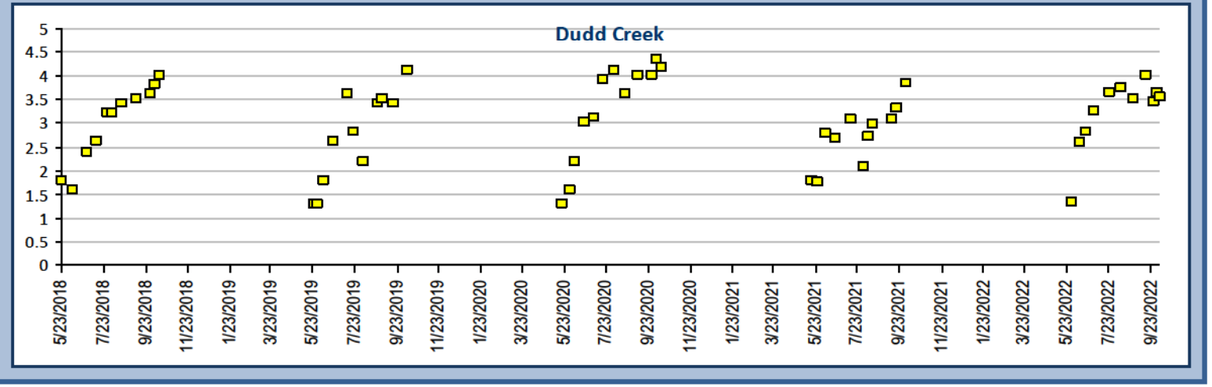












RED DOG MINE

Water Monitoring Bons Creek Drainage
Water Quality Profile I , 5-Year Trend Charts

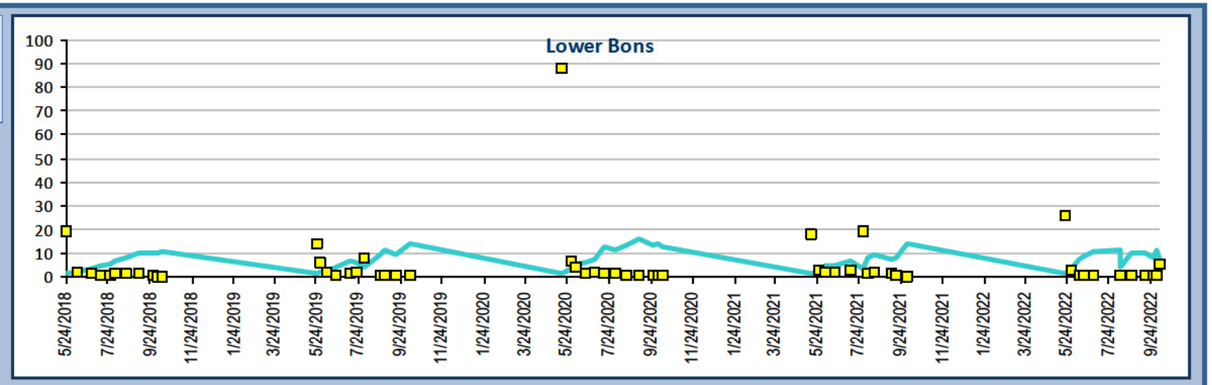
Lead, Total recoverable, units ug/L

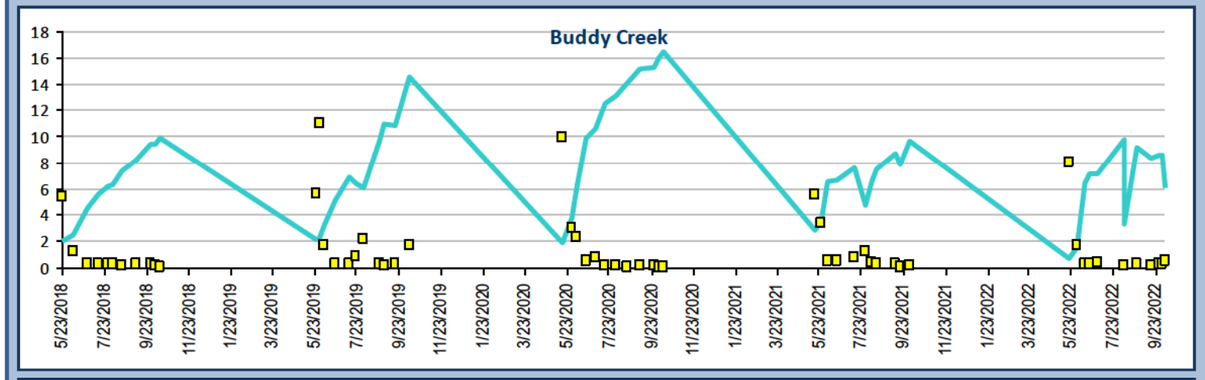
Aquatic Life - Fresh Water Chronic WQS ug/L

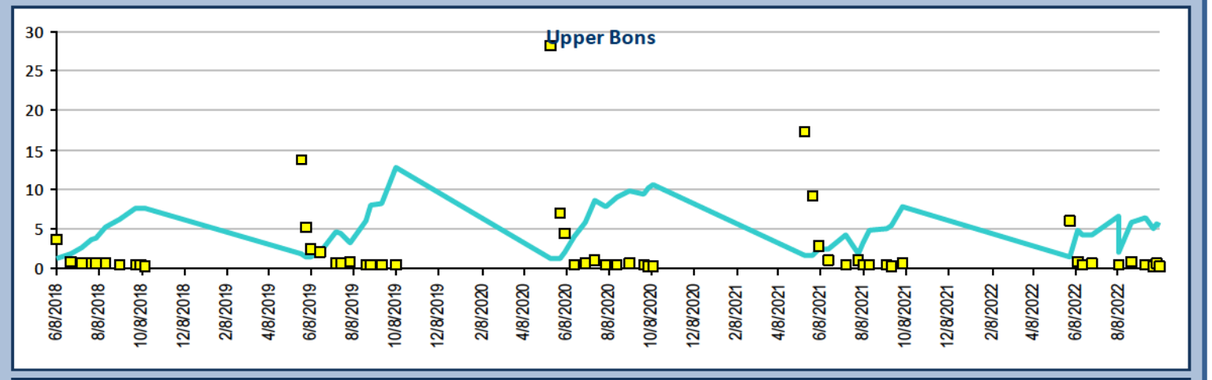
Hardness Dependent Calculation

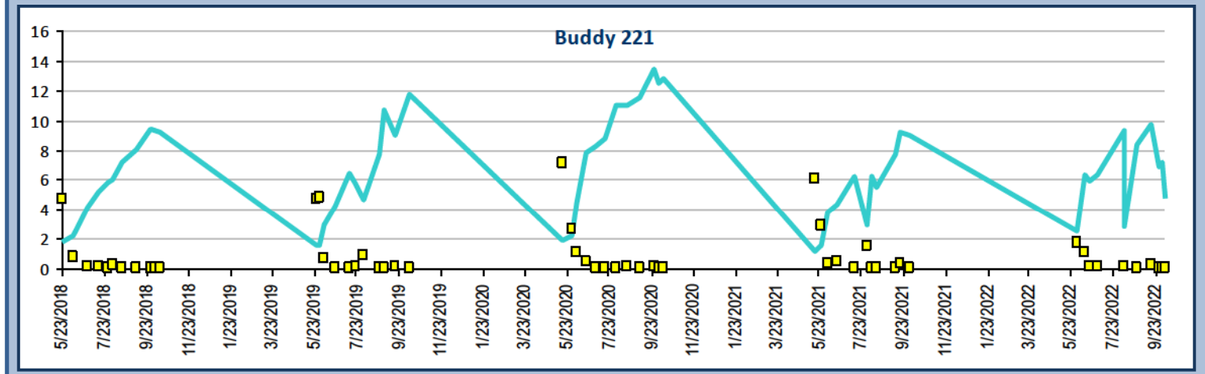
=EXP(1.273*(LN(calc *hardness))-4.705)

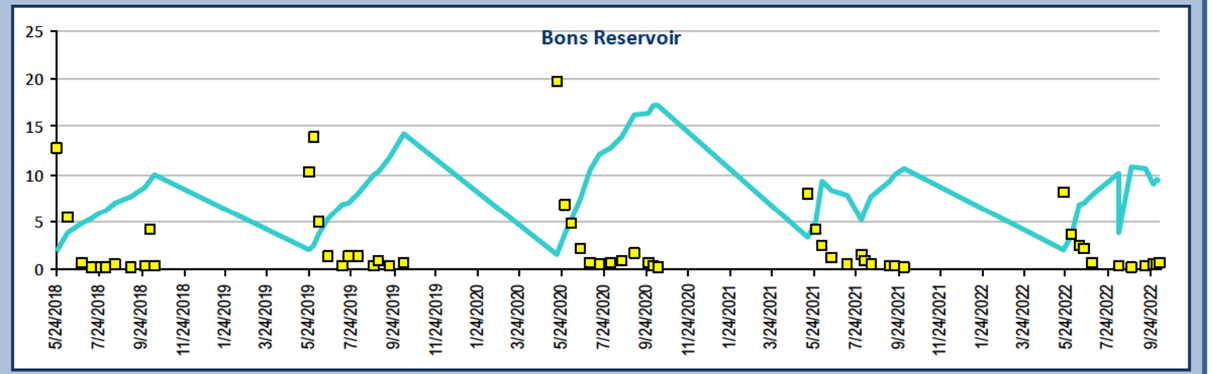
* Calculated using Standard Methods 2340B

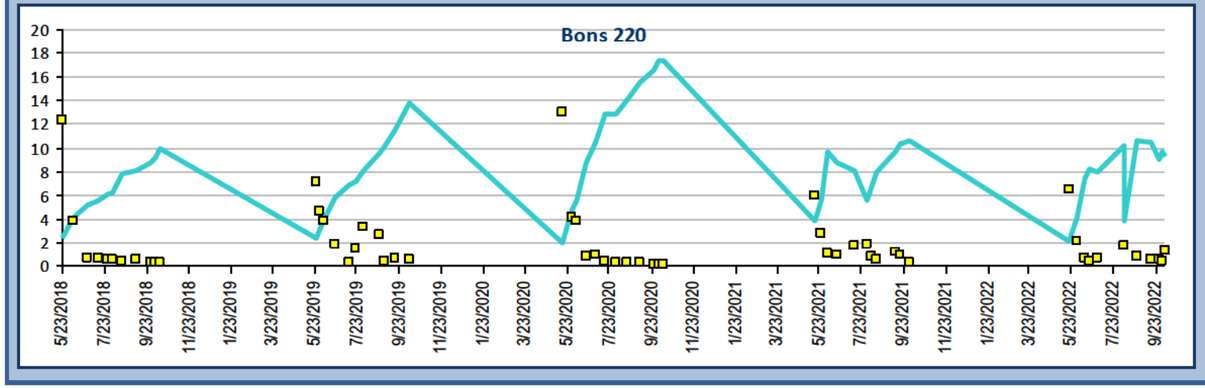


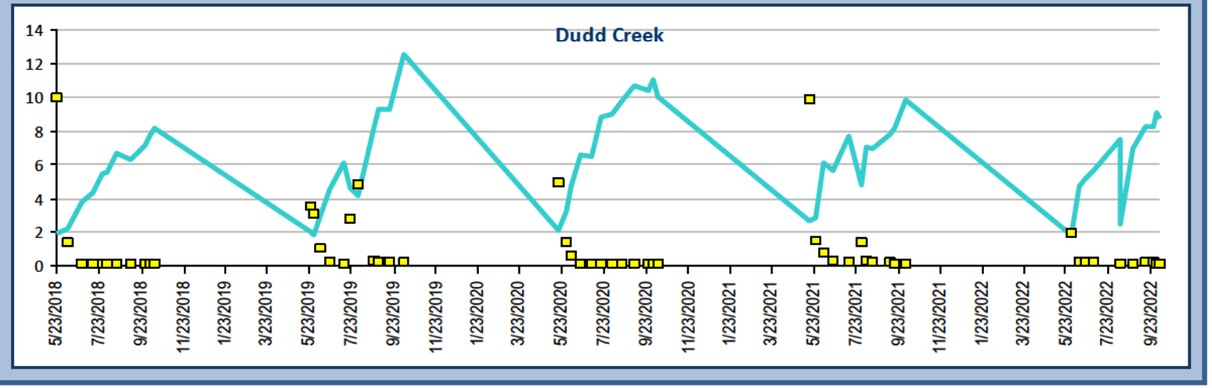










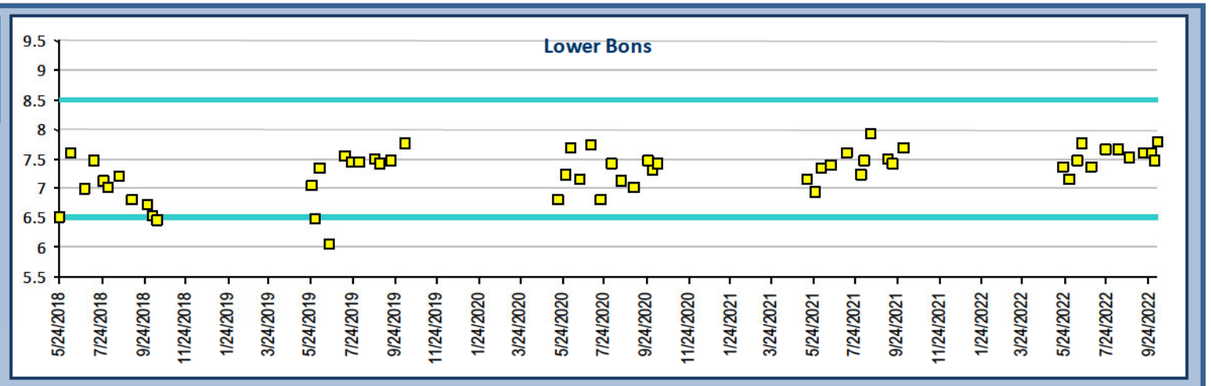


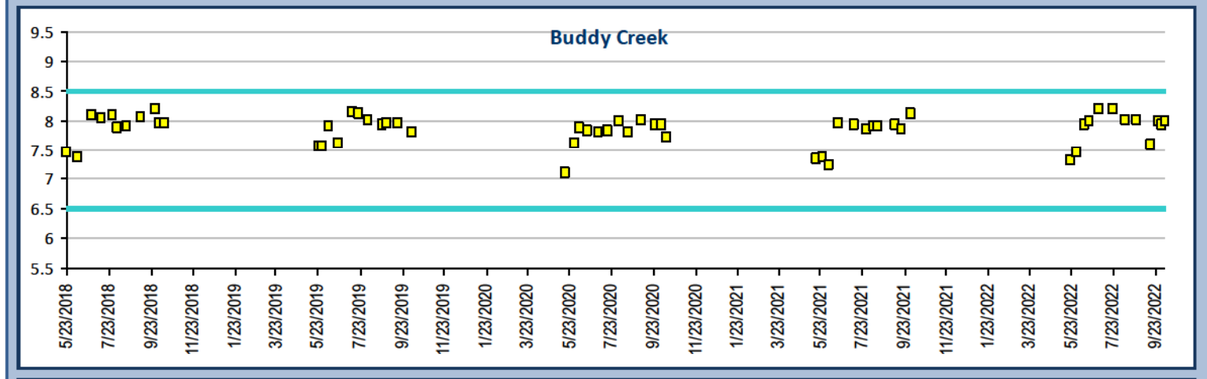
RED DOG MINE

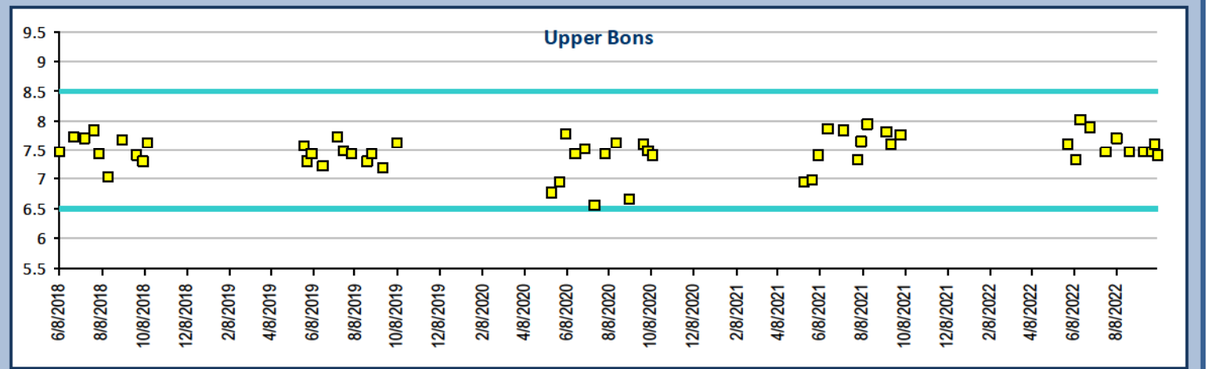
Water Monitoring Bons Creek Drainage
Water Quality Profile I , 5-Year Trend Charts

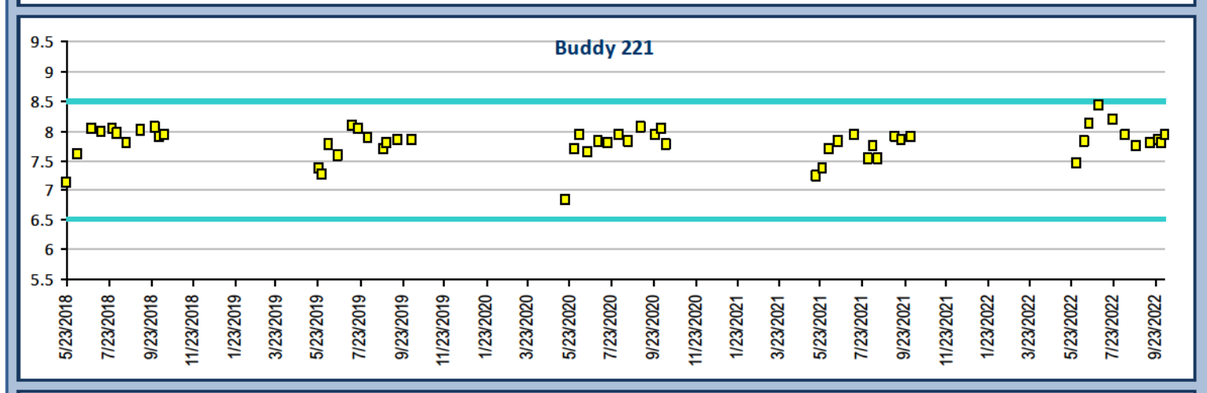
pH

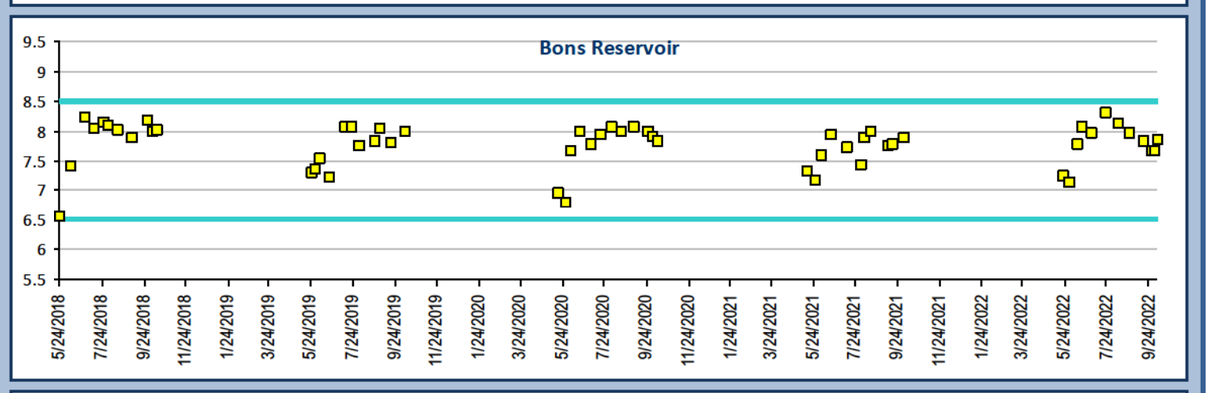
Site Specific WQS between 6.5 and 8.5

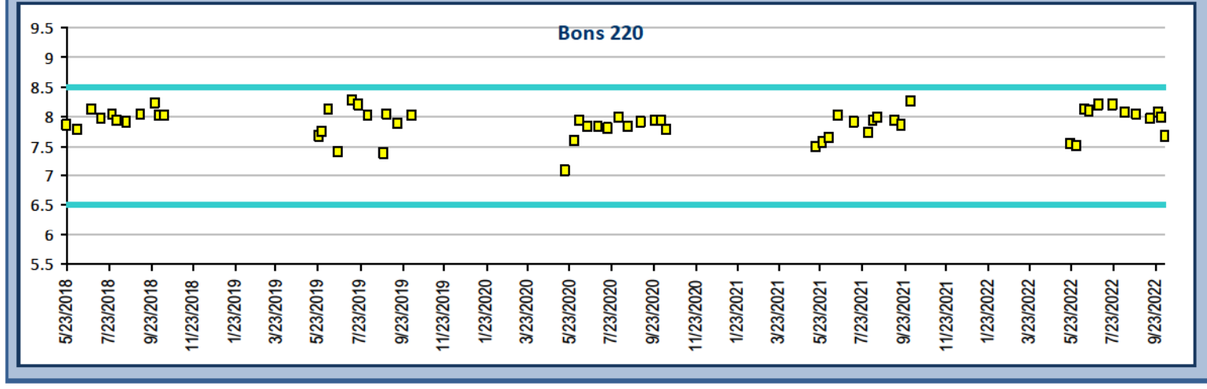


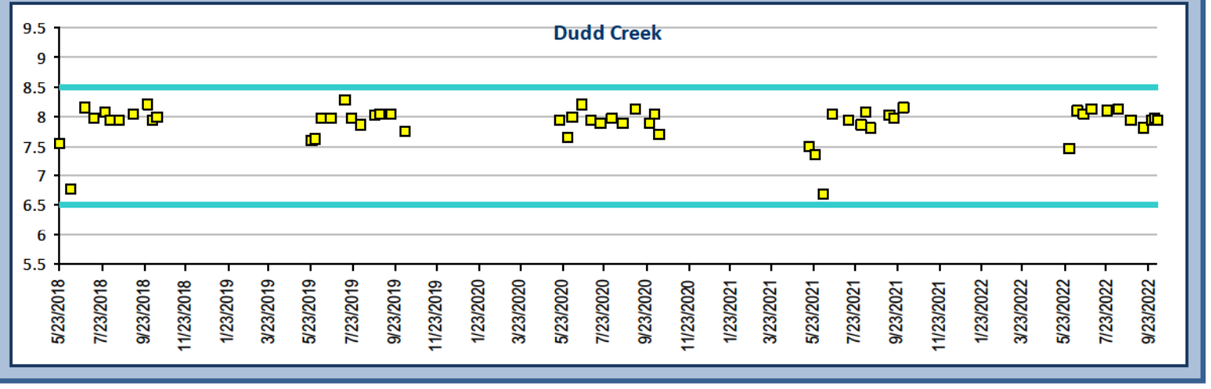










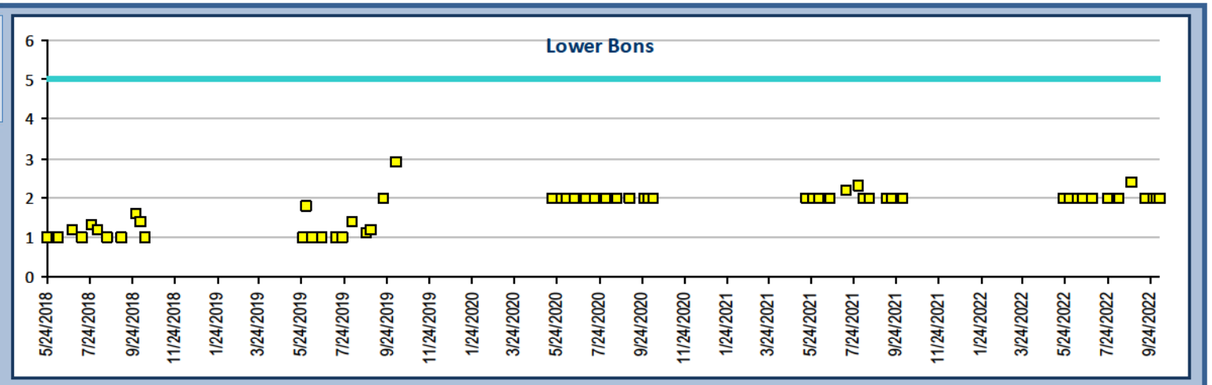


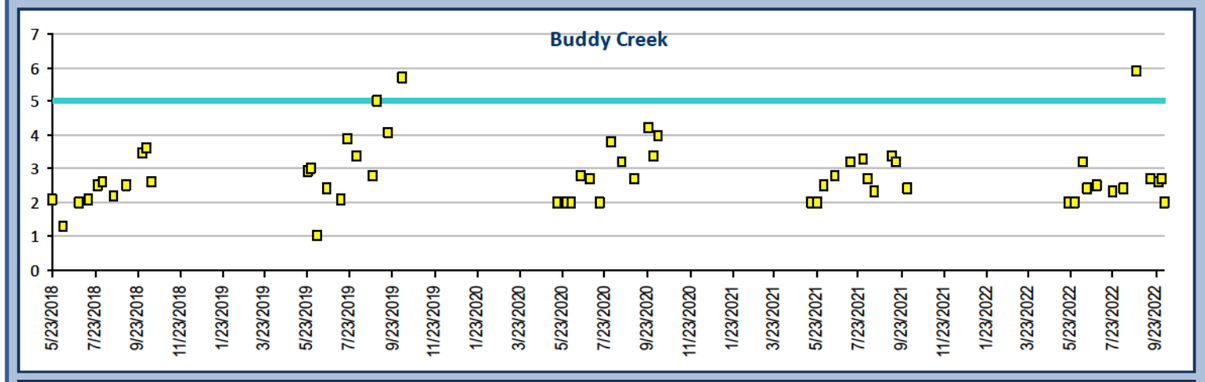
RED DOG MINE

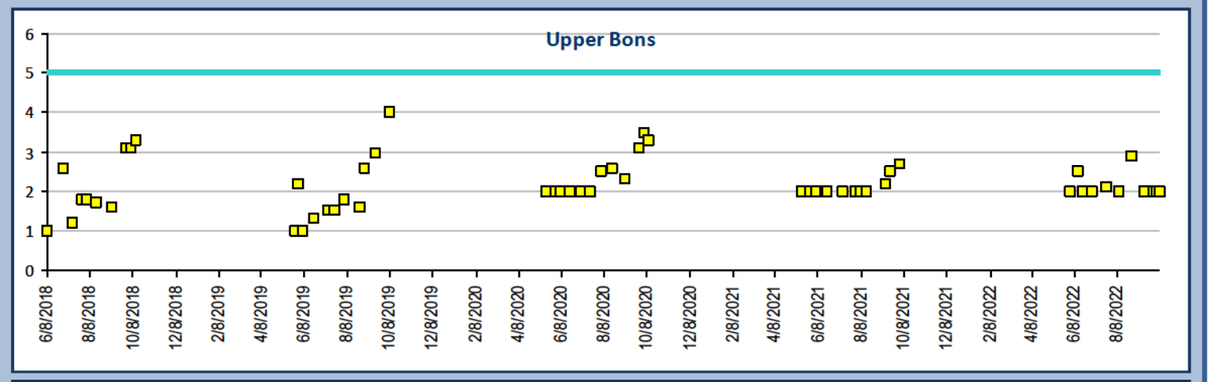
Water Monitoring Bons Creek Drainage
Water Quality Profile I , 5-Year Trend Charts
Selenium, Total Recoverable, units ug/L

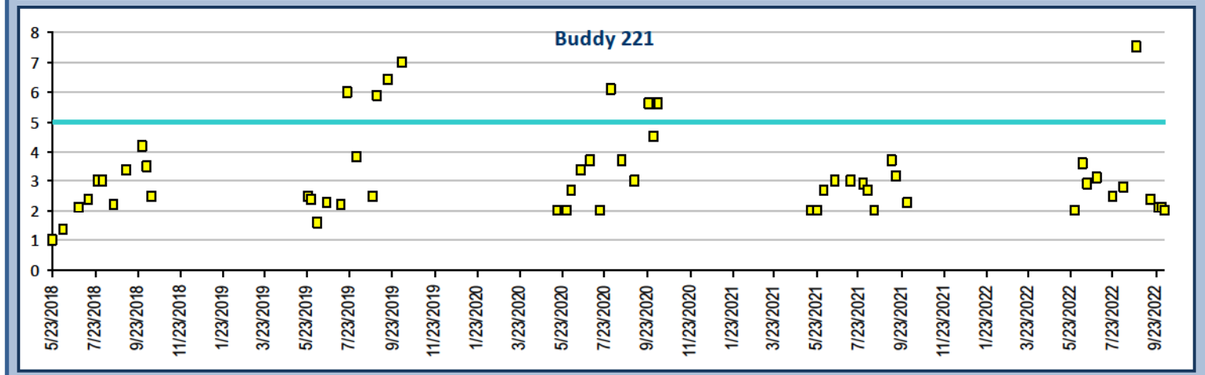
Aquatic Life - Fresh Water Chronic WQS ug/L

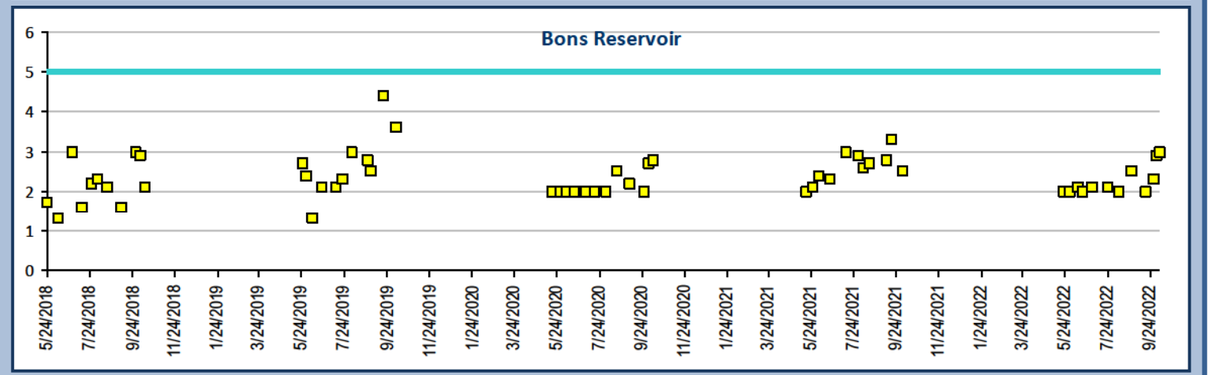
5 ug/L

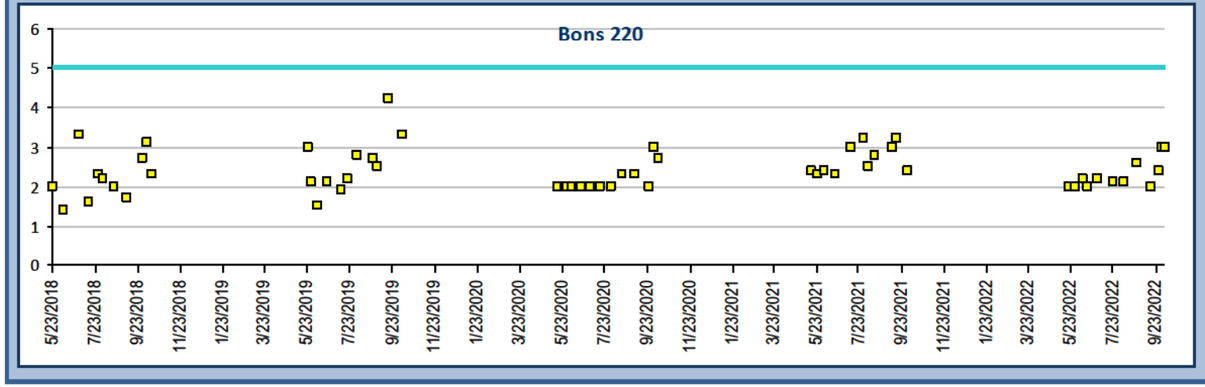


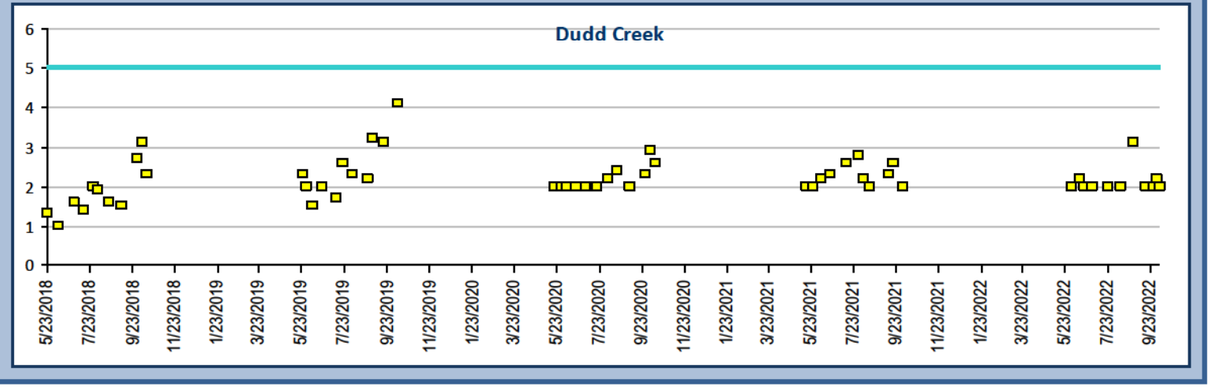








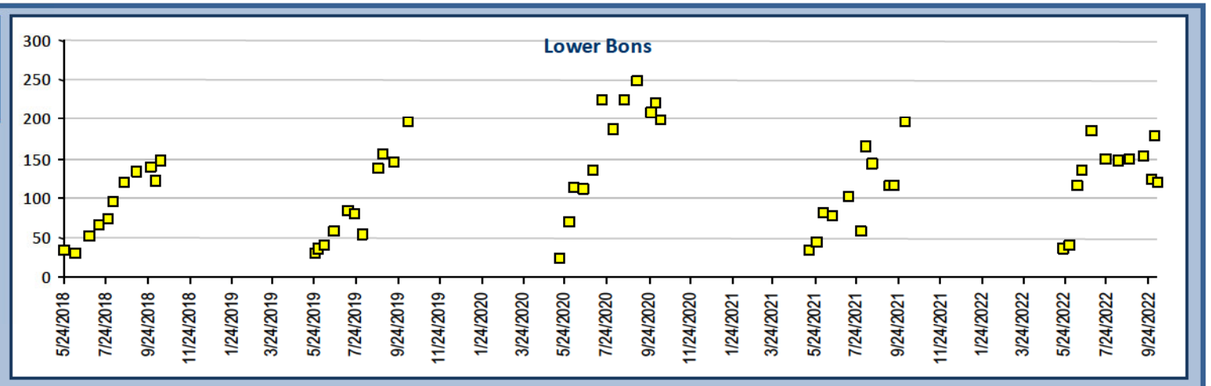


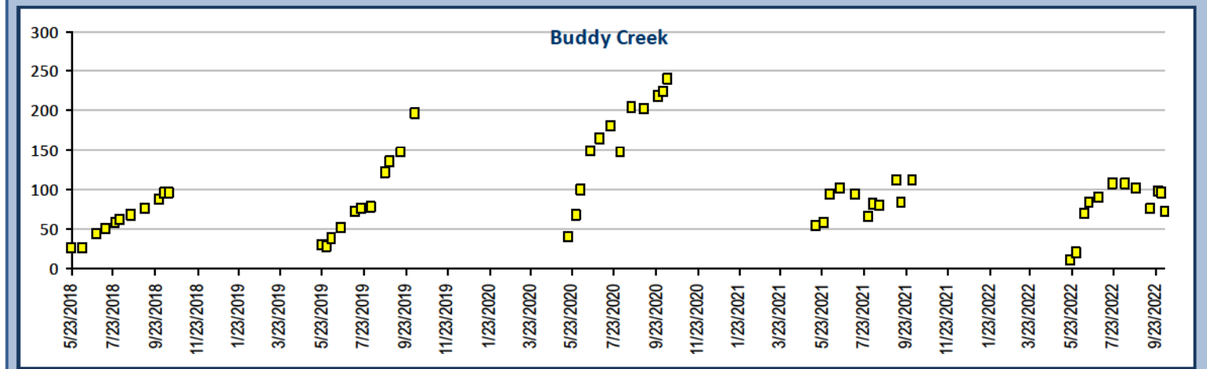


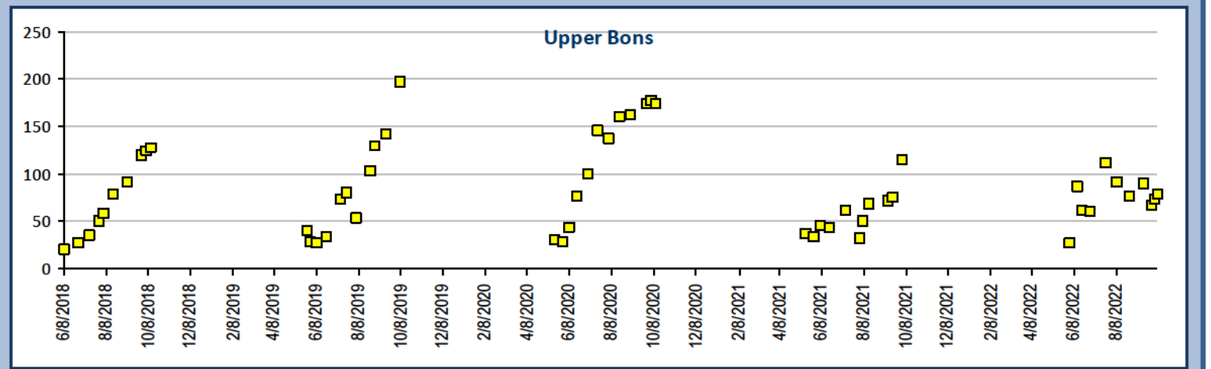
RED DOG MINE

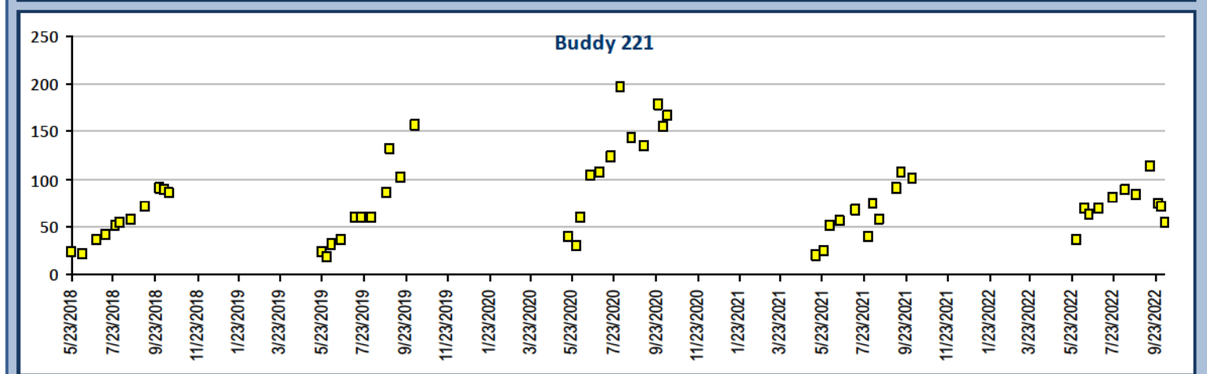
Water Monitoring Bons Creek Drainage
Water Quality Profile I , 5-Year Trend Charts

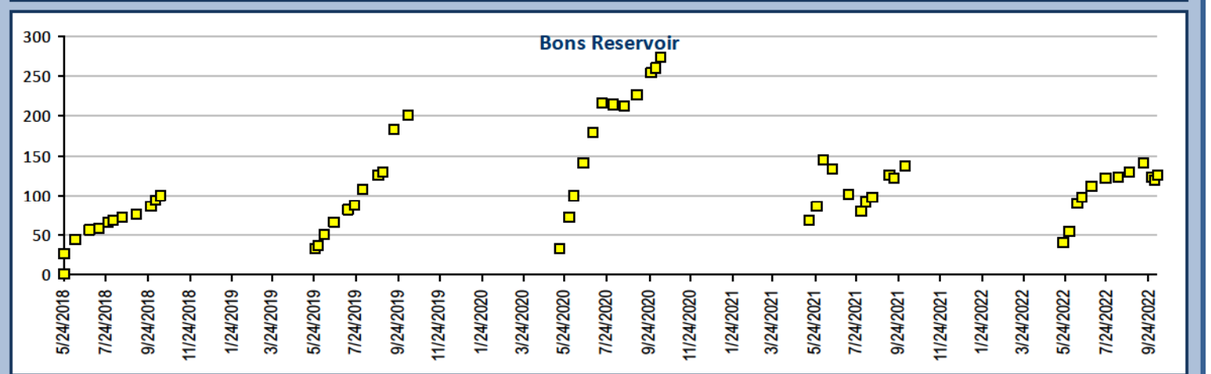
Sulfate, Total recoverable, units mg/L

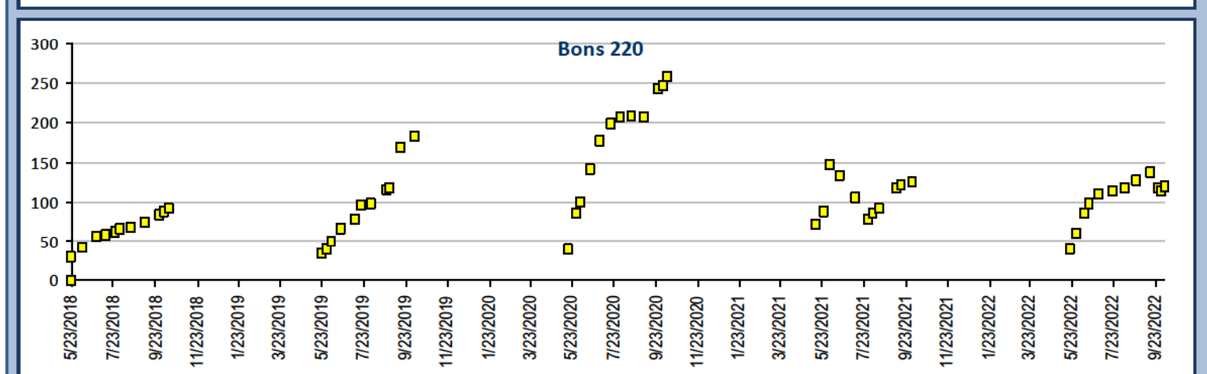


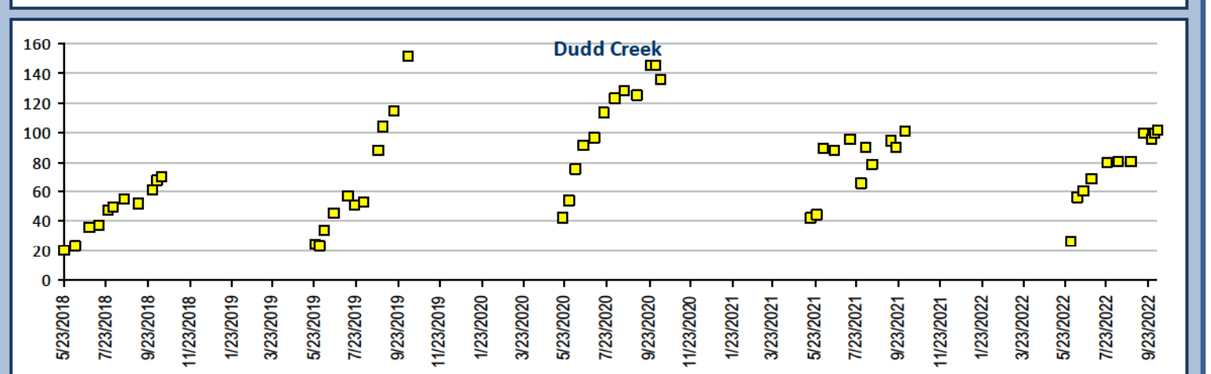












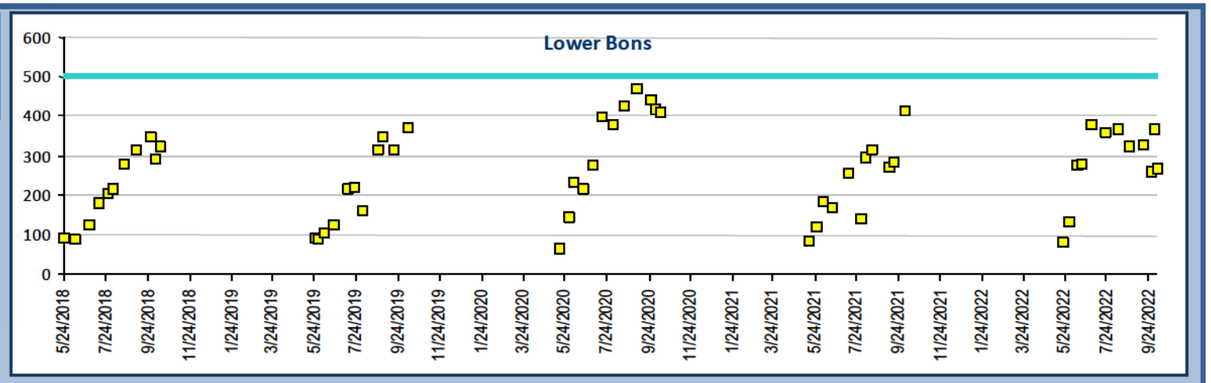
RED DOG MINE

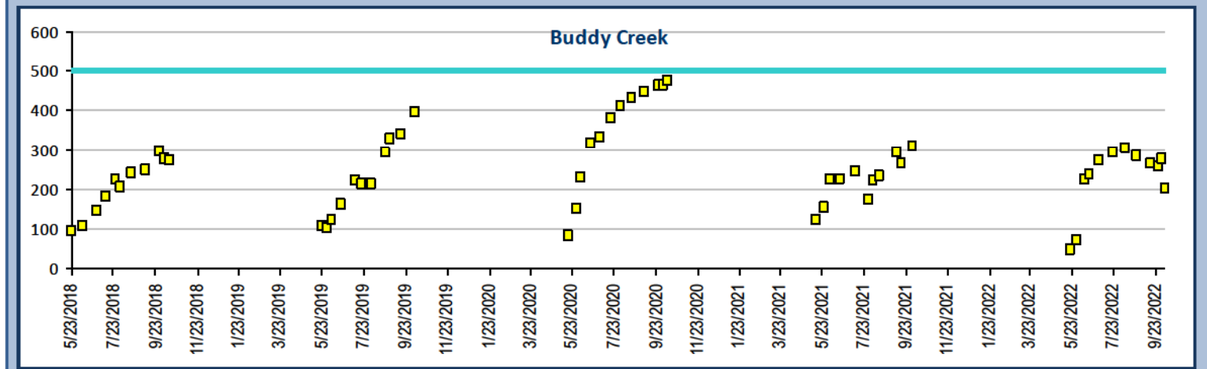
Water Monitoring Bons Creek Drainage
Water Quality Profile I , 5-Year Trend Charts

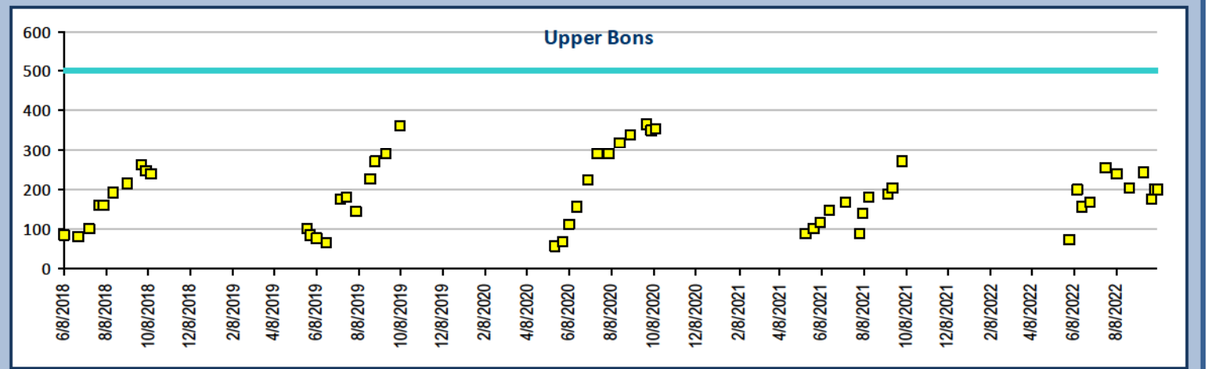
Total Dissolved Solids, units mg/L

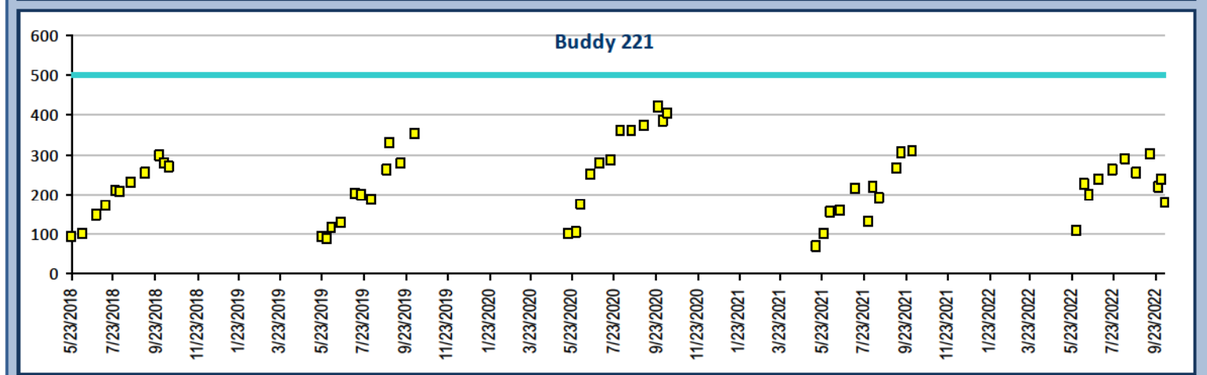
Site Specific WQS mg/L

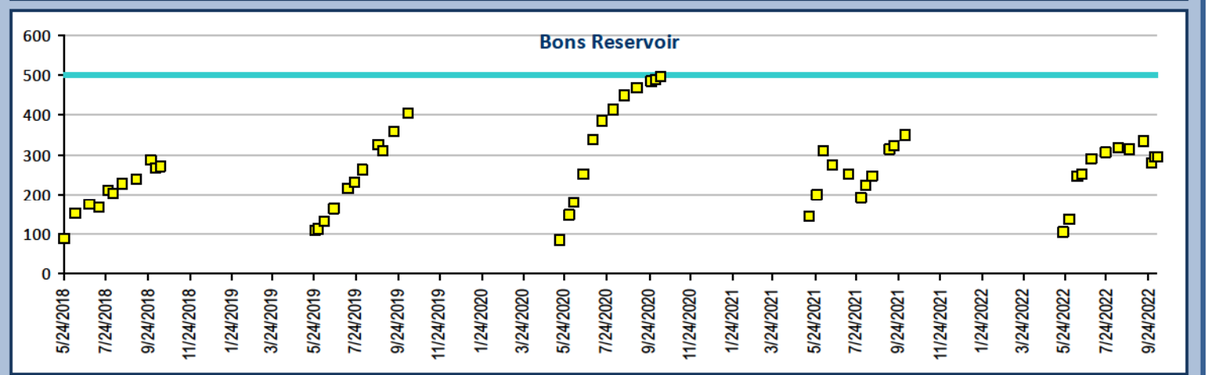
500 mg/L

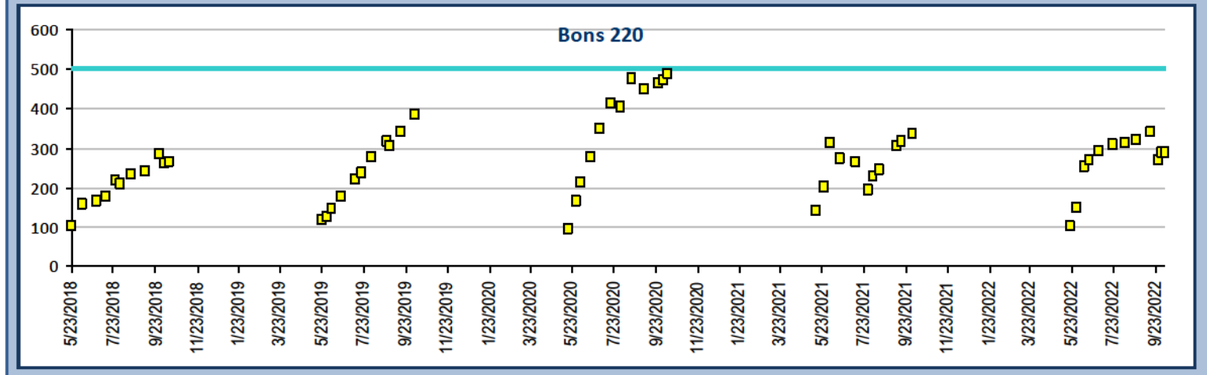


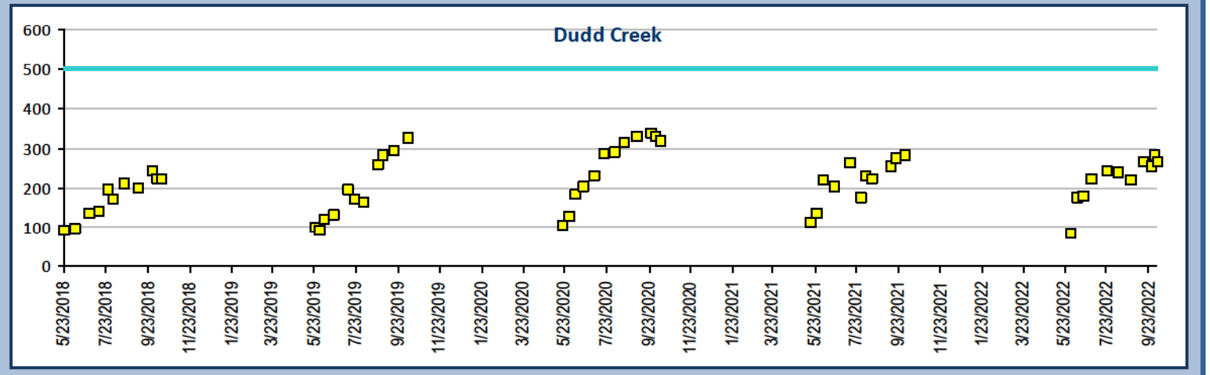












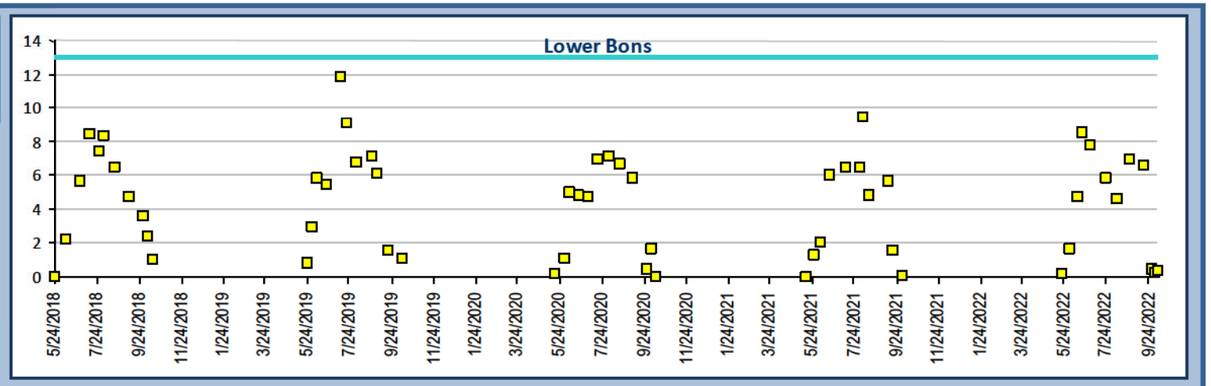
RED DOG MINE

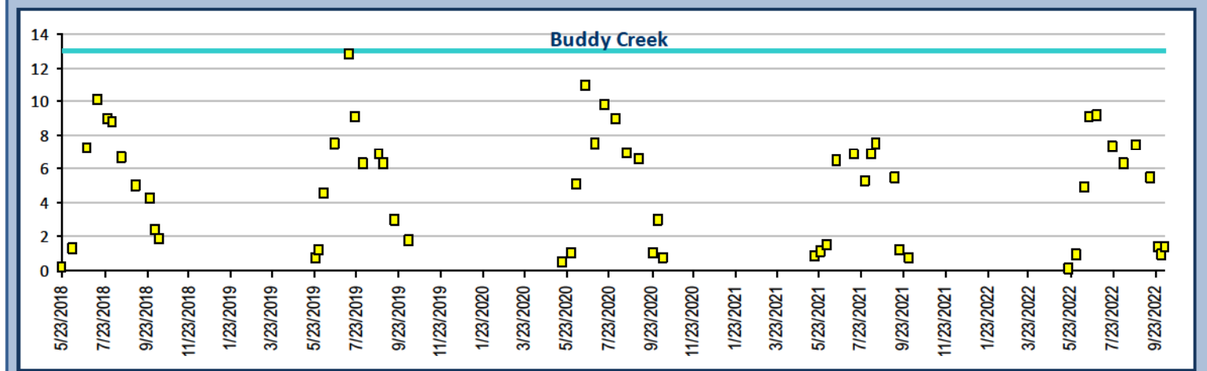
Water Monitoring Bons Creek Drainage
Water Quality Profile I , 5-Year Trend Charts

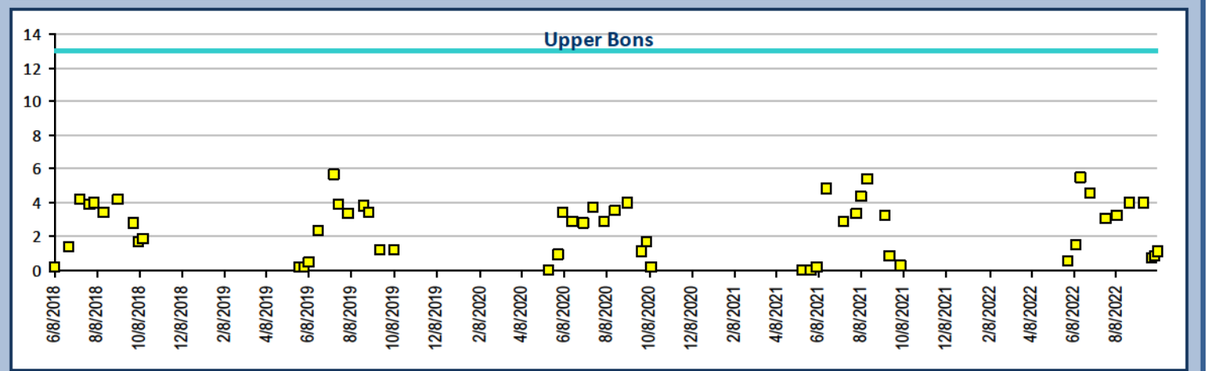
Temperature Field, units Celsius

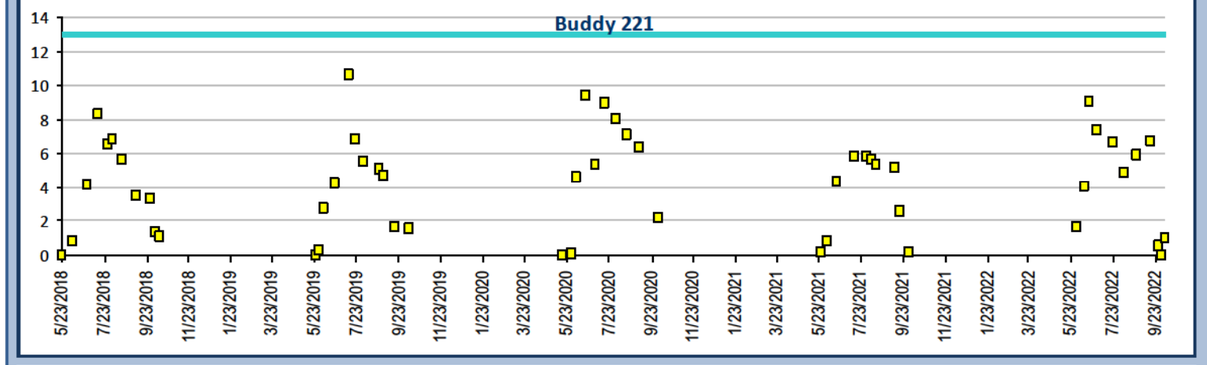
Site Specific WQS mg/L

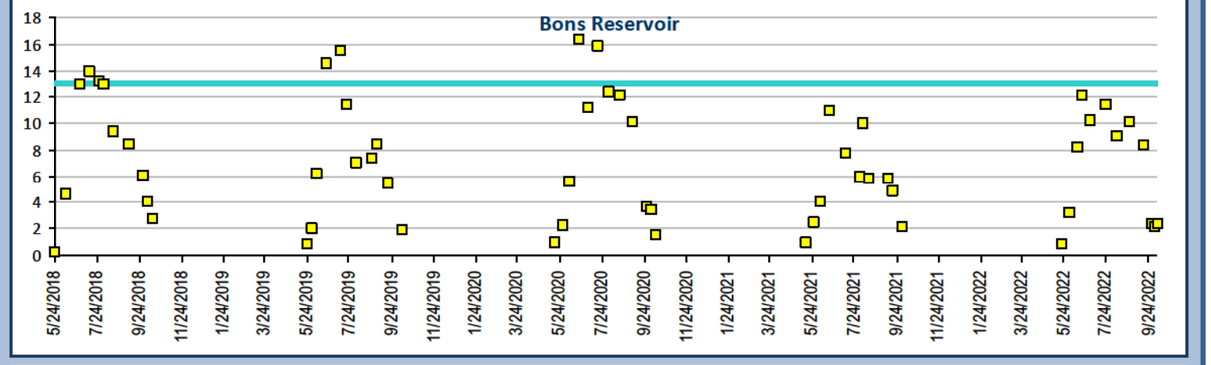
13 Celsius

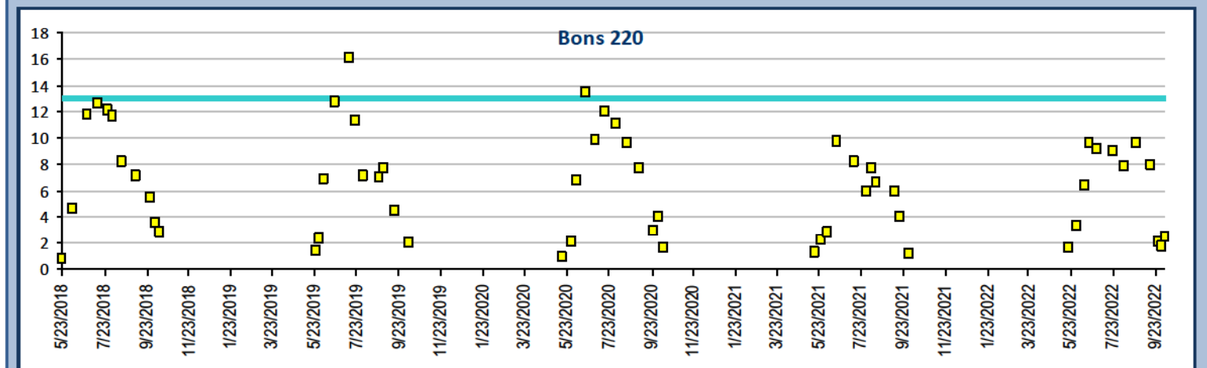


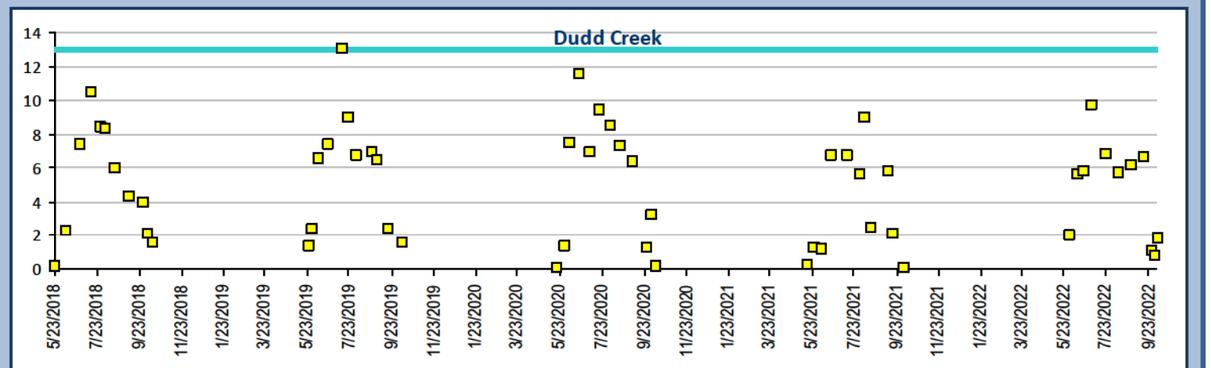








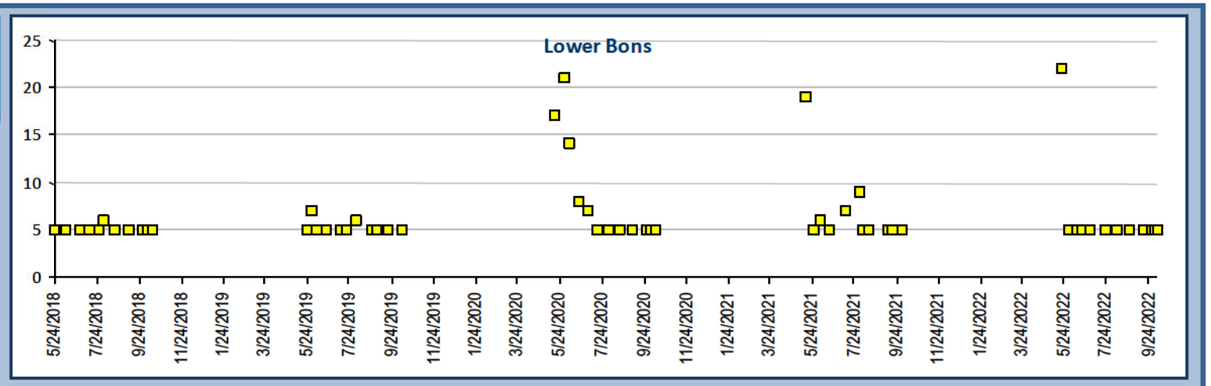


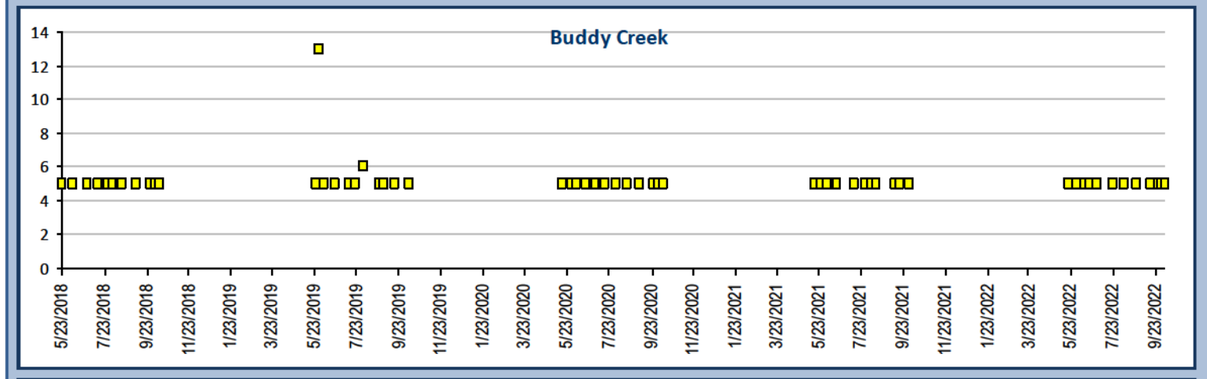


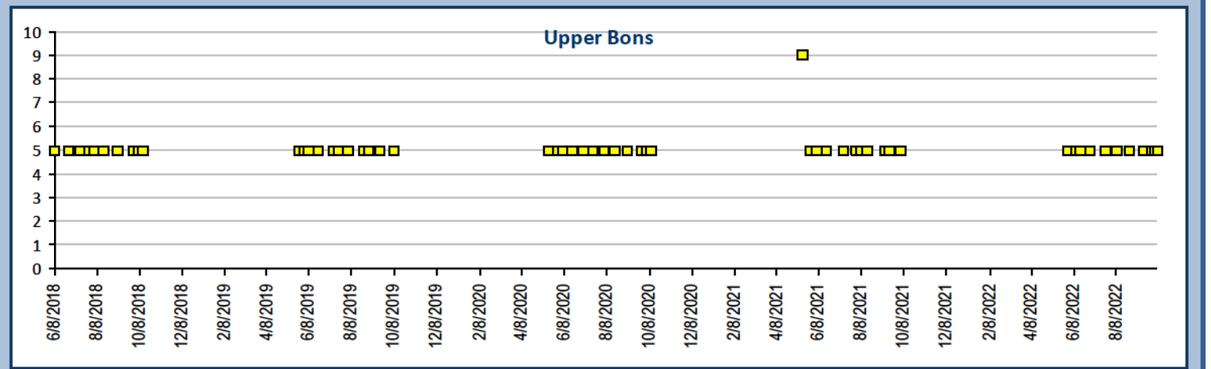
RED DOG MINE

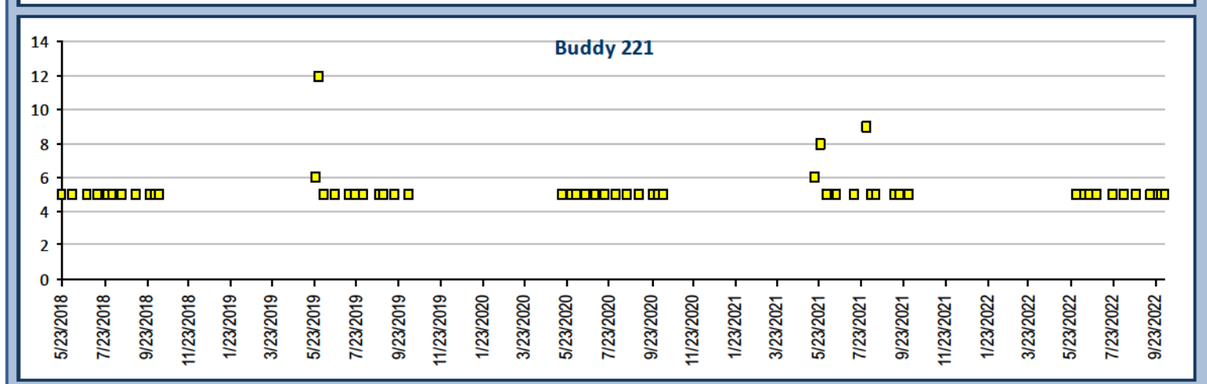
Water Monitoring Bons Creek Drainage
Water Quality Profile I , 5-Year Trend Charts

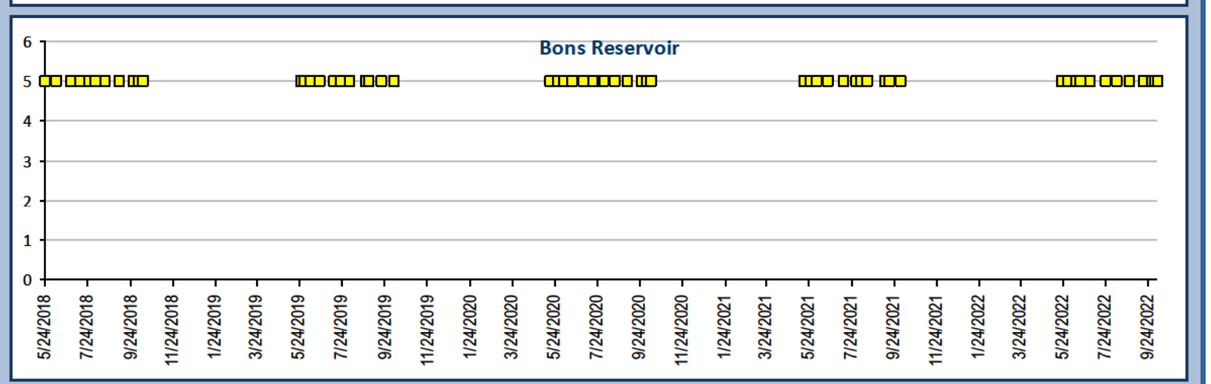
Total Suspended Solids, units mg/L

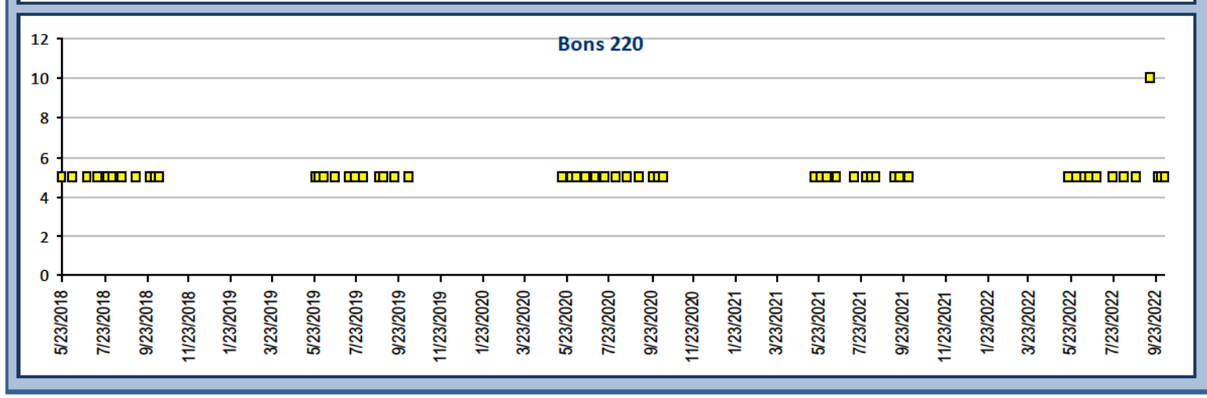


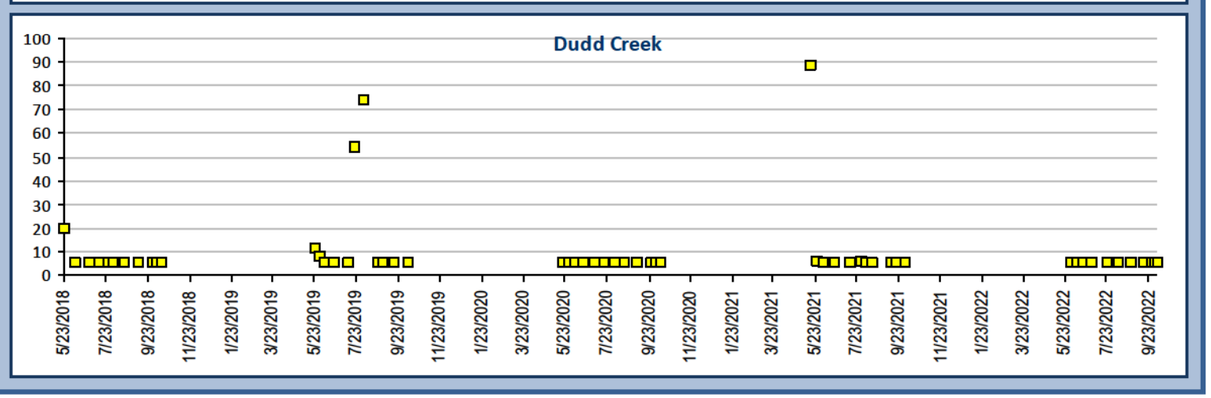












RED DOG MINE

Water Monitoring Bons Creek Drainage
Water Quality Profile I , 5-Year Trend Charts

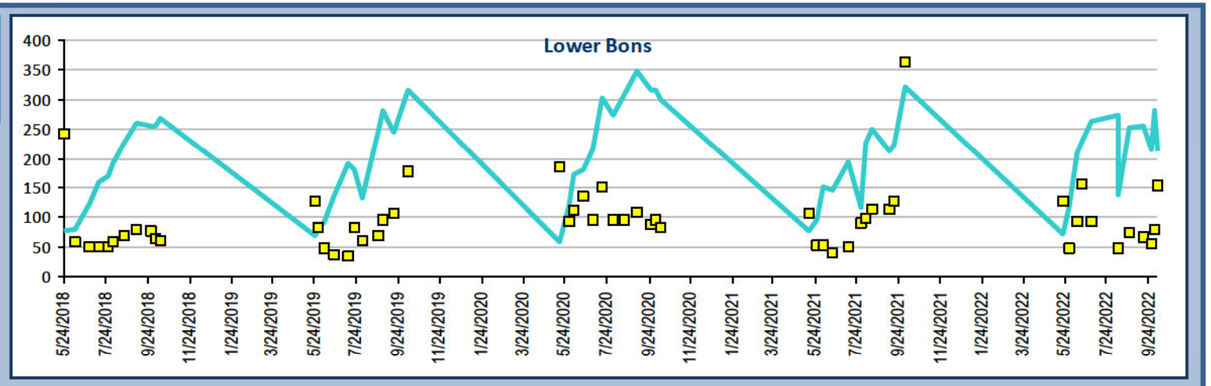
Zinc, Total Recoverable, units ug/L

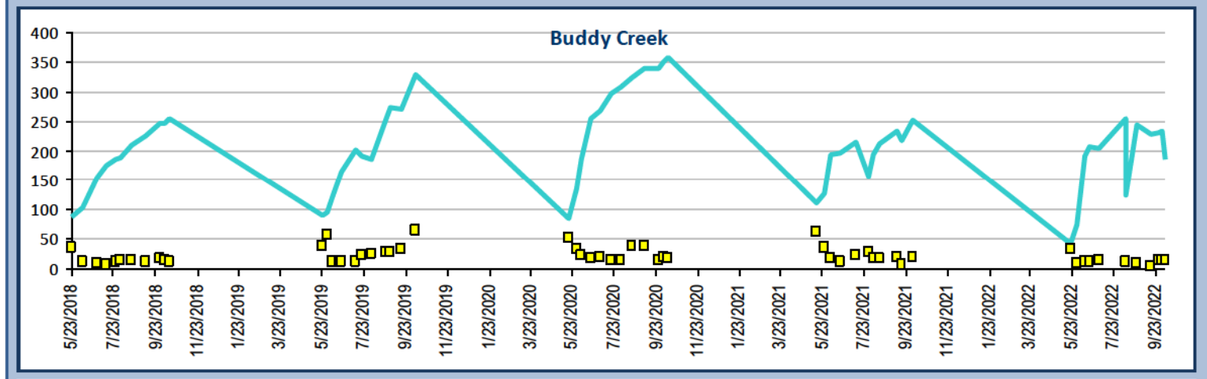
Aquatic Life - Fresh Water Acute WQS ug/L

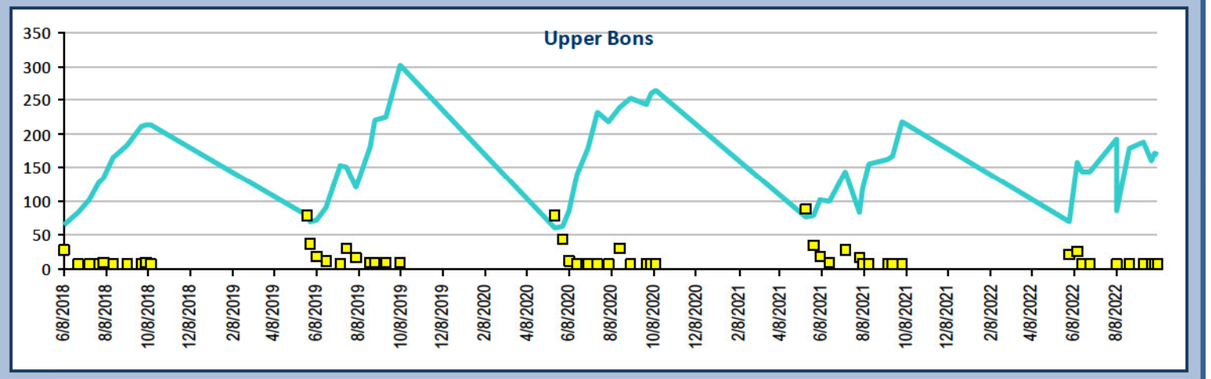
Hardness Dependent Calculation

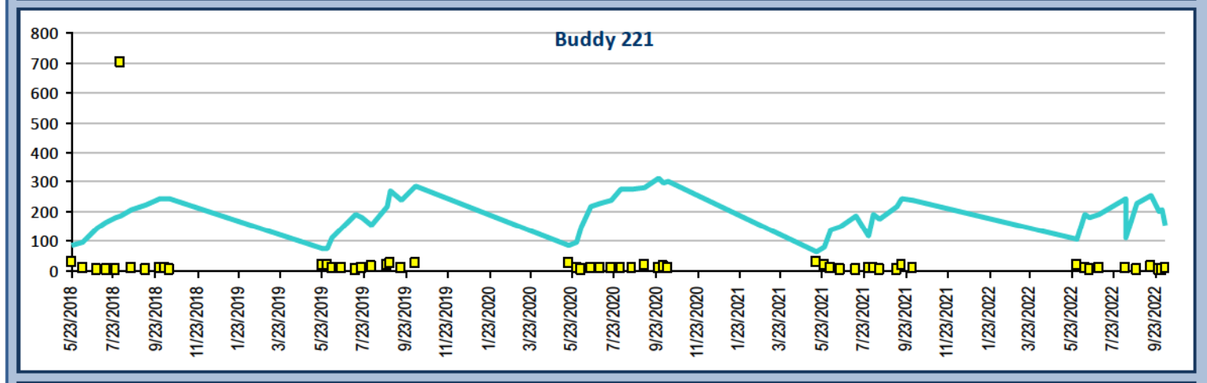
=EXP(0.8473*(LN(*hardness))+0.884)

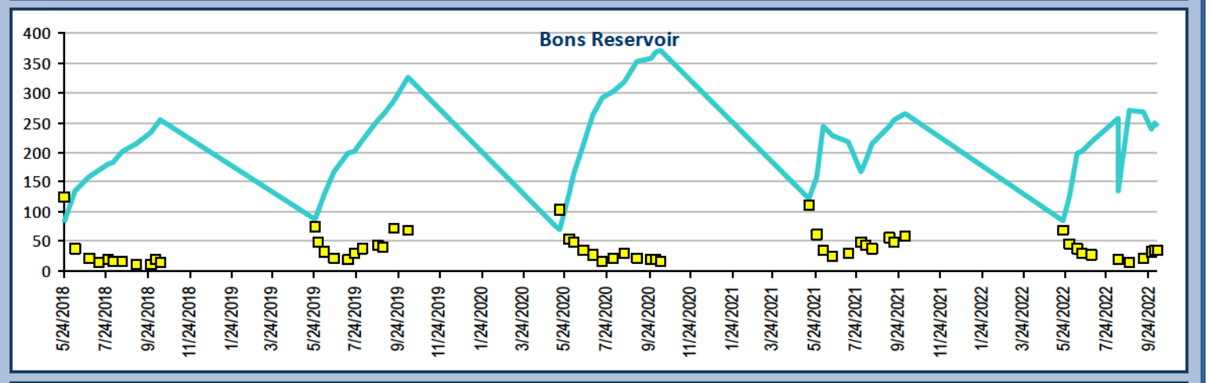
* Calculated using Standard Methods 2340B

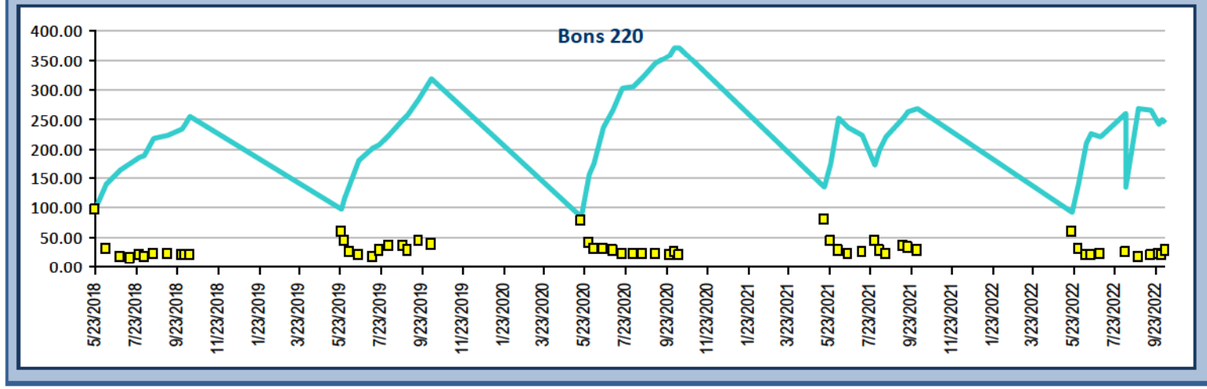


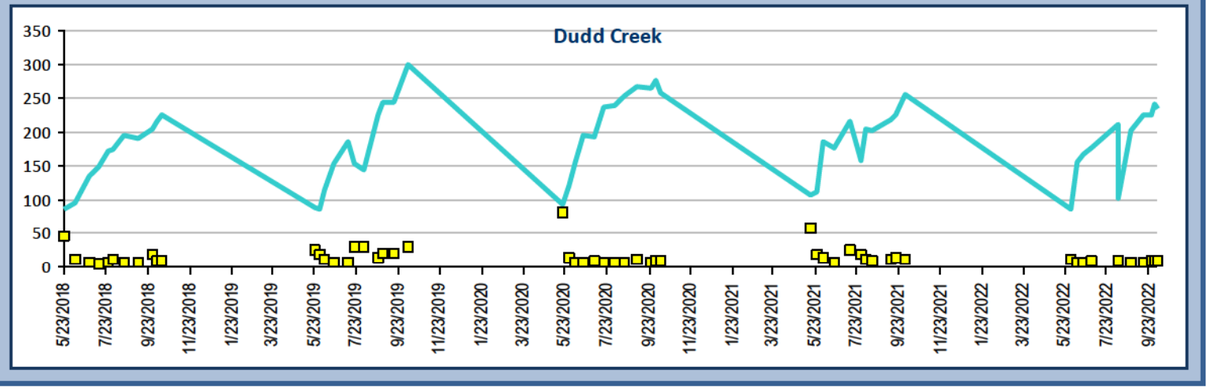






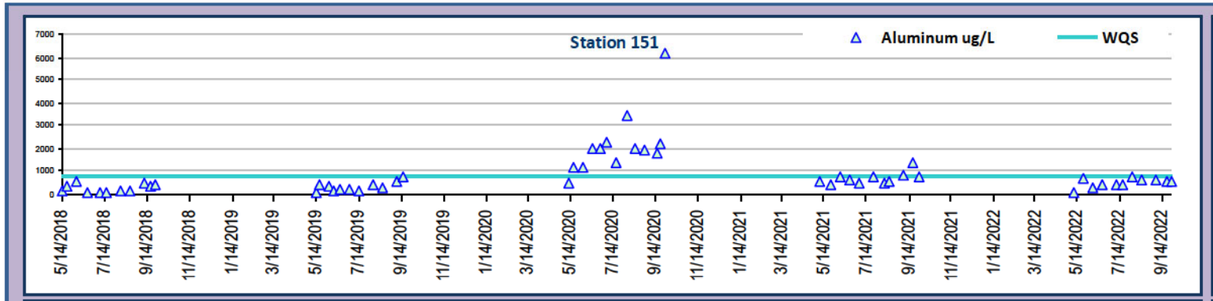


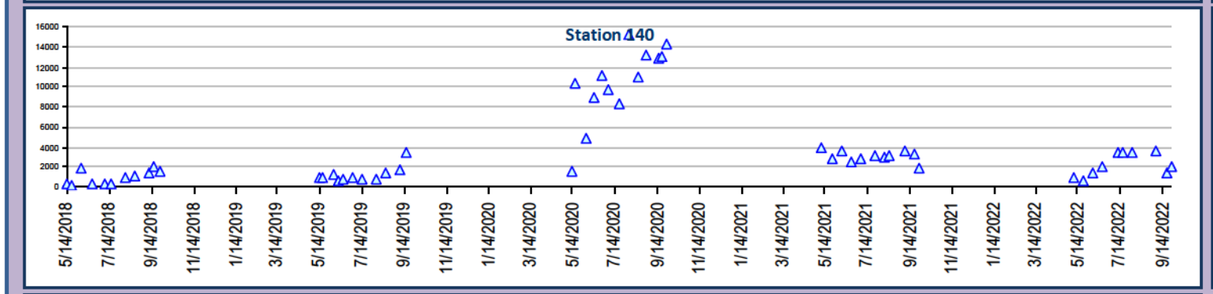


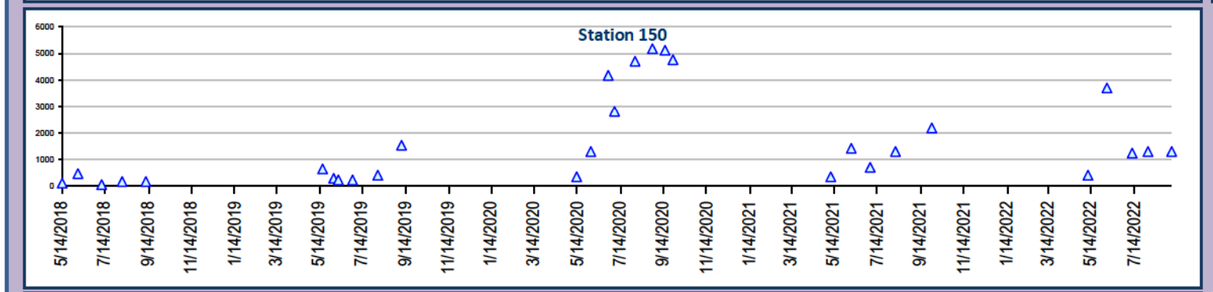


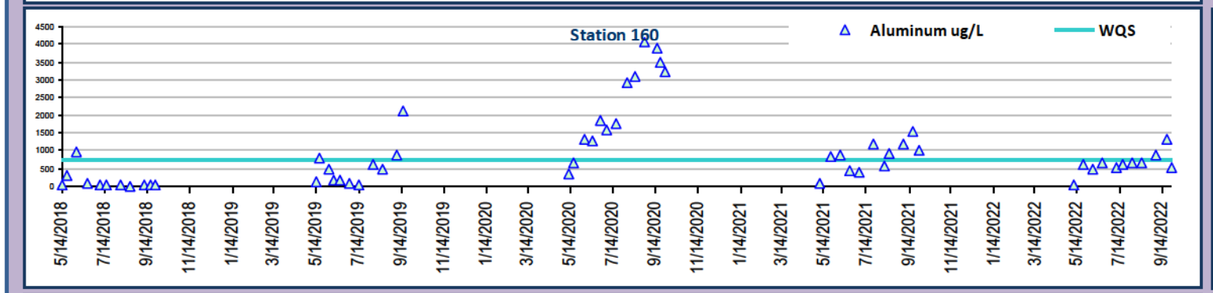
Appendix F: APDES Monitoring Station Trend Charts

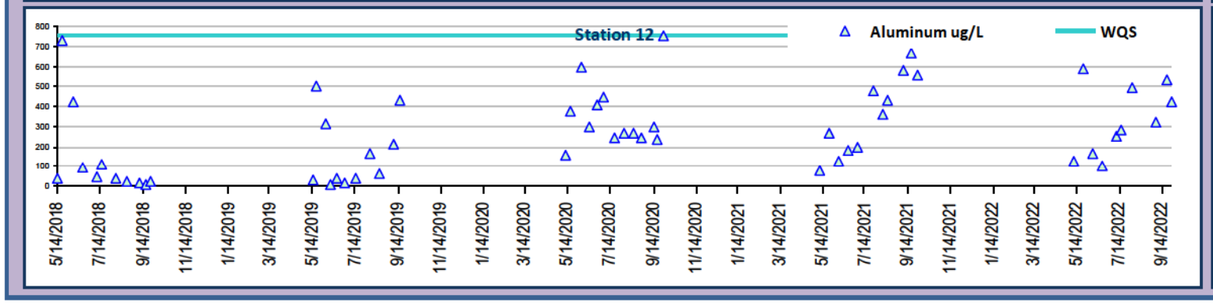
APDES Stations : Aluminum, Total, units ug/L - 5 Year Trend



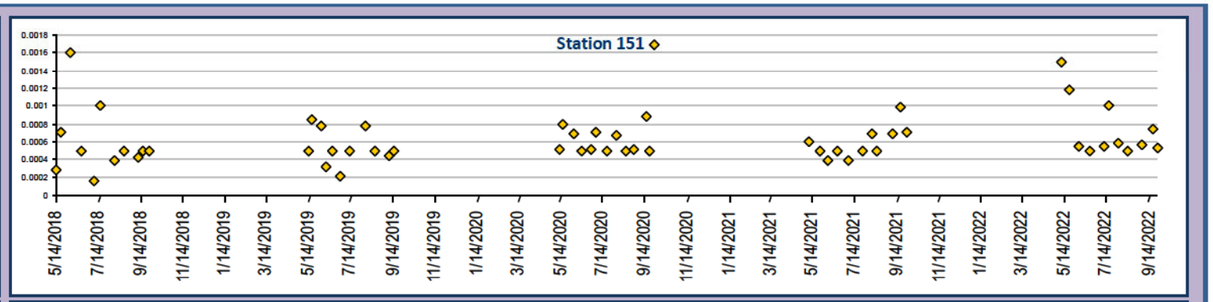


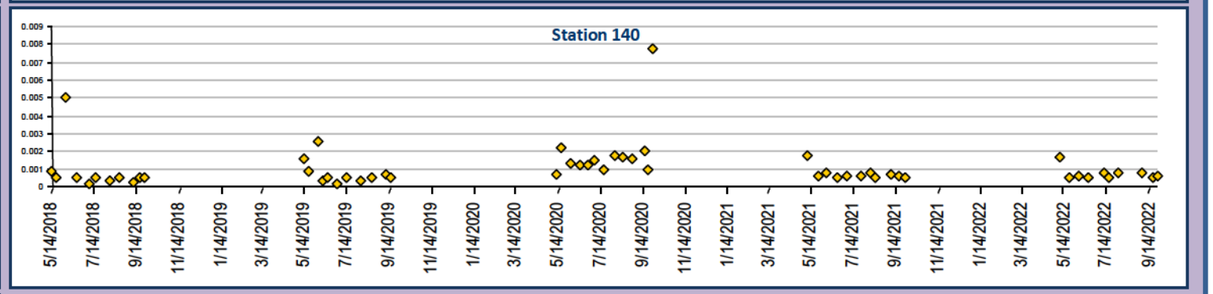


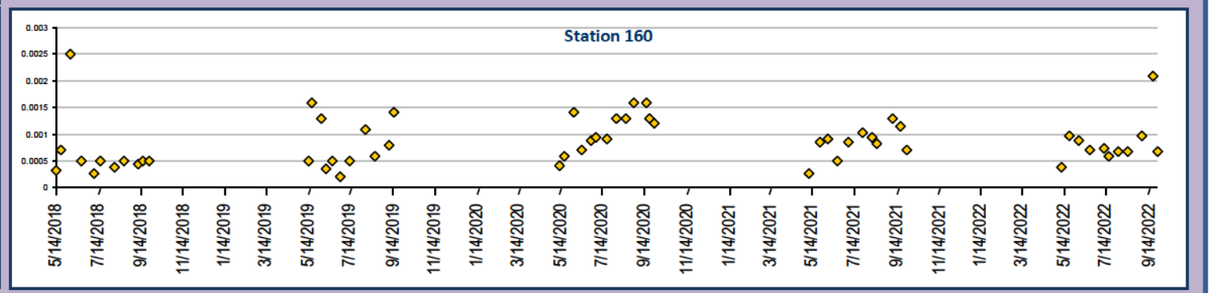


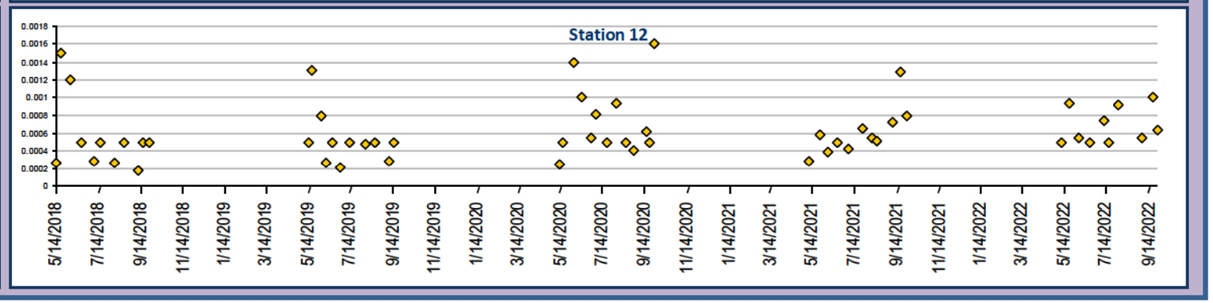


APDES Stations : Chromium, Total, units mg/L - 5 Year Trend

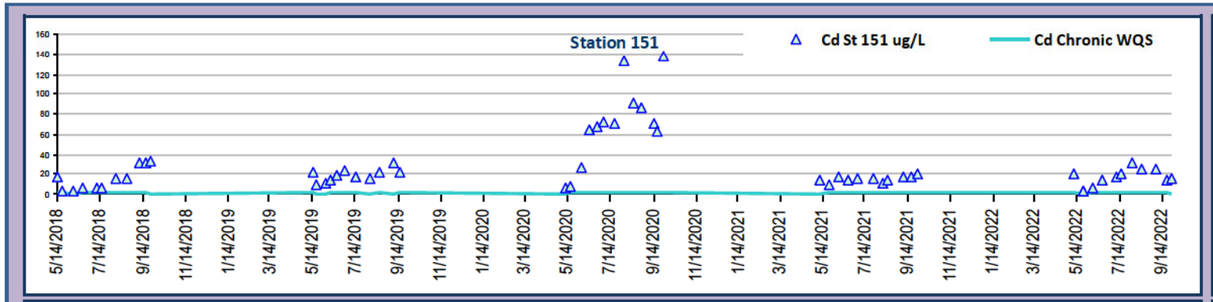


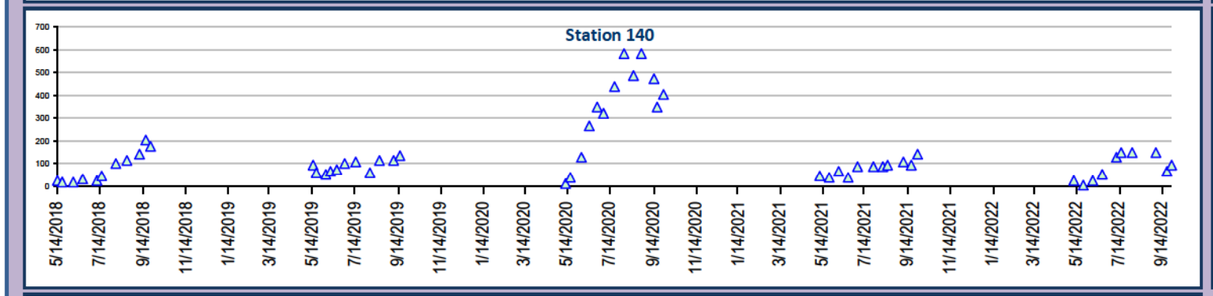


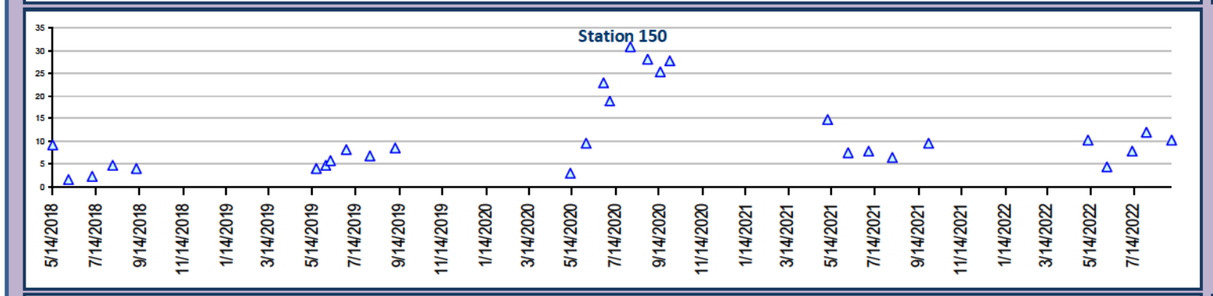


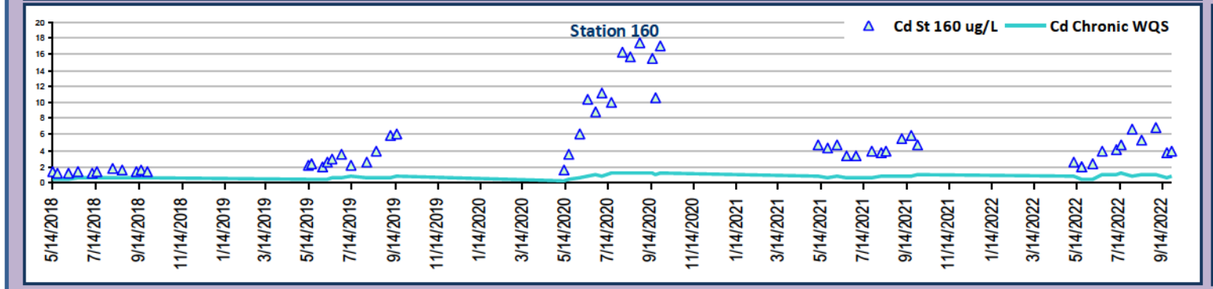


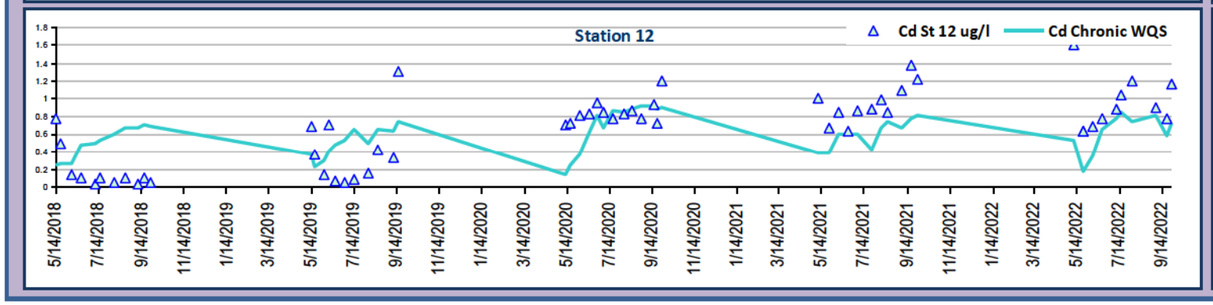
APDES Stations : Cadmium, Total, units ug/L - 5 Year Trend



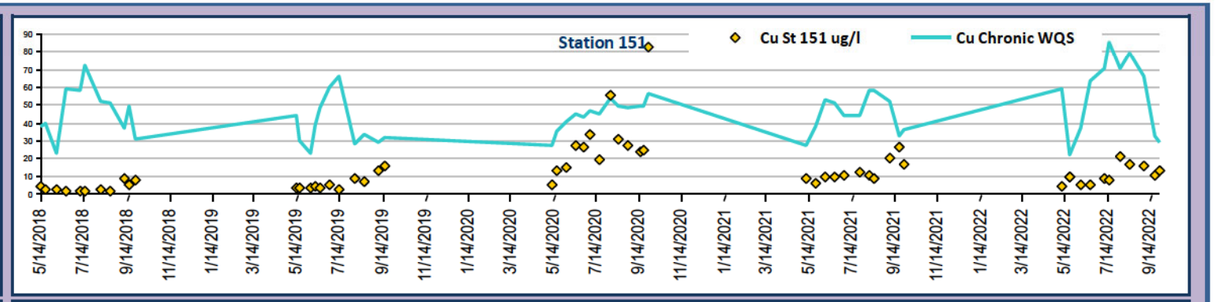


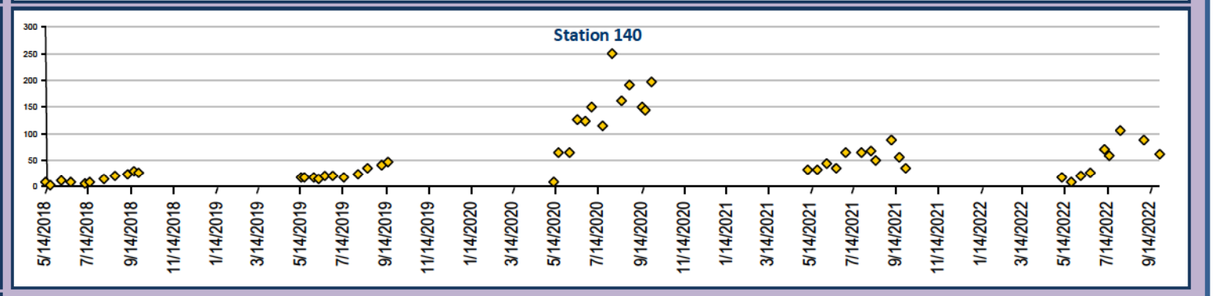


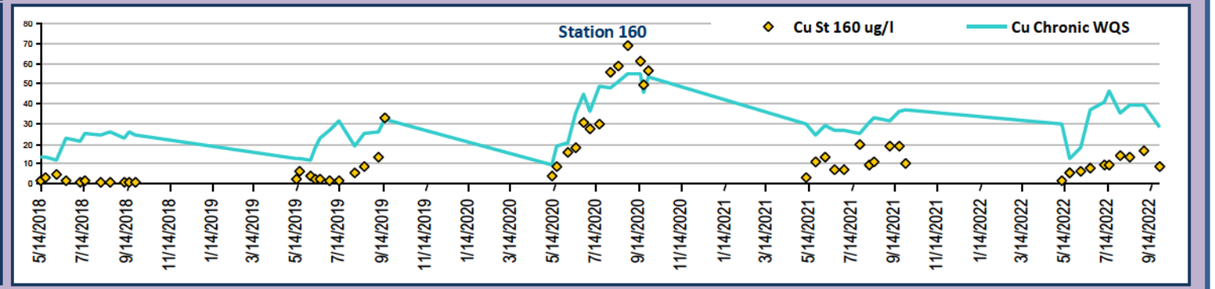


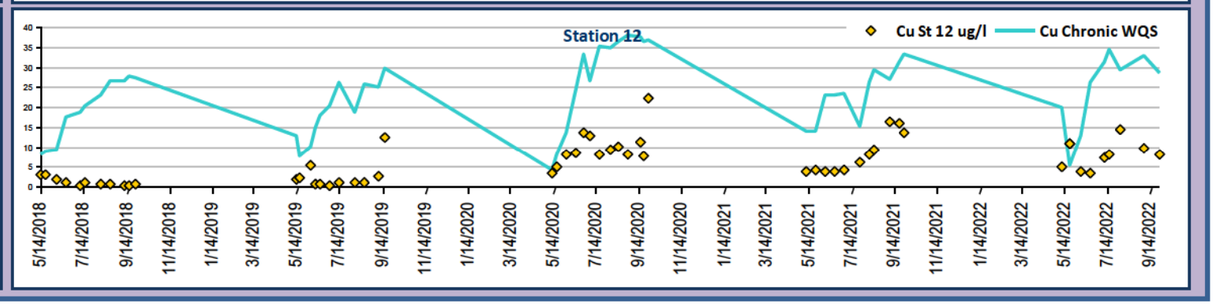


APDES Stations : Copper, Total, units, ug/L - 5 Year Trend

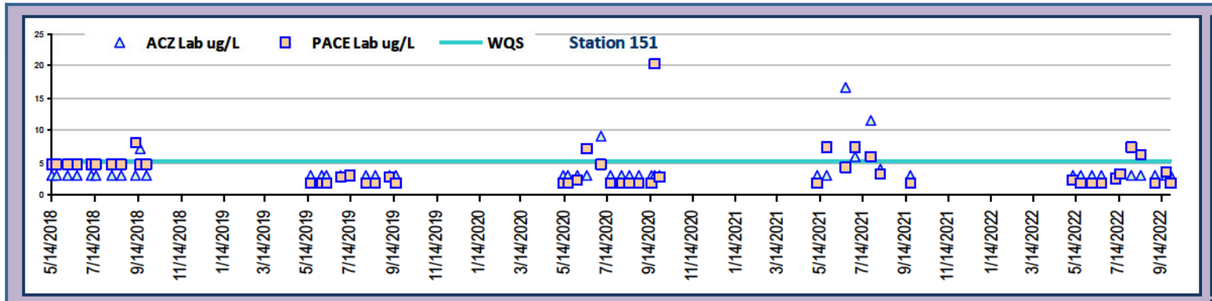




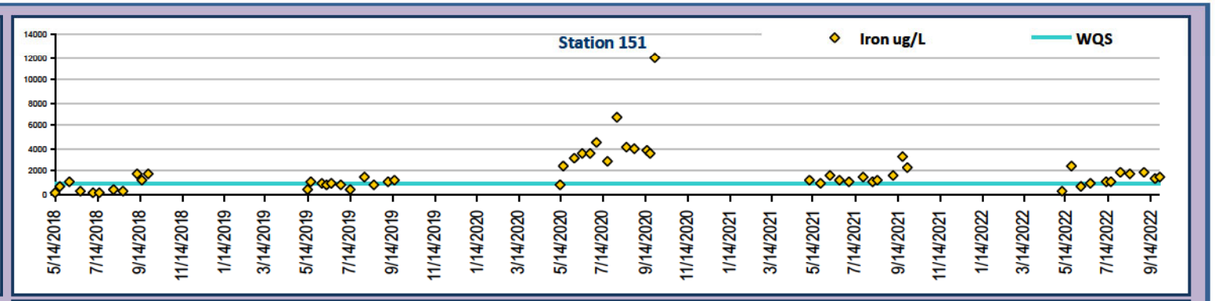


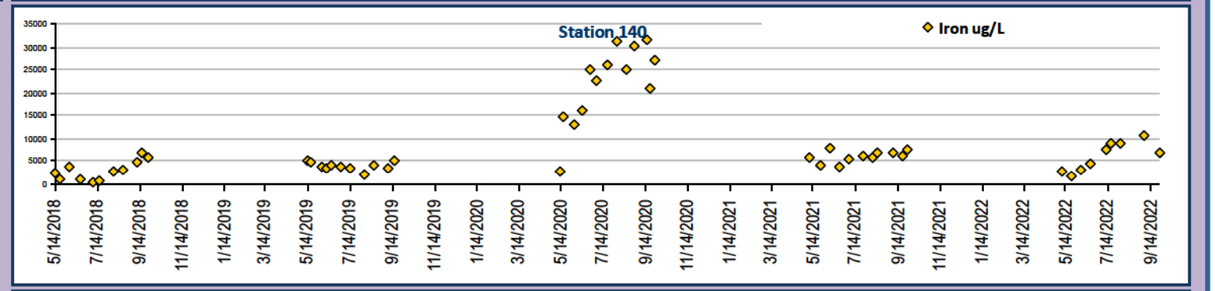


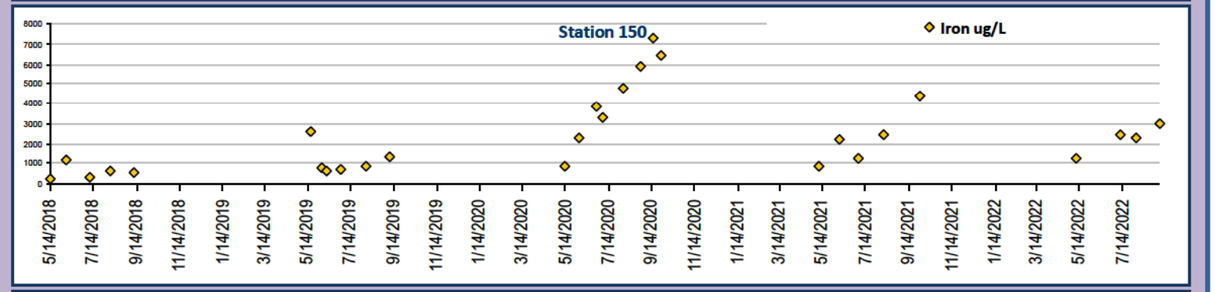
APDES Stations : Cyanide, WAD, units ug/L - 5 Year Trend

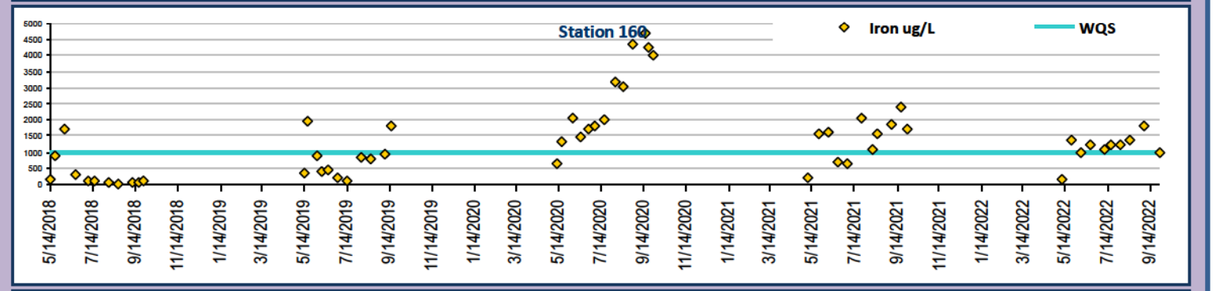


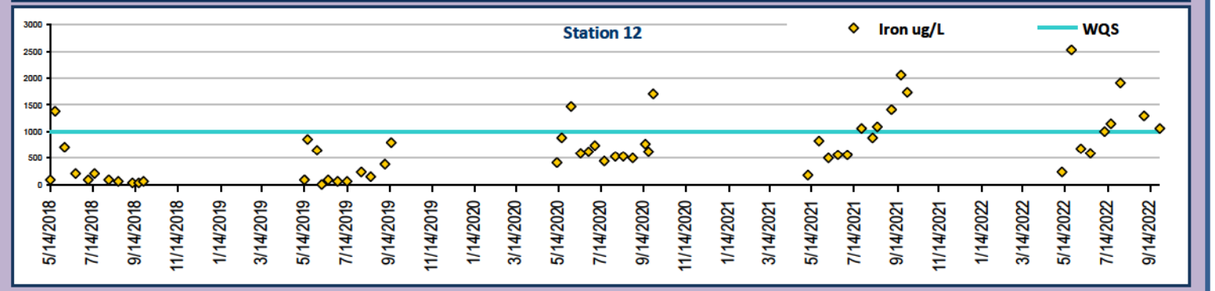
APDES Stations : Iron, Total, units, ug/L - 5 Year Trend



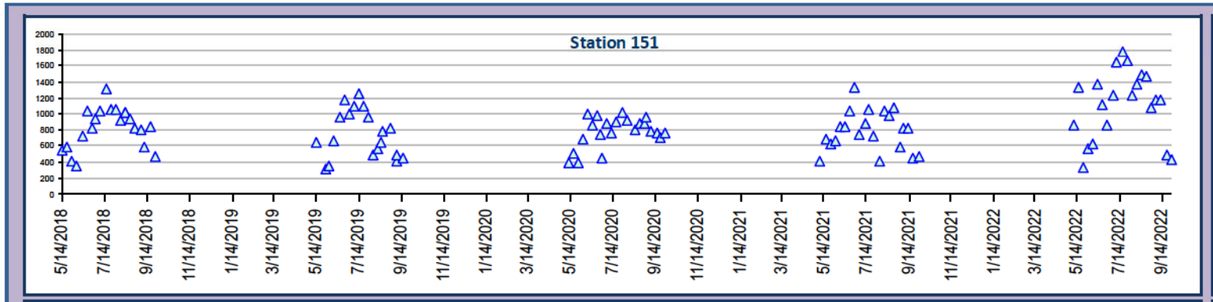


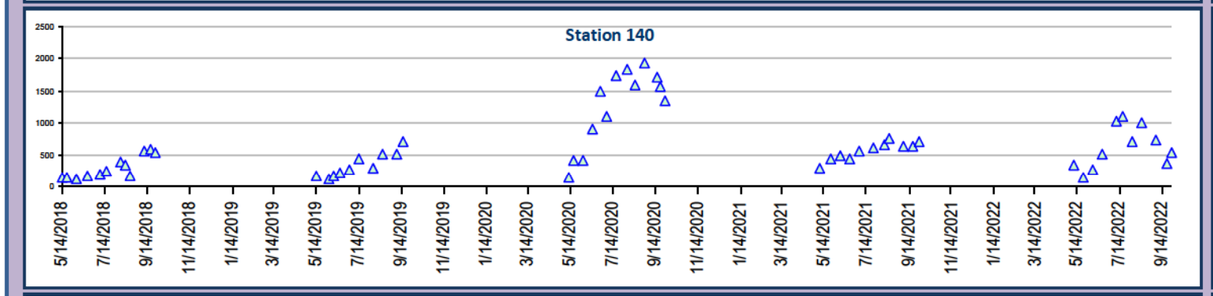


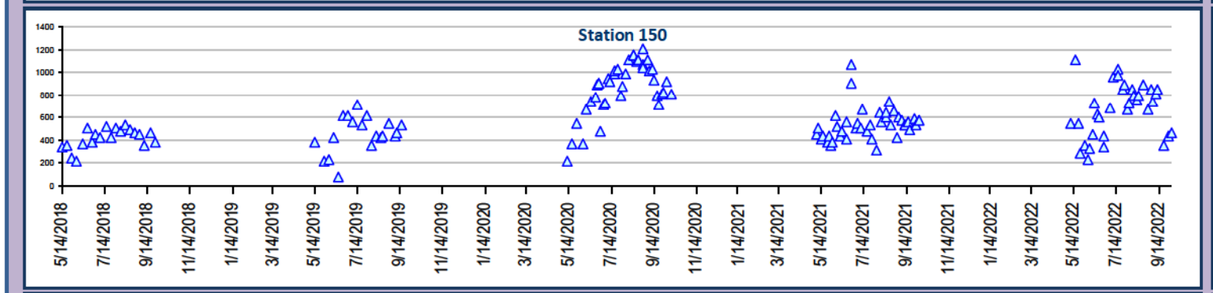


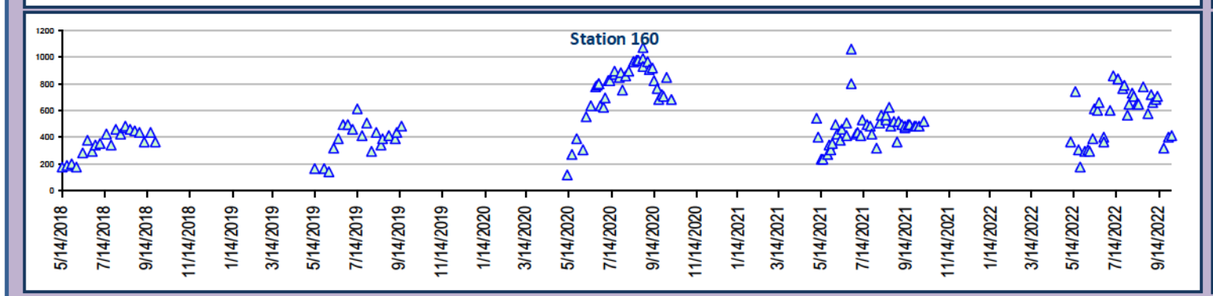


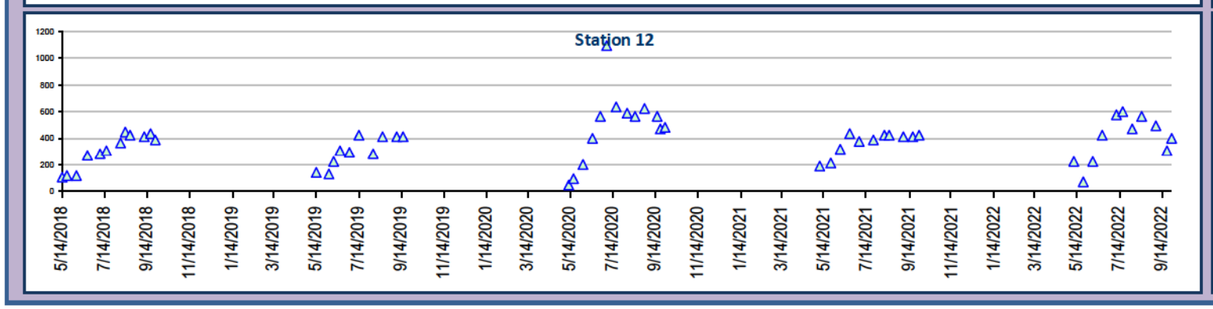
APDES Stations : Conductivity, Total, units uS/cm - 5 Year Trend



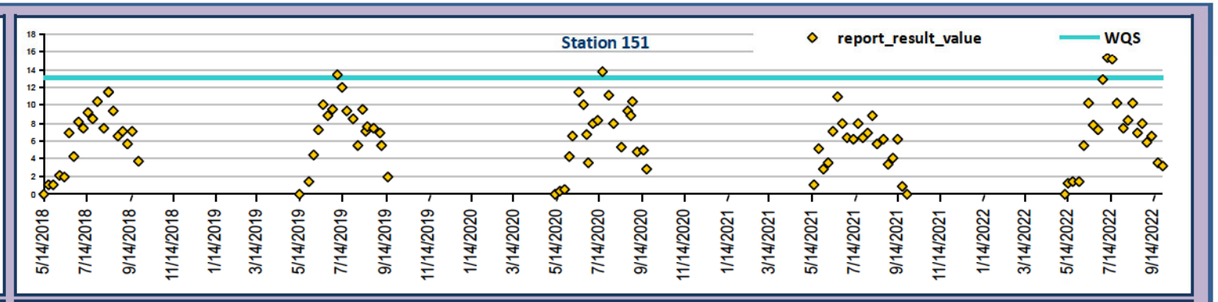


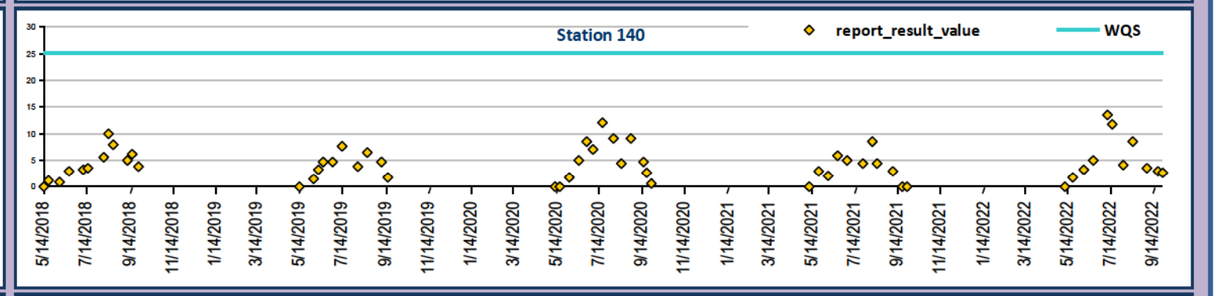


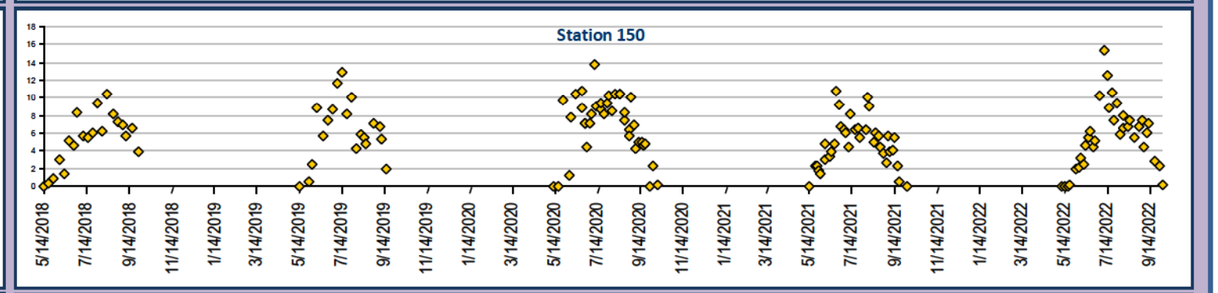


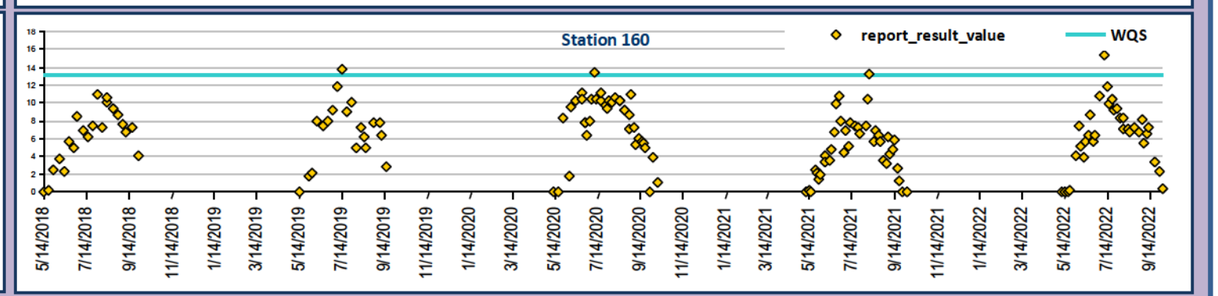


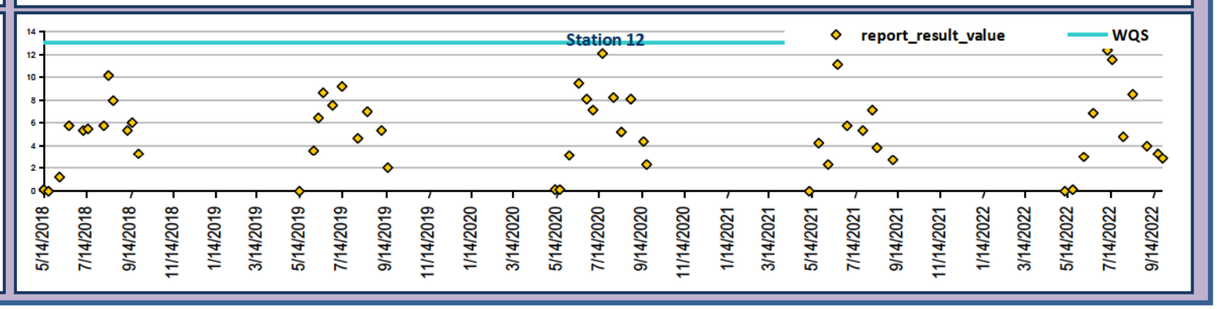
APDES Stations : Temperature, units Celsius - 5 Year Trend



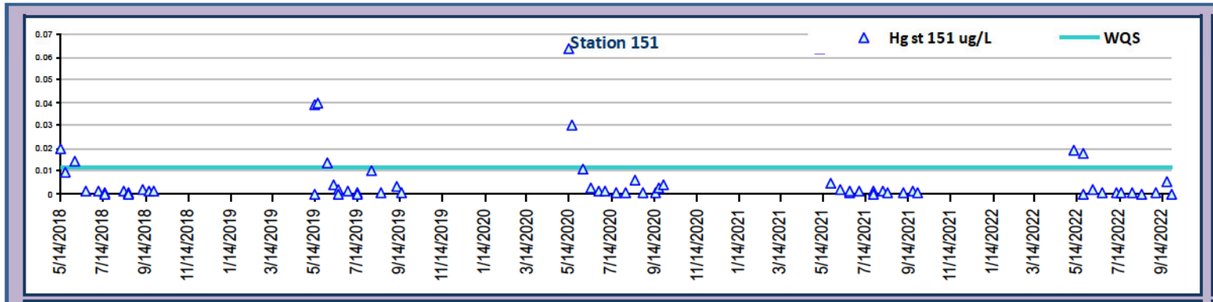


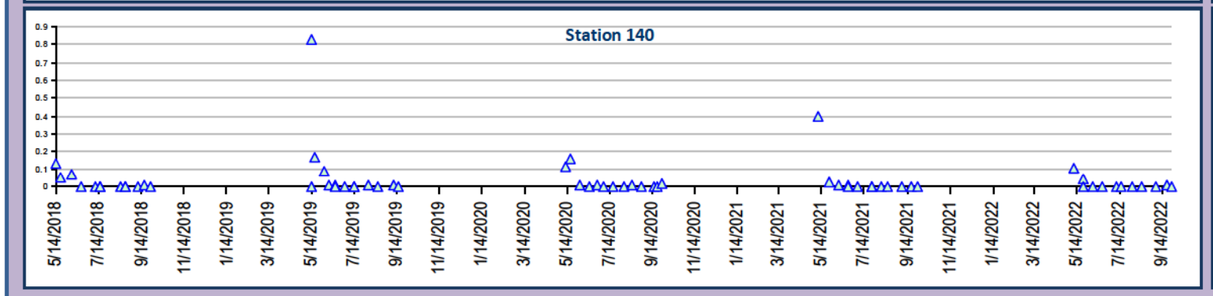






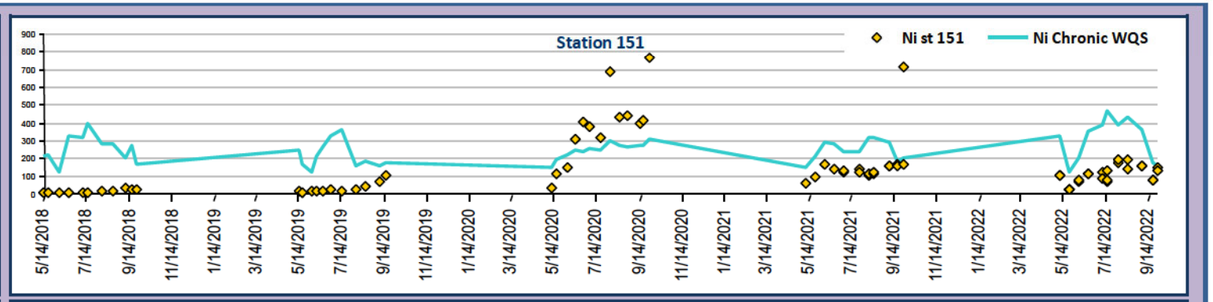
APDES Stations : Mercury, Total, units ug/L - 5 Year Trend

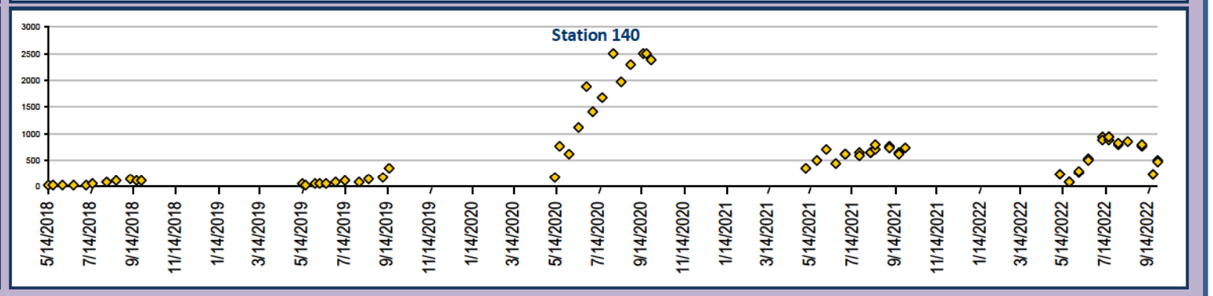


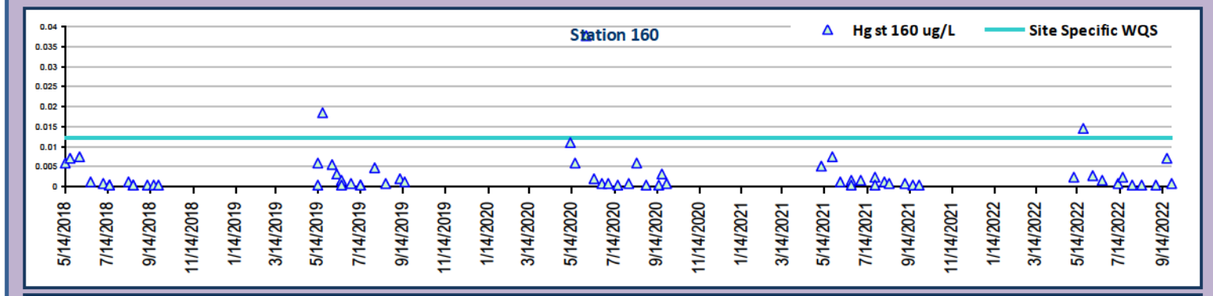


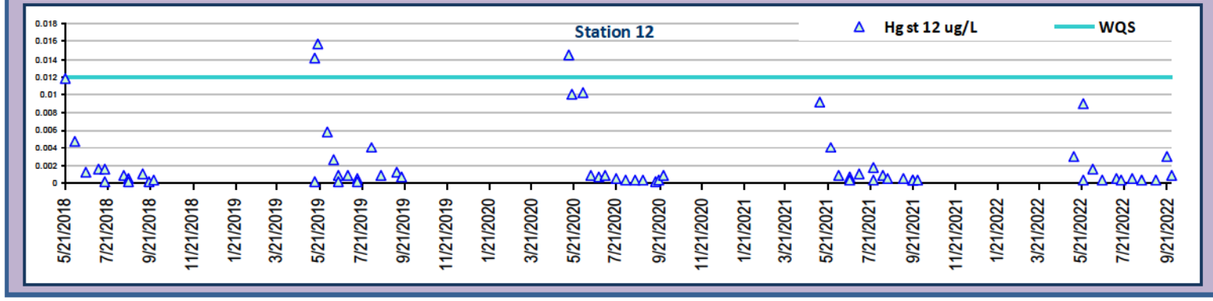
APDES Stations : Nickel, Total, units, ug/L - 5 Year Trend

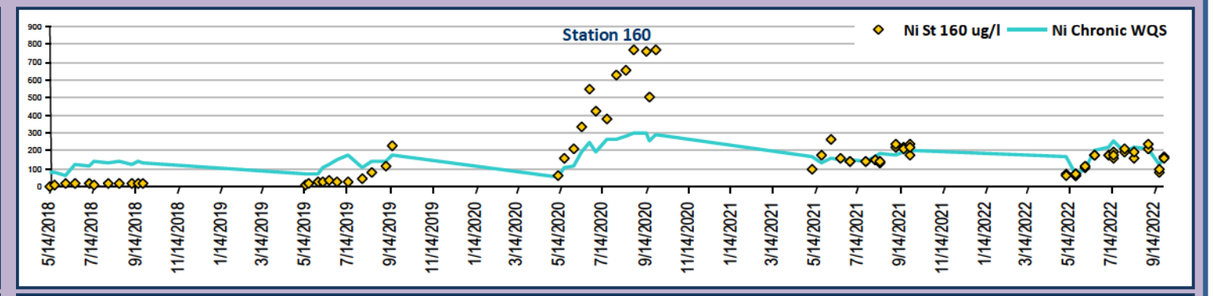
Teck

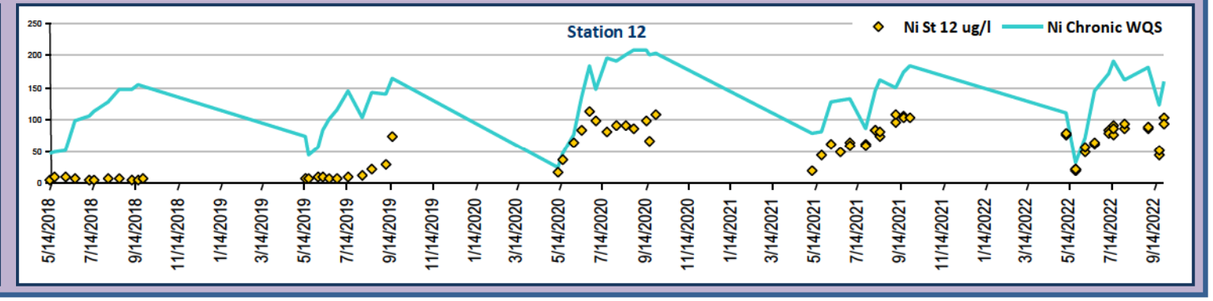




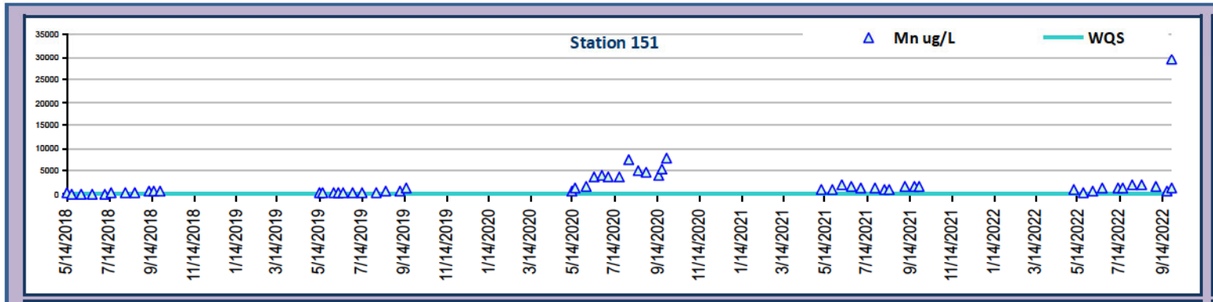


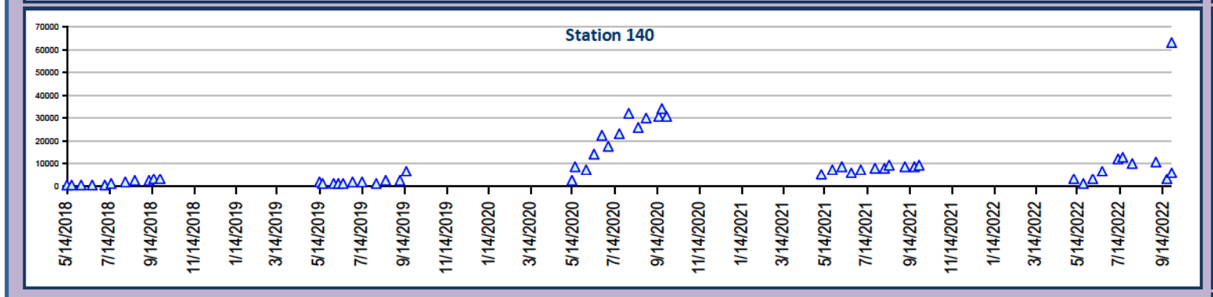


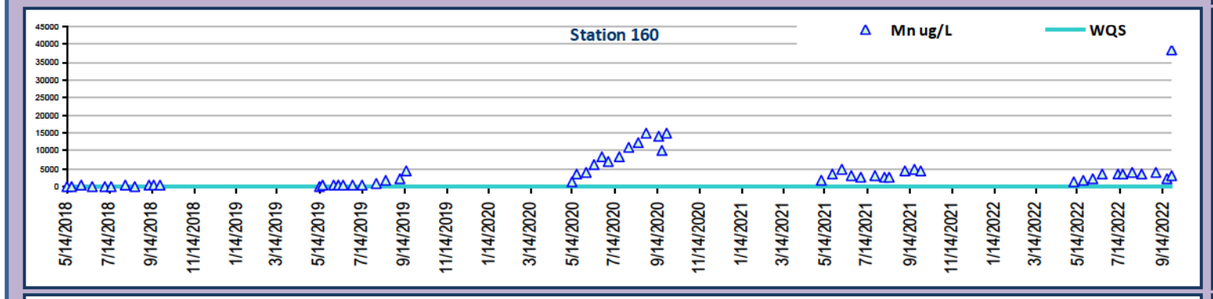


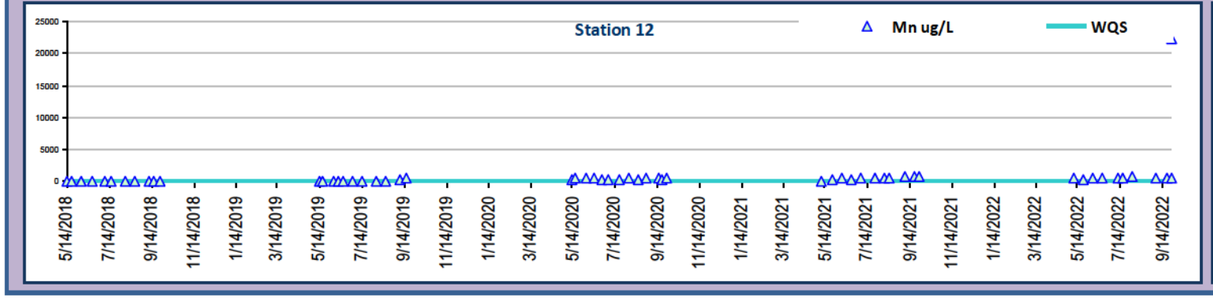


APDES Stations : Manganese, Total, units ug/L - 5 Year Trend



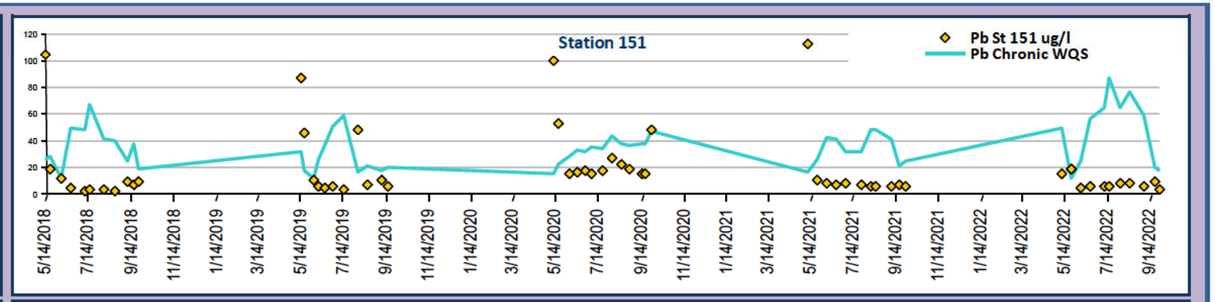


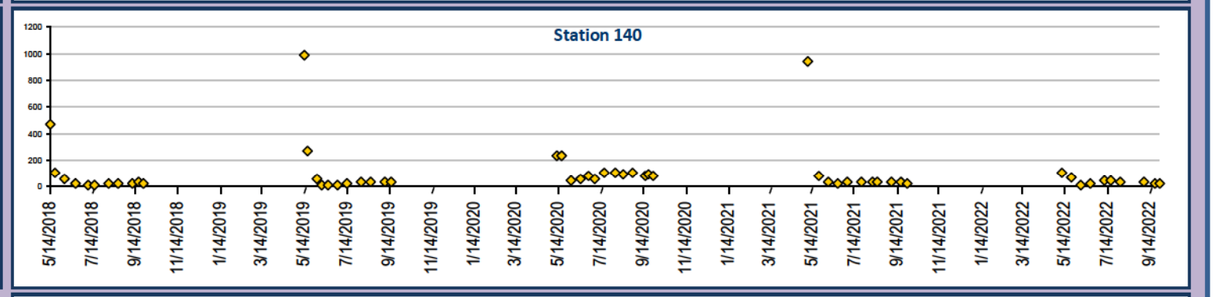


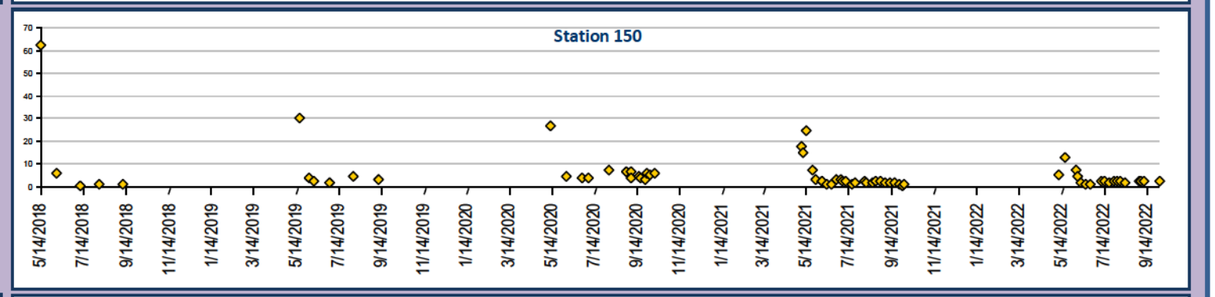


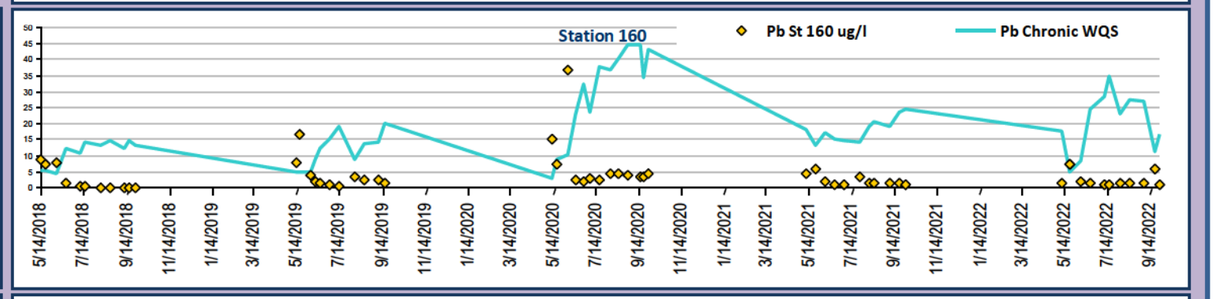
APDES Stations : Lead, Total, units, ug/L - 5 Year Trend

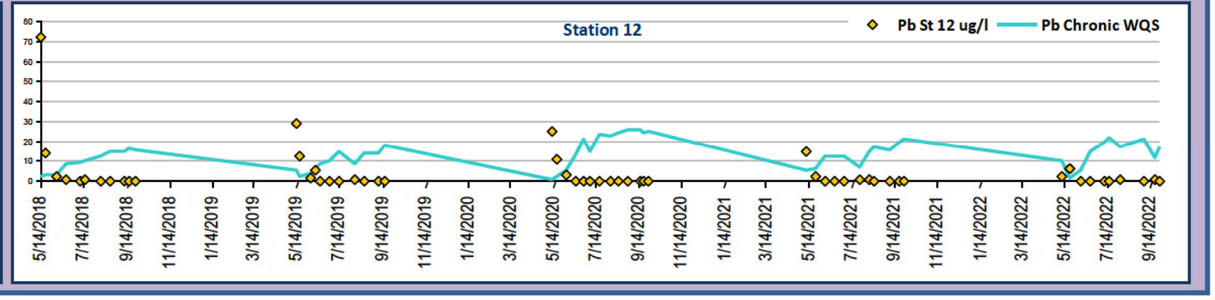
Teck



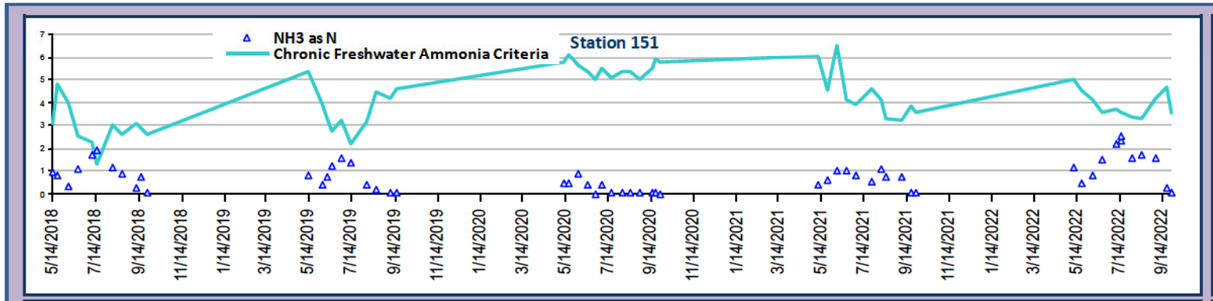


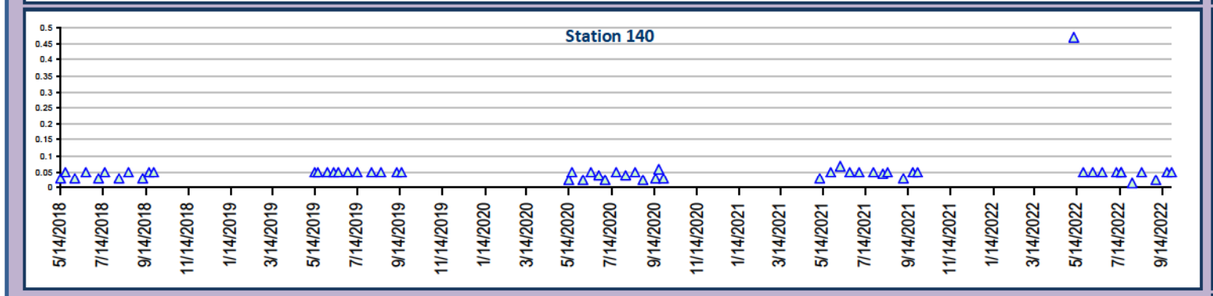


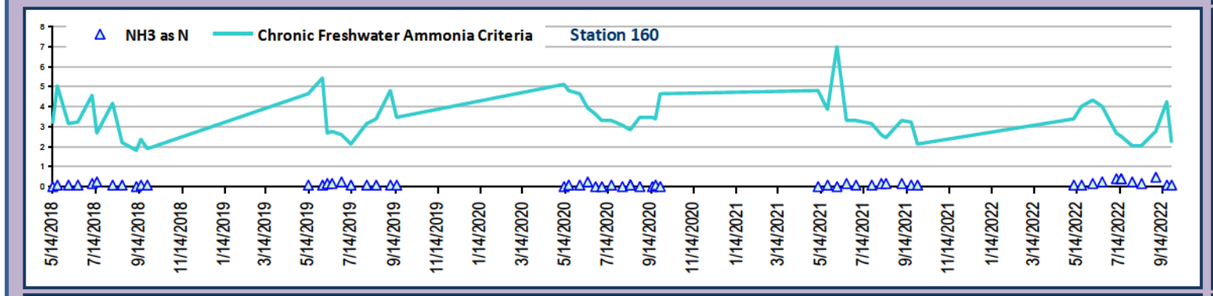


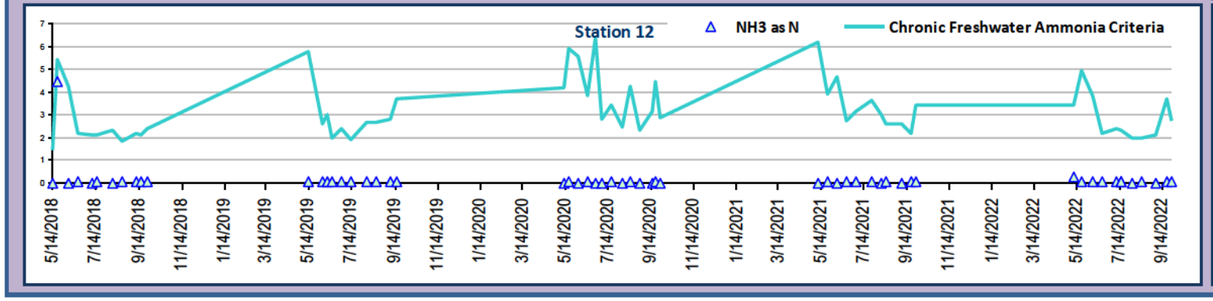


APDES Stations : NH3-N, Total, units mg/l - 5 Year Trend



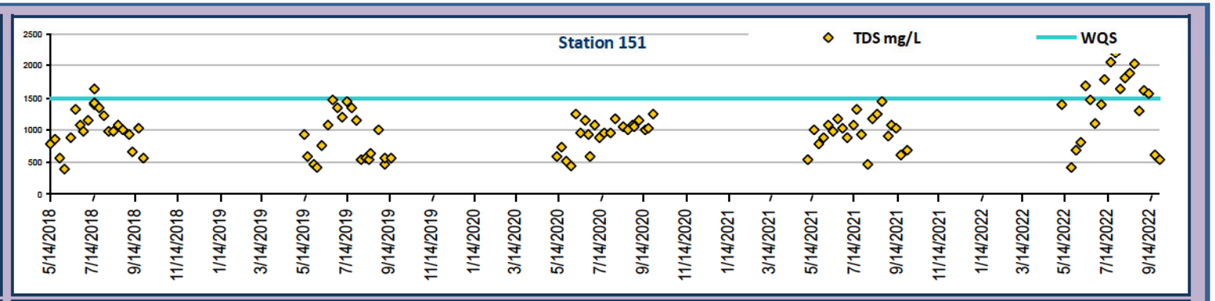


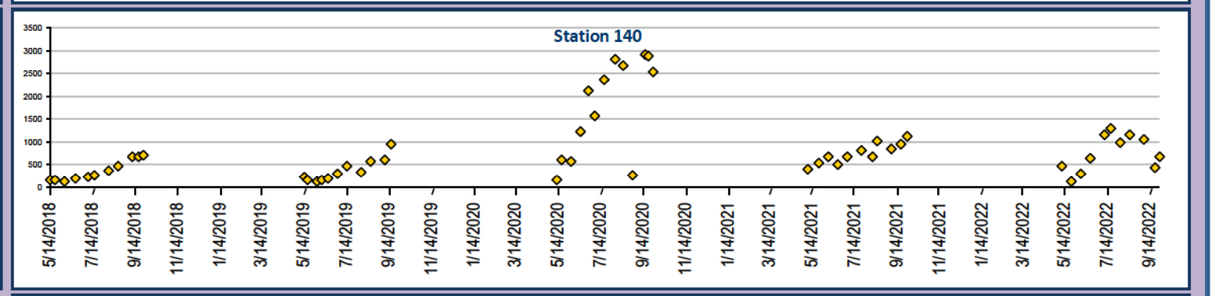


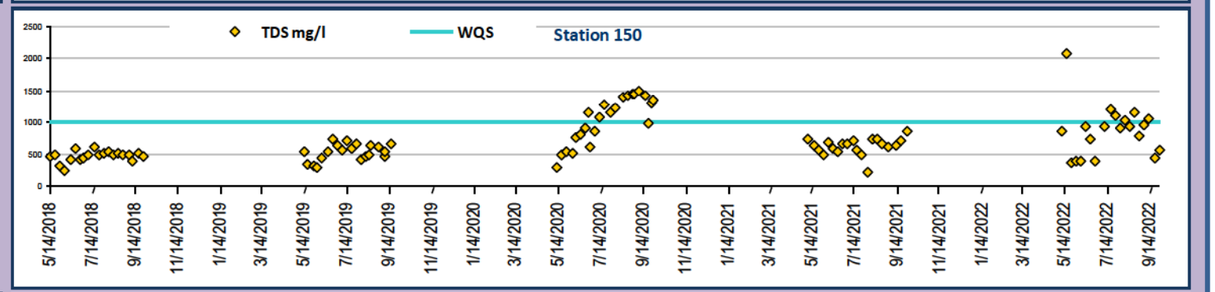


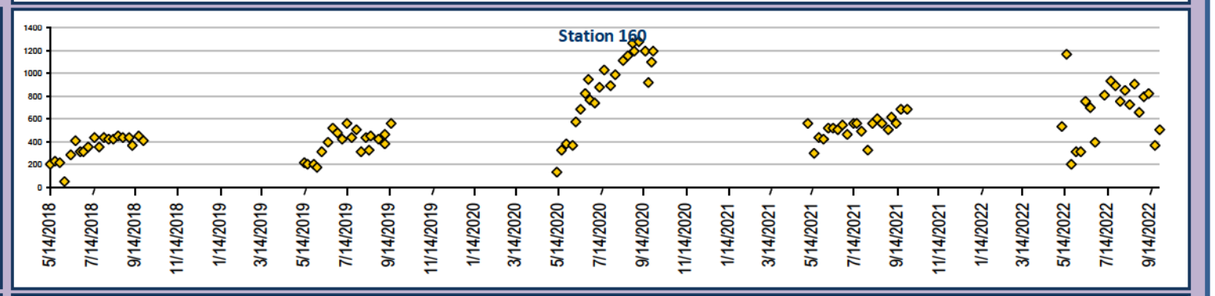
APDES Stations : TDS, units mg/l - 5 Year Trend

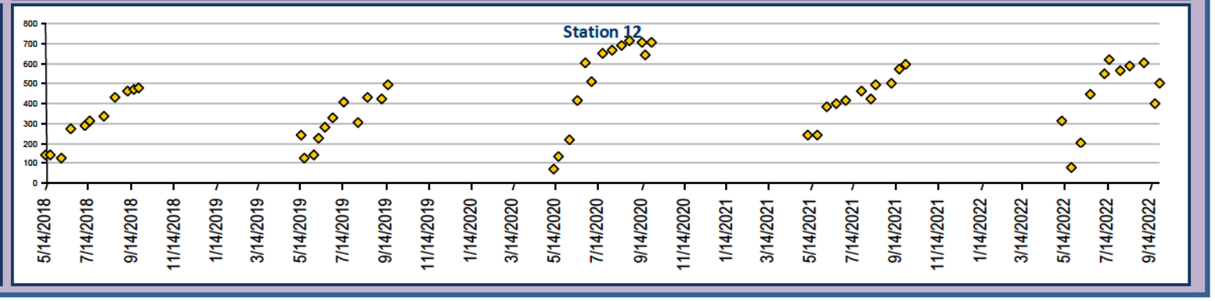
Teck



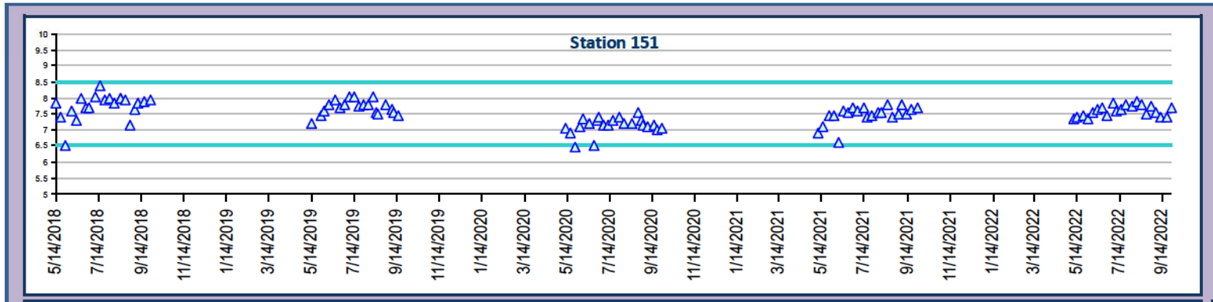


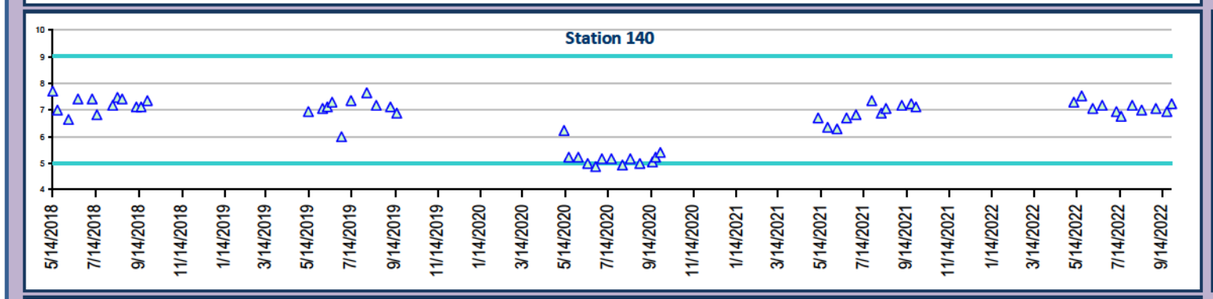


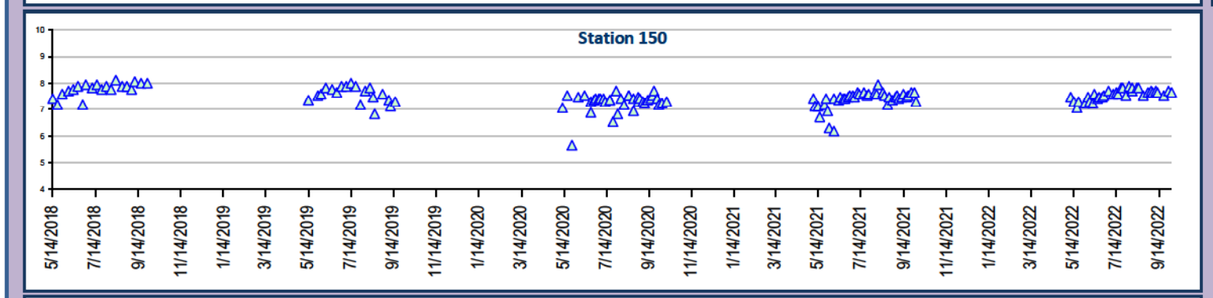


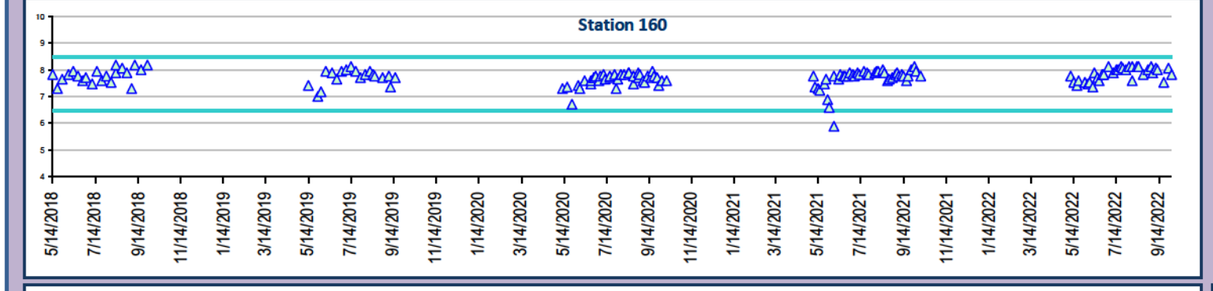


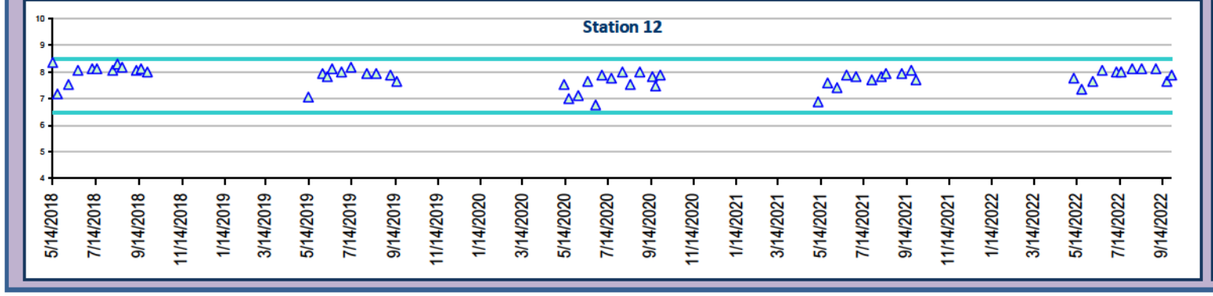
APDES Stations : pH, units - 5 Year Trend



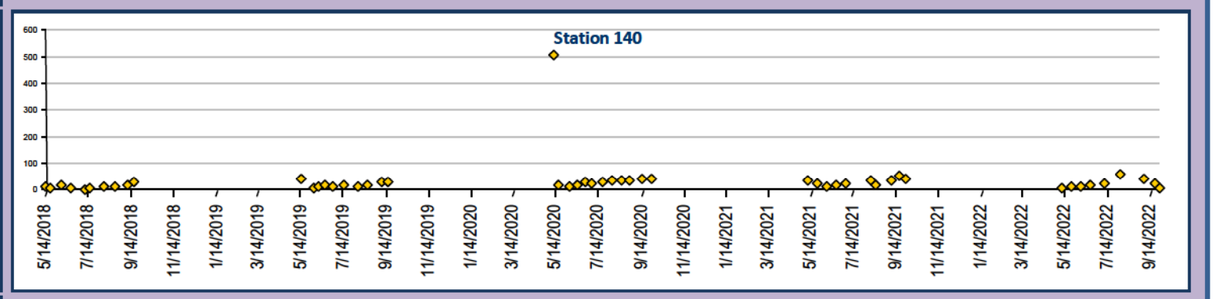


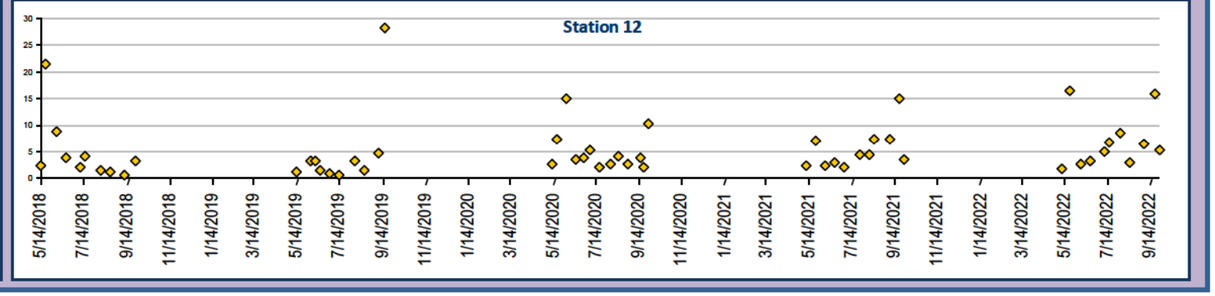




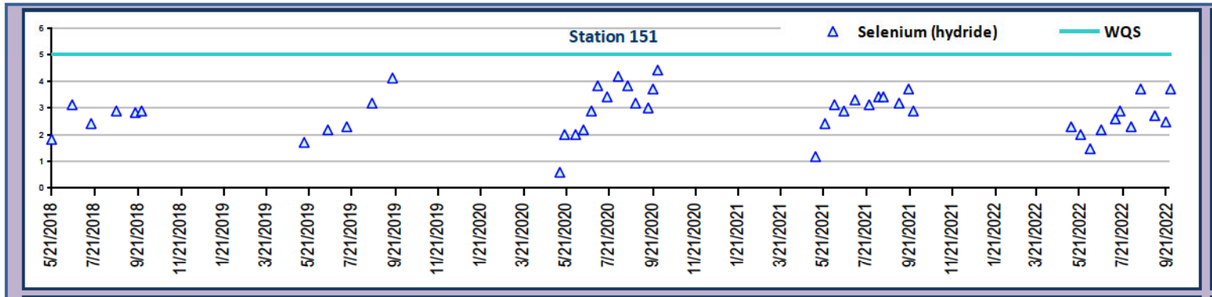


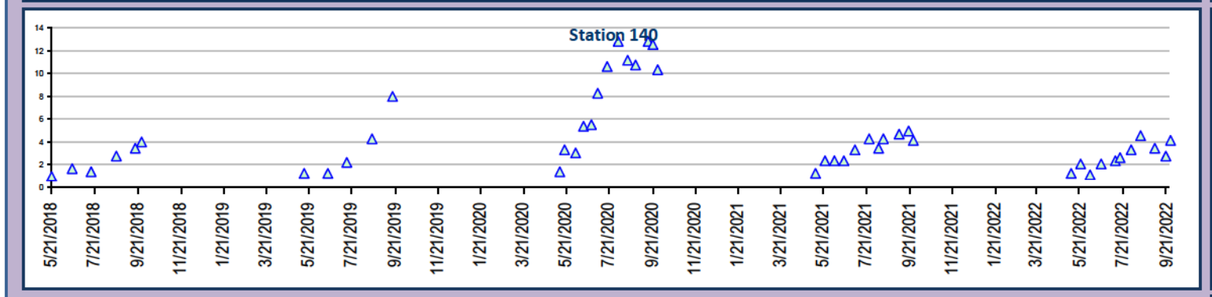
APDES Stations : Turbidity, Total, units NTU - 5 Year Trend

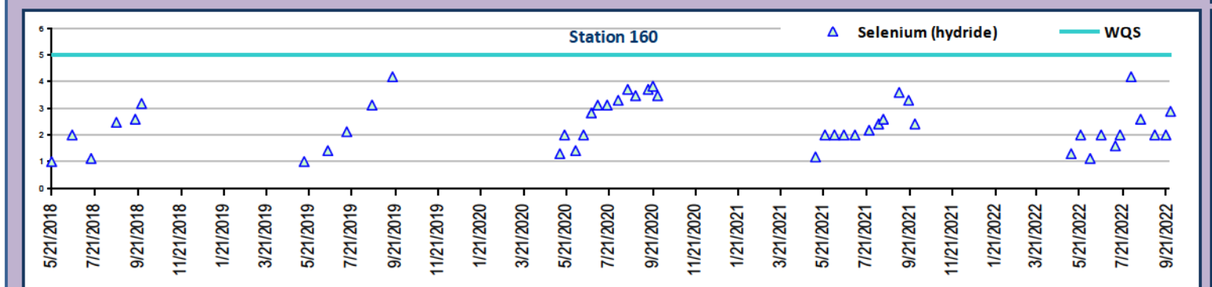


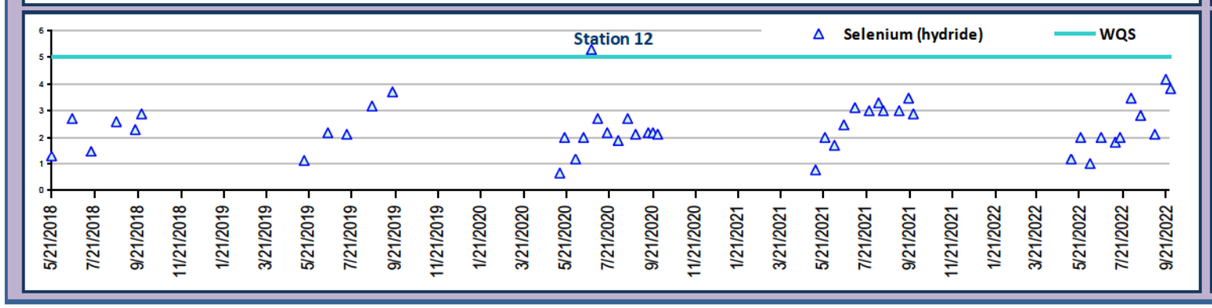


APDES Stations : Selenium, units, ug/l - 5 Year Trend

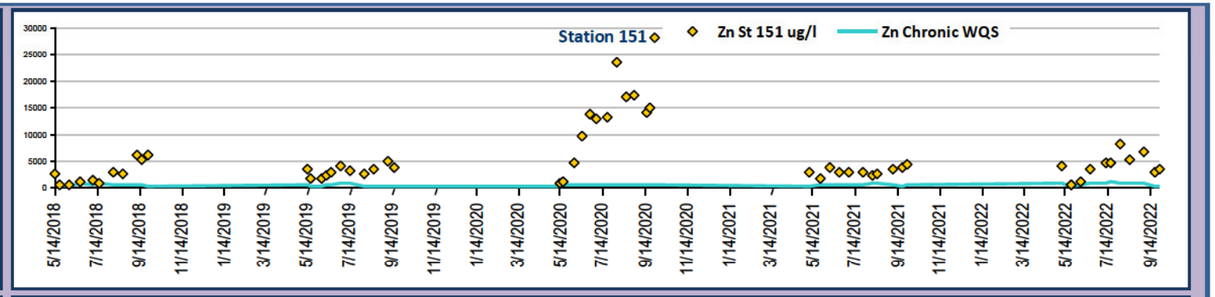


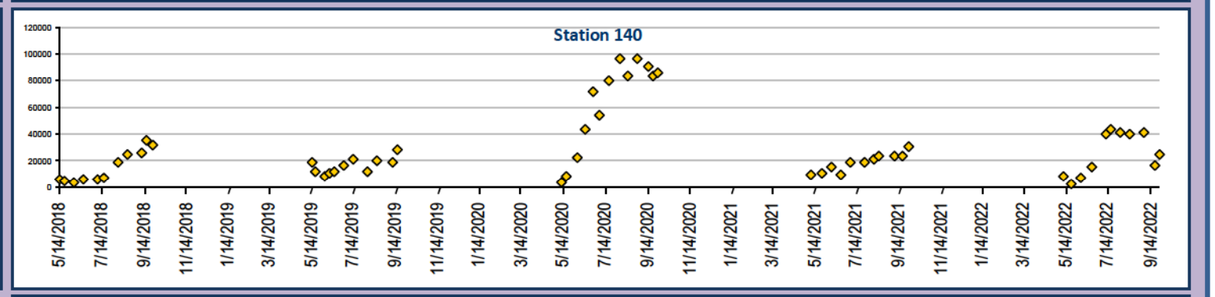


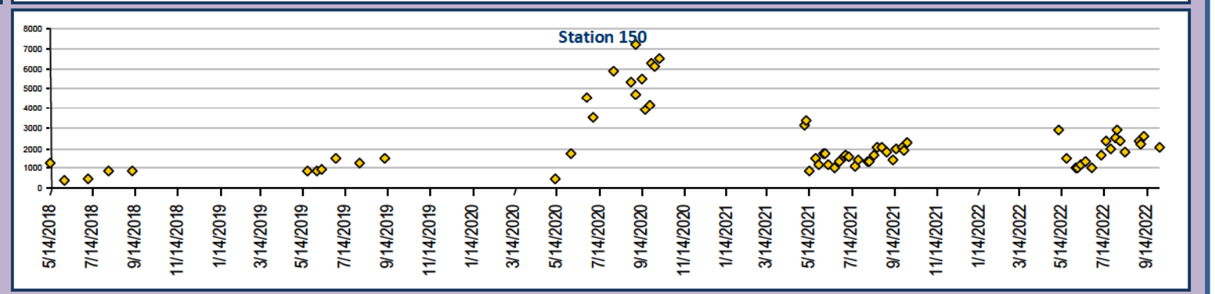


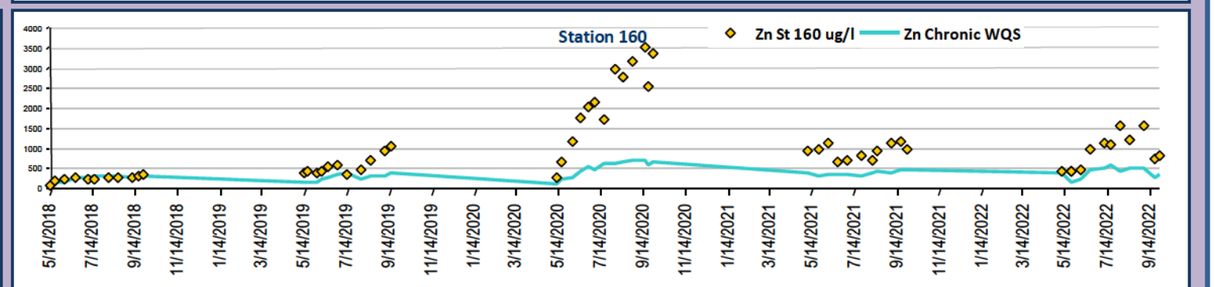


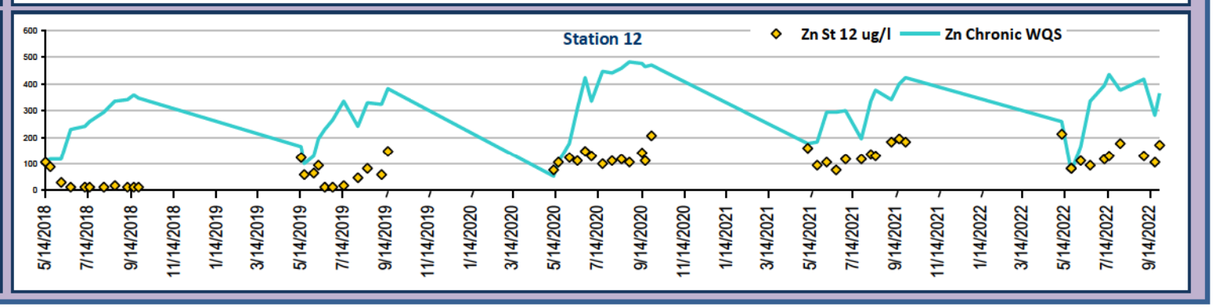
APDES Stations : Zinc, Total, units ug/l - 5 Year Trend











Appendix G: Waste Rock Management Summary Reports

Quarterly Waste Rock Production Report

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Production Month **October 2022**

Waste Type: Construction Waste	**Tonnes**	**Avg Zn%**	**Avg Fe%**	**Avg Pb%**
Formation: Ikalukrok				
Placed Location				
Portable crusher Pad	23,413	3.85%	2.42%	1.99%
Placed Location				
Crusher Pad	154	0.47%	0.45%	2.19%
Formation: Siksikpuk				
Placed Location				
Haul Road Maintenance	184	0.70%	6.60%	0.90%
Placed Location				
West Spur Dump	4,007	0.85%	4.27%	1.72%
Waste Type Subtotal	**27,758**			

Waste Type: Other Waste	**Tonnes**	**Avg Zn%**	**Avg Fe%**	**Avg Pb%**
Formation: Ikalukrok				
Placed Location				
Main Pit Dump 3	327	0.30%	2.60%	0.10%
Placed Location				
Main pit dump 4	14,527	0.28%	2.58%	0.10%
Placed Location				
Main Pit Dump 5	1,740	0.30%	2.60%	0.10%
Placed Location				
Qanaiyaq Pit Dump 1	170,794	0.66%	0.69%	2.47%
Formation: Okpikruak				
Placed Location				
Main Pit Dump 3	44,476	0.14%	5.67%	0.13%
Placed Location				
Main Pit Dump 5	74,498	0.14%	5.67%	0.13%
Formation: Siksikpuk				
Placed Location				
Landfill @MWD	2,813	1.08%	0.85%	2.93%
Placed Location				
Main Pit Dump 3	93,479	0.17%	5.60%	0.17%
Placed Location				
Main pit dump 4	40,869	0.57%	5.30%	0.47%
Placed Location				
Main Pit Dump 5	96,866	0.28%	5.59%	0.19%
Placed Location				
Qanaiyaq Pit Dump 1	265,433	1.18%	1.09%	2.72%
Placed Location				
Haul Road Maintenance	83	1.08%	0.85%	2.93%
Waste Type Subtotal	**805,905**			
Total tonnes for month	**833,663**			

Production Month **November 2022**

Waste Type: Construction Waste	**Tonnes**	**Avg Zn%**	**Avg Fe%**	**Avg Pb%**
Formation: Ikalukrok				
Placed Location				
Portable crusher Pad	33,129	3.85%	2.42%	1.99%
Formation: Siksikpuk				
Placed Location				
Haul Road Maintenance	80	0.10%	4.96%	0.11%
Waste Type Subtotal	**33,209**			
Waste Type: Cover Material	**Tonnes**	**Avg Zn%**	**Avg Fe%**	**Avg Pb%**
Formation: Kivalina				
Placed Location				
Cover Dump	26,858	0.10%	2.53%	0.09%
Waste Type Subtotal	**26,858**			
Waste Type: Other Waste	**Tonnes**	**Avg Zn%**	**Avg Fe%**	**Avg Pb%**
Formation: Ikalukrok				
Placed Location				
Main Pit Dump 5	1,920	3.85%	2.42%	1.99%
Placed Location				
Qanaiyaq Pit Dump 1	174,198	1.32%	0.64%	3.62%
Placed Location				
Main pit dump 4	44,055	0.77%	2.29%	0.45%
Formation: Kivalina				
Placed Location				
Main pit dump 4	94,874	0.29%	3.16%	0.19%
Formation: Okpikruak				
Placed Location				
Main pit dump 4	52,725	0.10%	5.42%	0.09%
Formation: Siksikpuk				
Placed Location				
Qanaiyaq Pit Dump 1	229,325	1.61%	1.34%	2.74%
Placed Location				
Main Pit Dump 3	14,024	0.10%	3.08%	0.10%
Placed Location				
Main pit dump 4	204,642	0.17%	4.86%	0.12%
Placed Location				
Main Pit Dump 5	13,579	0.10%	3.72%	0.11%
Waste Type Subtotal	**829,342**			
Total tonnes for month	**889,409**			

Production Month **December 2022**

Waste Type: Construction Waste	**Tonnes**	**Avg Zn%**	**Avg Fe%**	**Avg Pb%**
Formation: Ikalukrok				
Placed Location				
Haul Road Maintenance	929	3.62%	3.06%	1.84%
Placed Location				
Portable crusher Pad	50,280	3.62%	3.06%	1.84%
Formation: Siksikpuk				
Placed Location				
Haul Road Maintenance	399	0.10%	2.00%	0.10%
Waste Type Subtotal	**51,608**			
Waste Type: Cover Material	**Tonnes**	**Avg Zn%**	**Avg Fe%**	**Avg Pb%**
Formation: Kivalina				
Placed Location				
Cover Dump	18,430	0.18%	2.38%	0.13%
Waste Type Subtotal	**18,430**			
Waste Type: Most Reactive Waste	**Tonnes**	**Avg Zn%**	**Avg Fe%**	**Avg Pb%**
Formation: Ikalukrok				
Placed Location				
Main pit dump 4	1,498	12.84%	8.00%	3.80%
Waste Type Subtotal	**1,498**			
Waste Type: Other Waste	**Tonnes**	**Avg Zn%**	**Avg Fe%**	**Avg Pb%**
Formation: Ikalukrok				
Placed Location				
Main pit dump 4	182,896	0.86%	3.32%	0.39%
Placed Location				
Qanaiyaq Pit Dump 1	124,616	0.55%	0.28%	1.74%
Formation: Kivalina				
Placed Location				
Main pit dump 4	6,004	1.09%	2.79%	0.43%
Formation: Siksikpuk				
Placed Location				
Qanaiyaq Pit Dump 1	39,048	0.89%	0.54%	2.78%
Placed Location				
Main pit dump 4	98,428	0.14%	2.03%	0.12%
Waste Type Subtotal	**450,992**			
Total tonnes for month	**522,528**			

Total Waste Rock tonnes for period **2,245,600**

Appendix H: Risk Management Plan (pending 4th quarter)

Appendix I: Kaviqsaaq Diversion – Profile I Trend Charts

Kaviqsaaq Diversion - Profile I: Total

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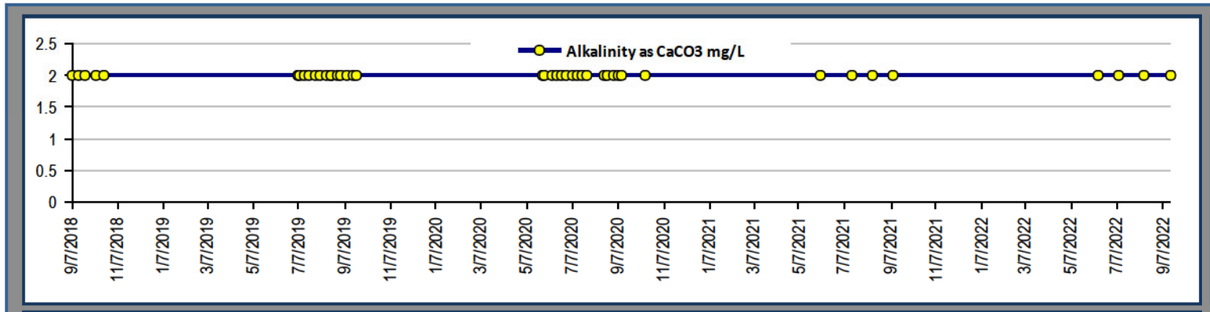
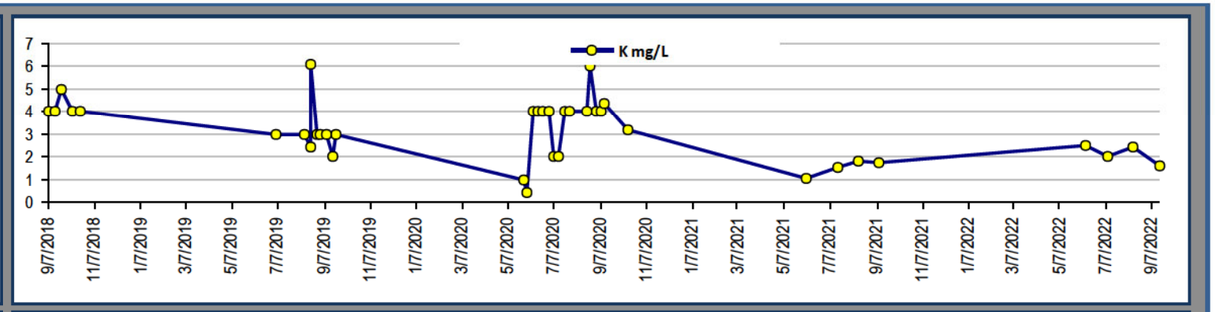
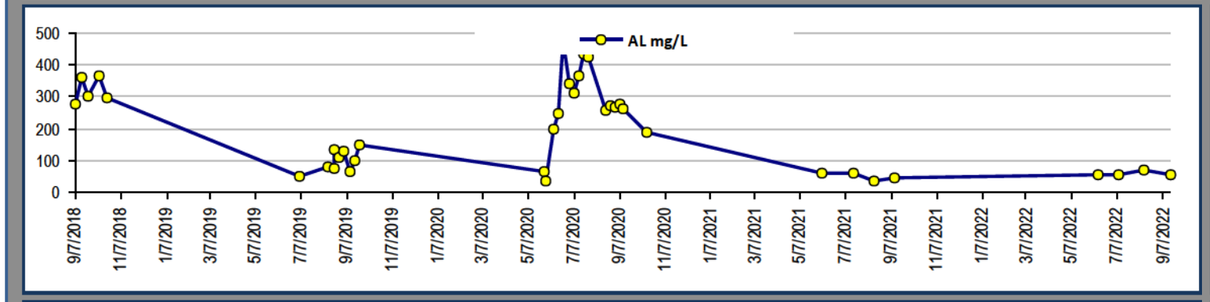
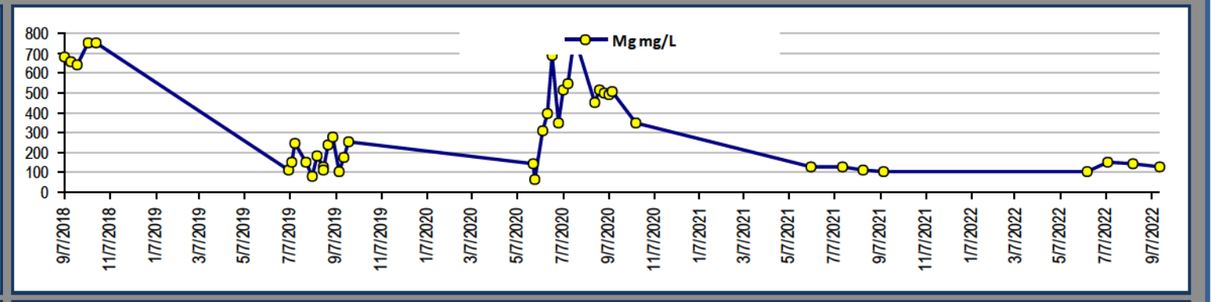
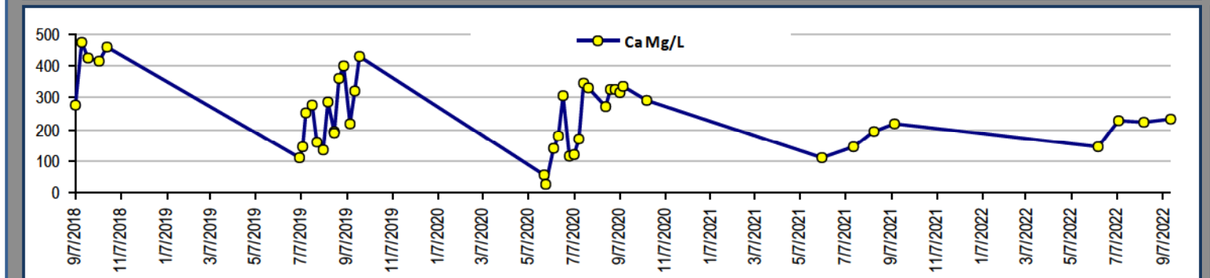
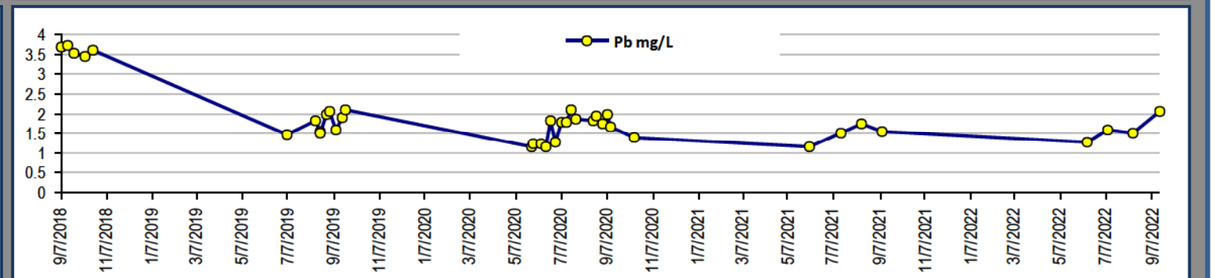


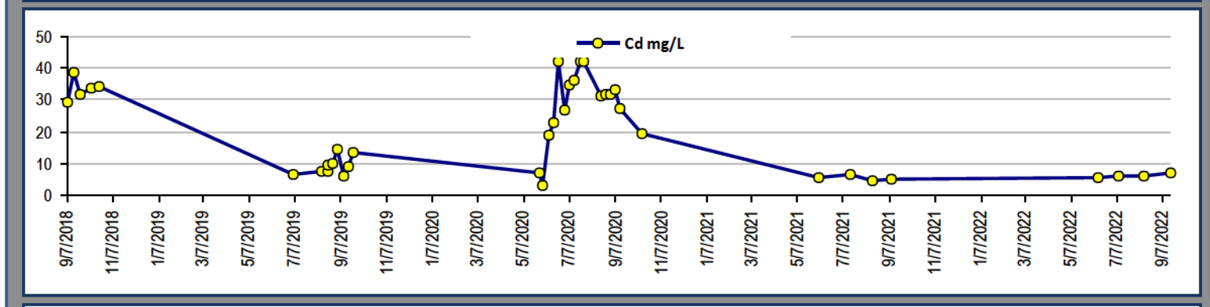


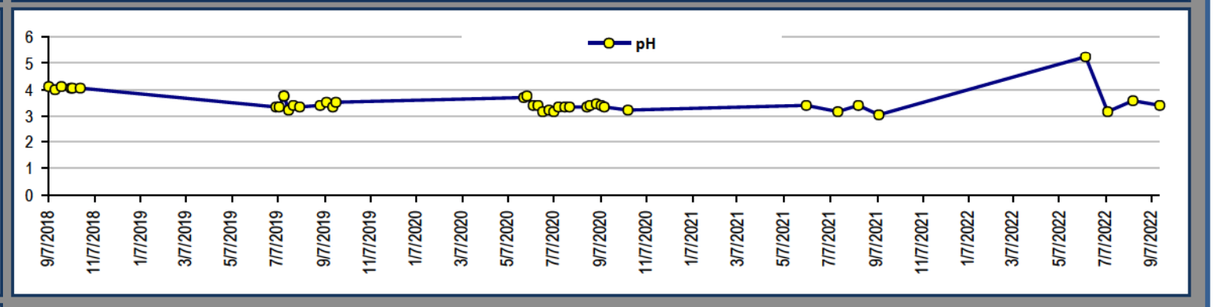


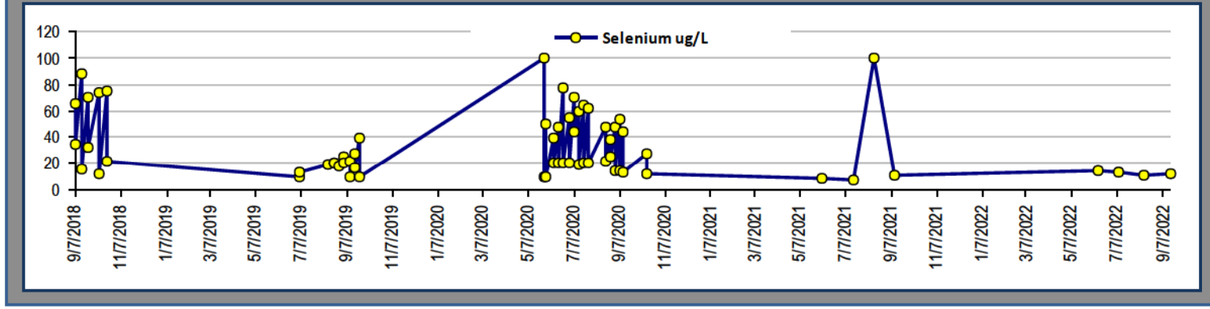






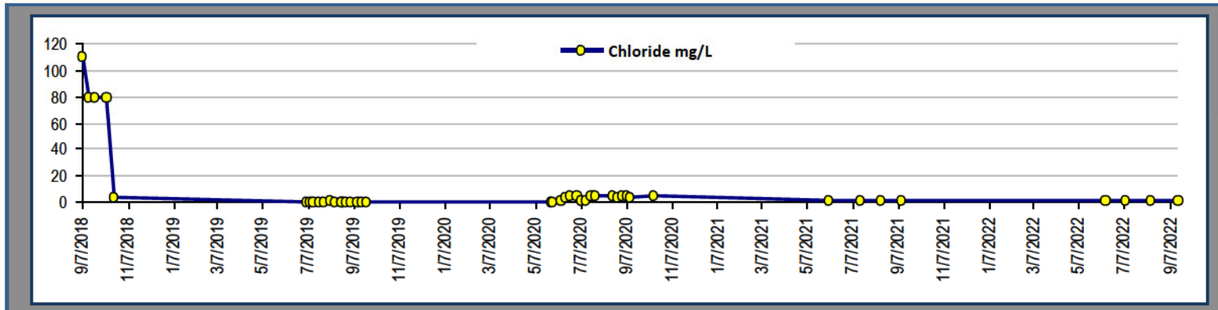


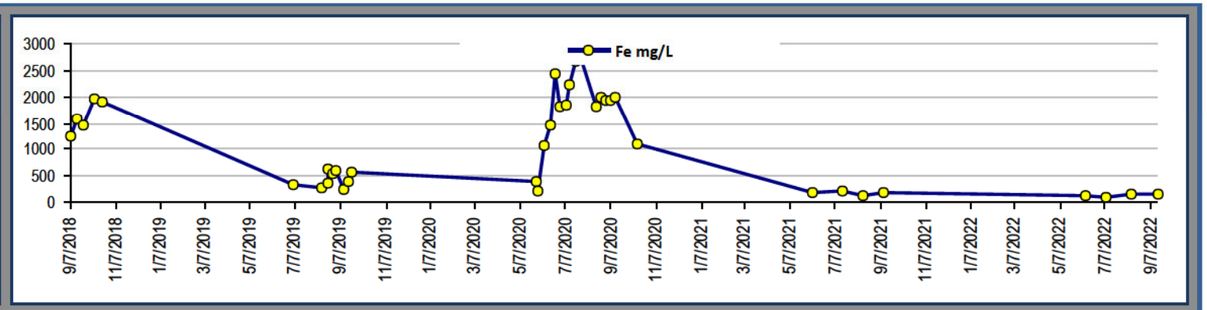


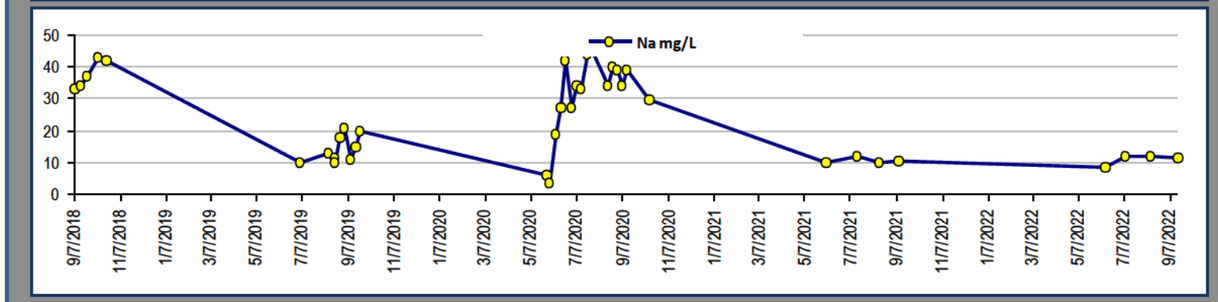


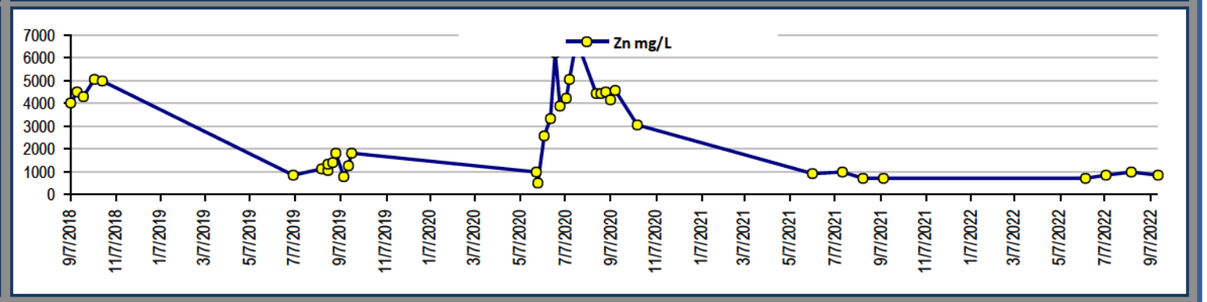
Kaviqsaaq Diversion - Profile I: Total

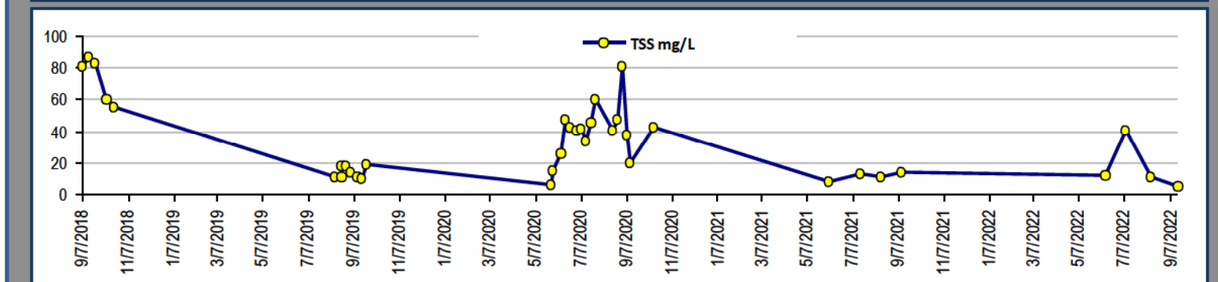
Teck

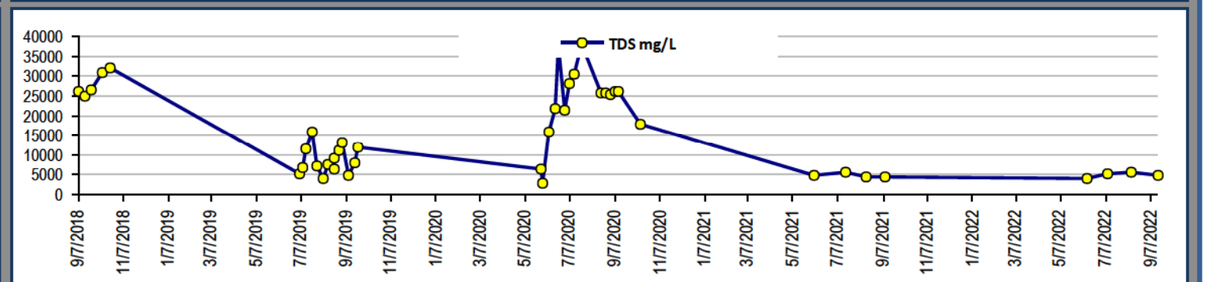


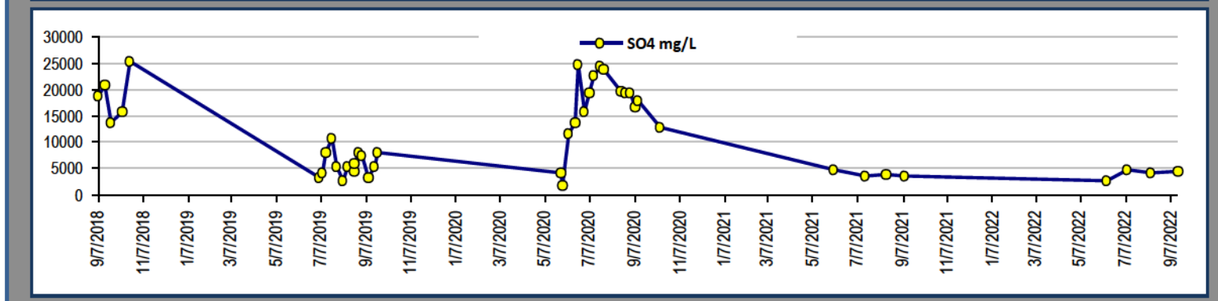


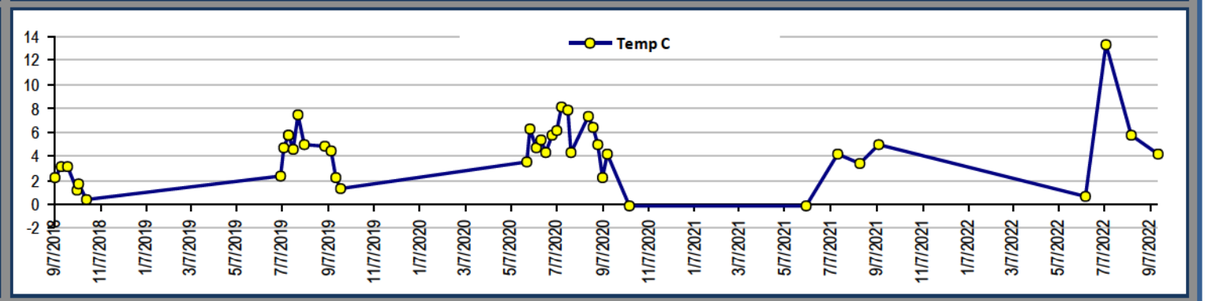


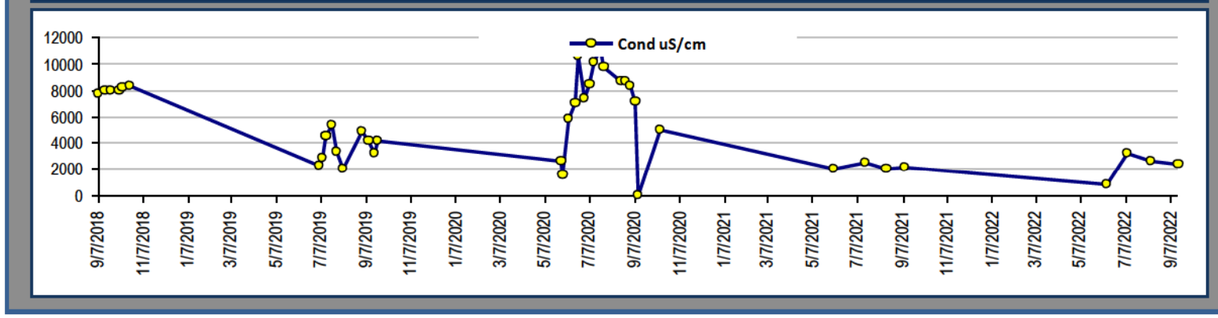












Appendix J: Hill top Diversion Profile II Trend Charts

Hill Top Diversion - Profile II: Dissolved

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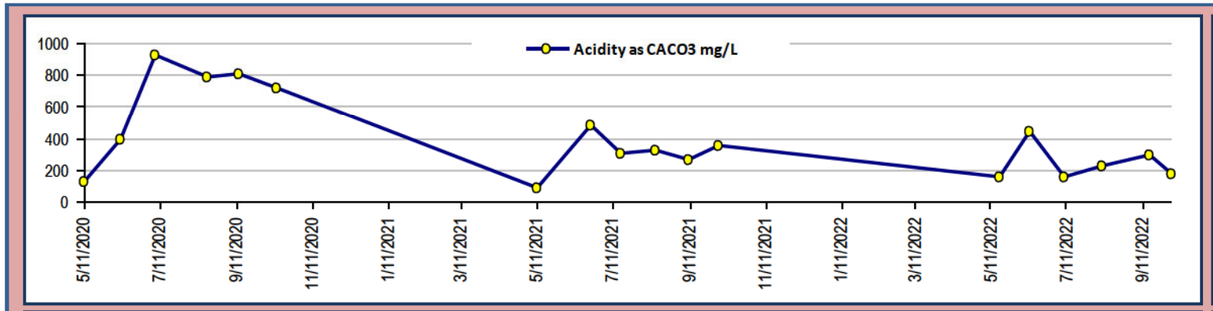

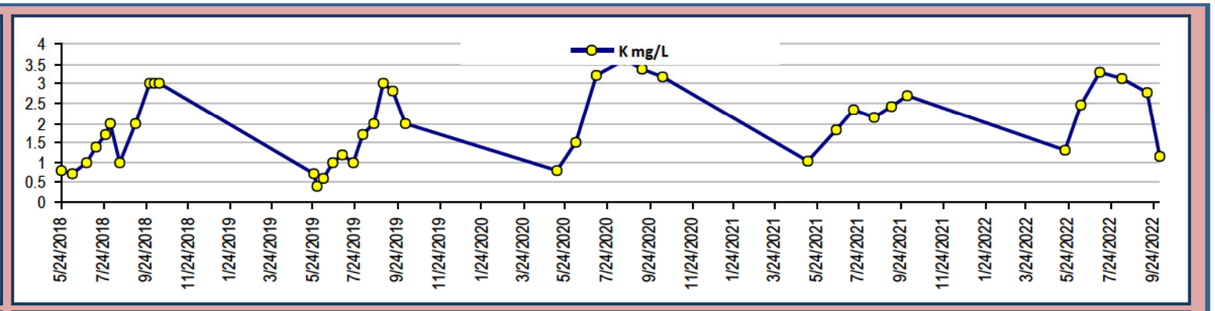

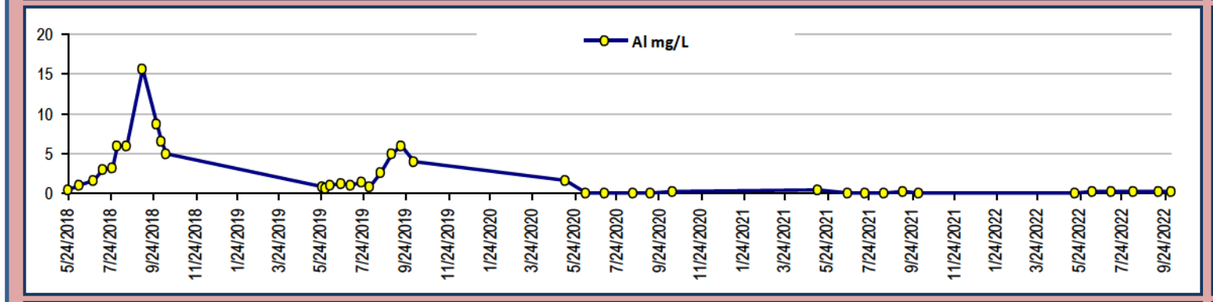

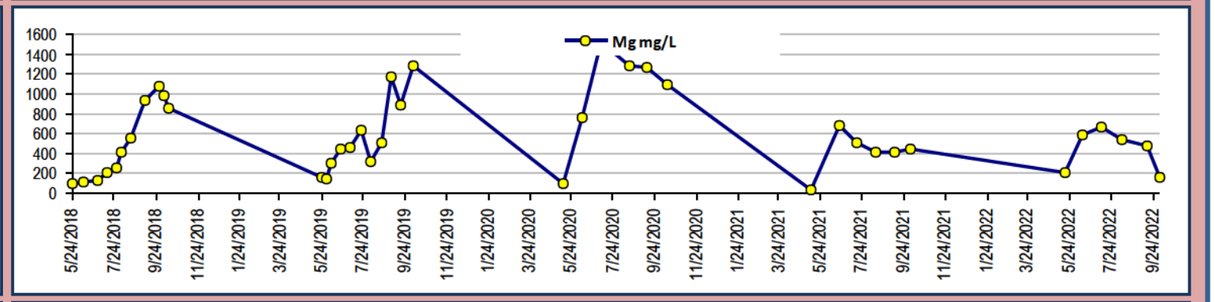

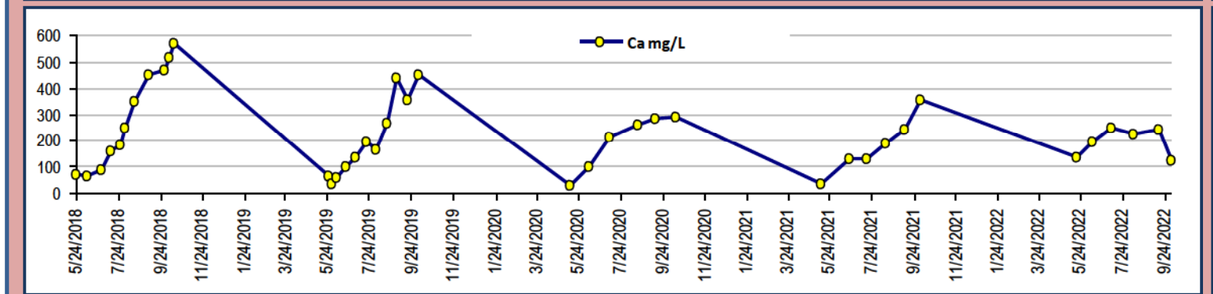

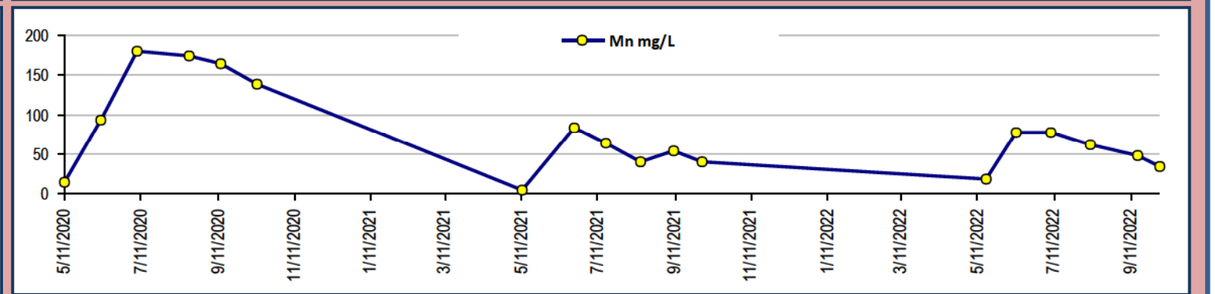

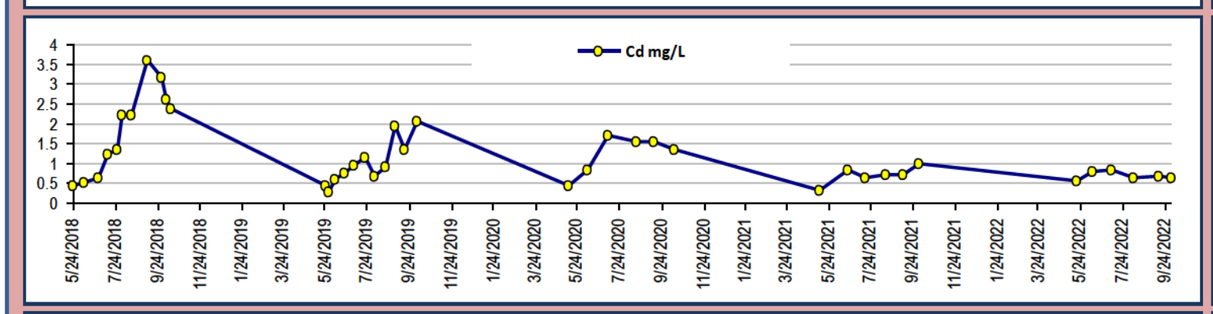

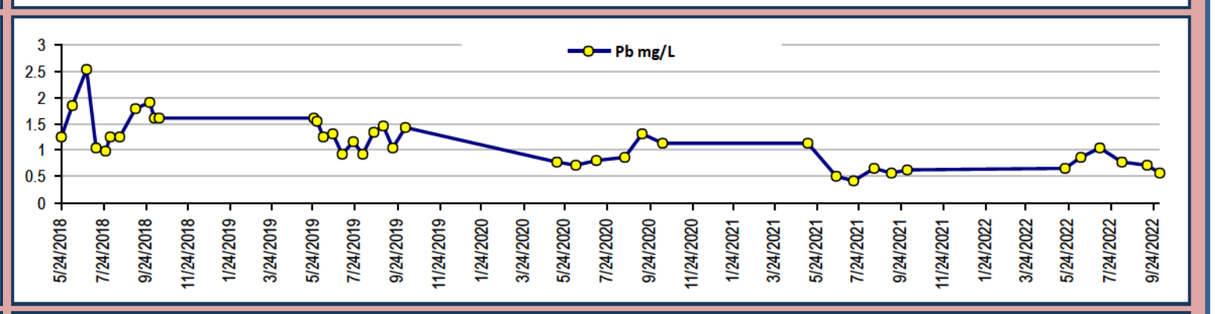

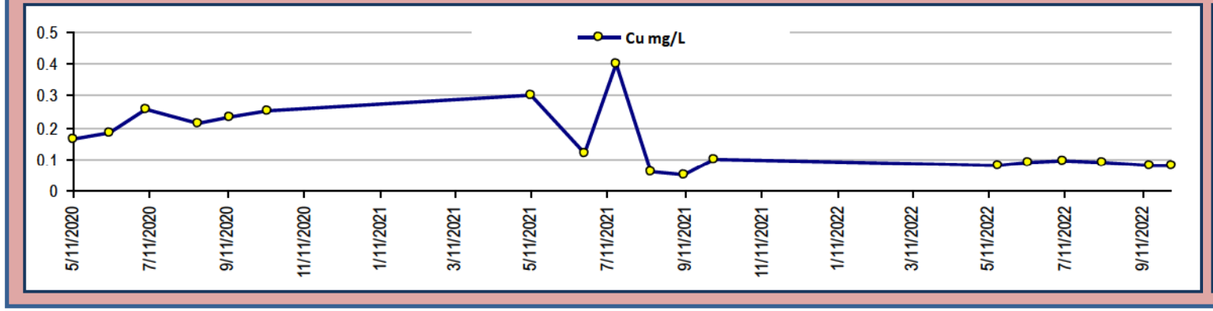

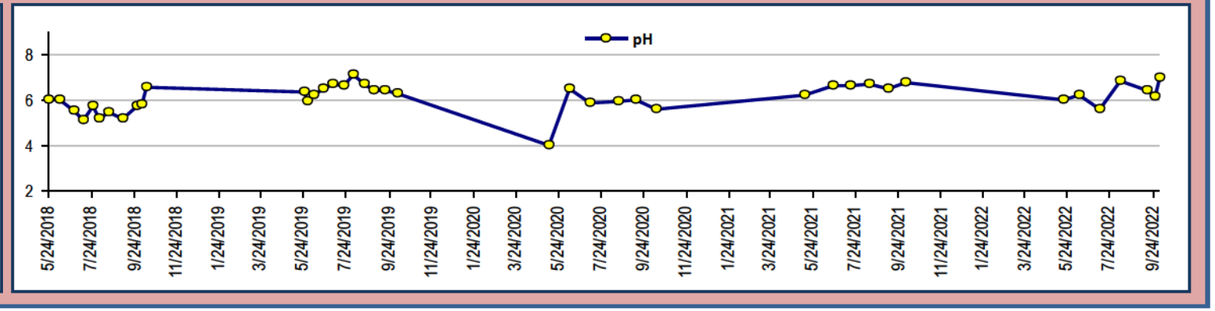

Hill Top Diversion - Prifile II: Dissolved

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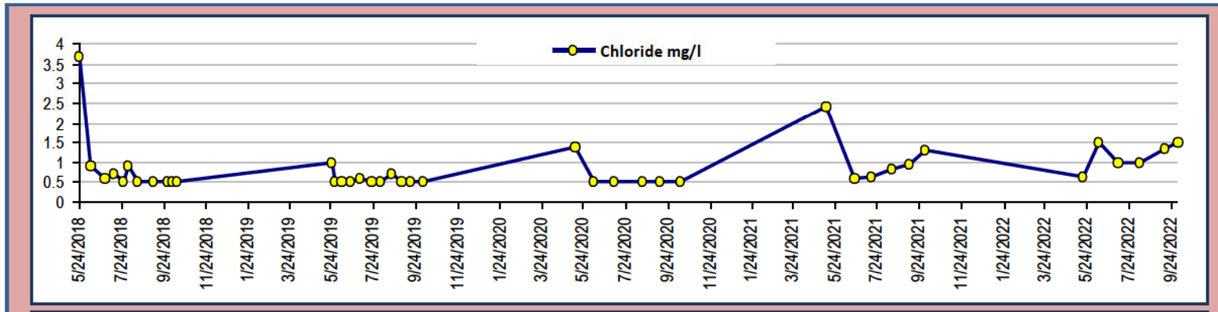

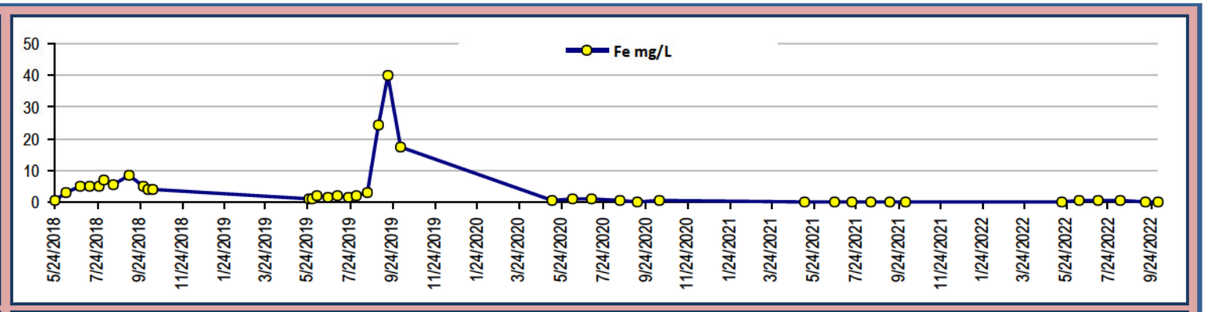

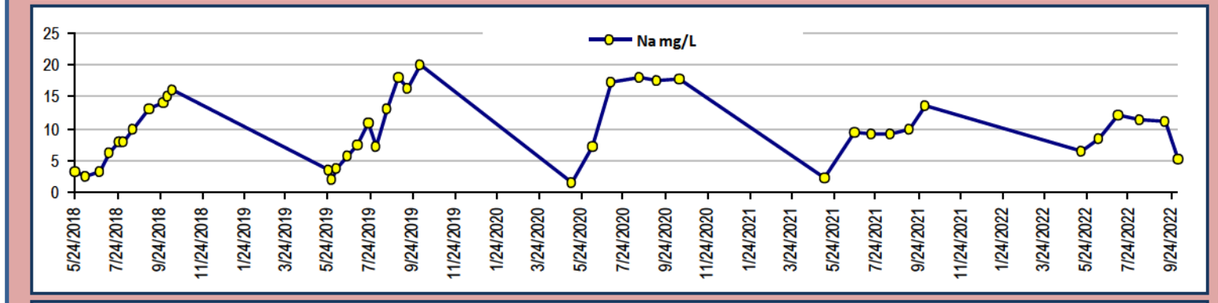

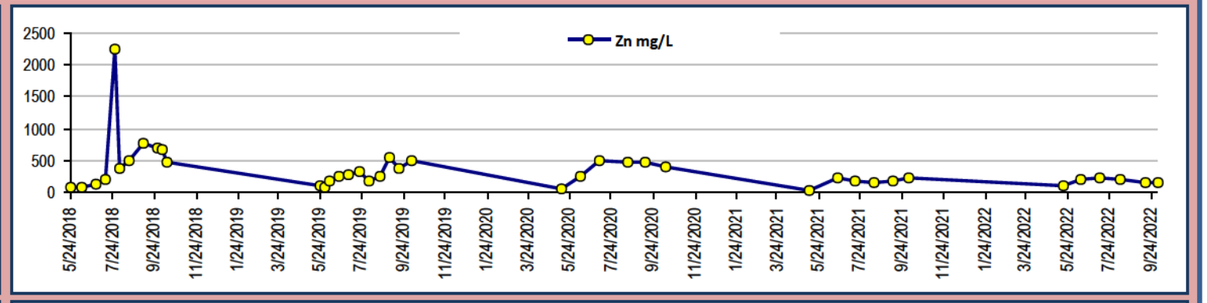

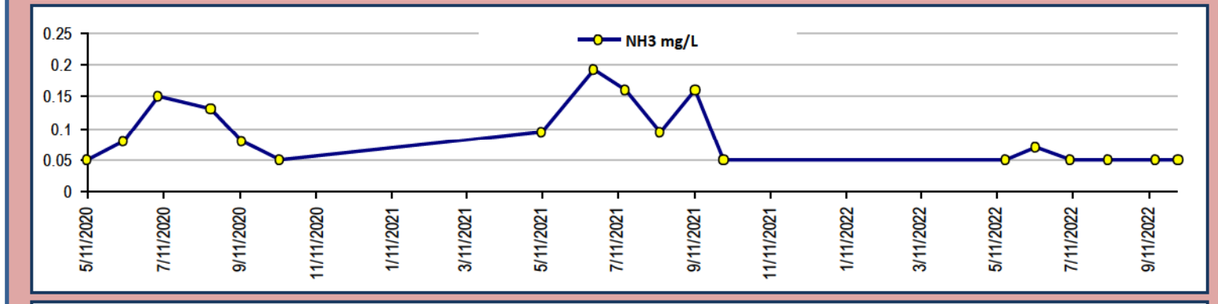

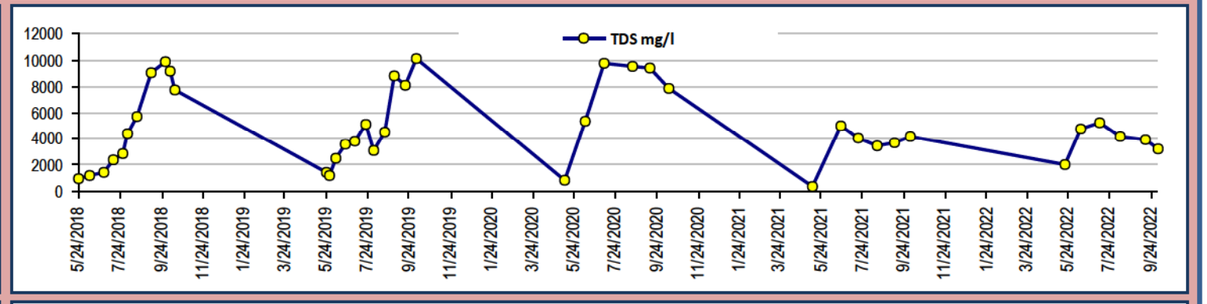

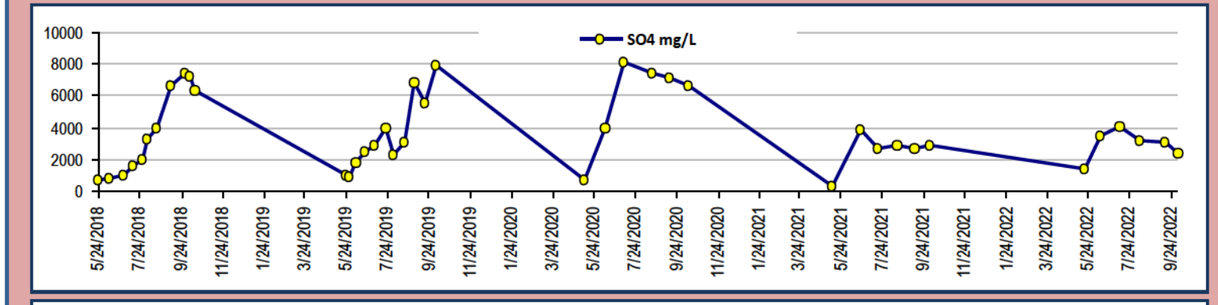

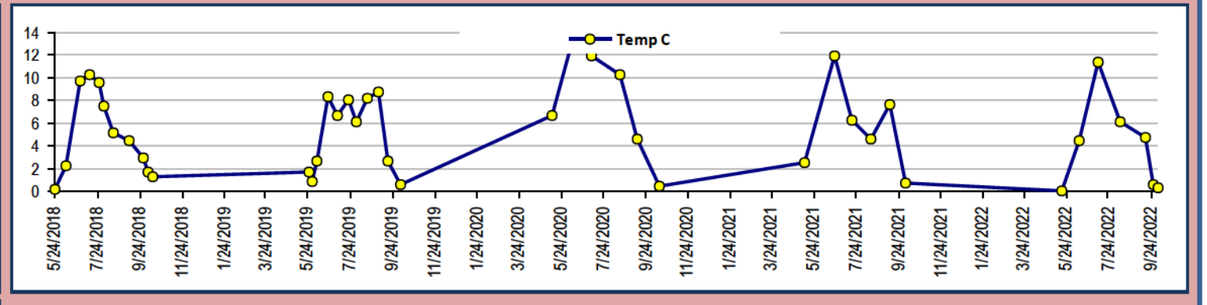

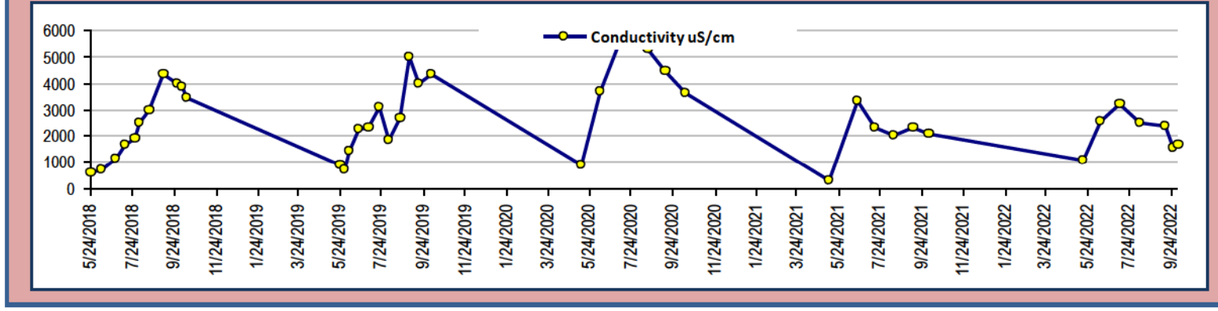

Appendix K: Mill Pad Collection Profile II Trend Charts

Mill Pad Runoff - Profile II: Dissolved

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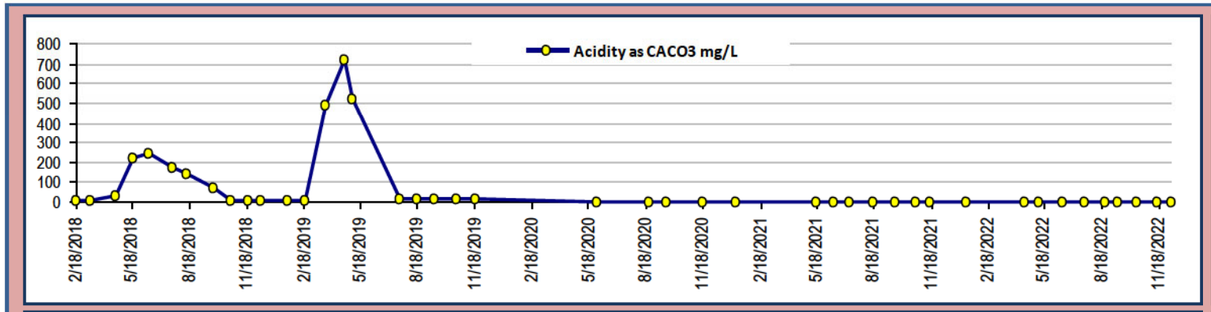

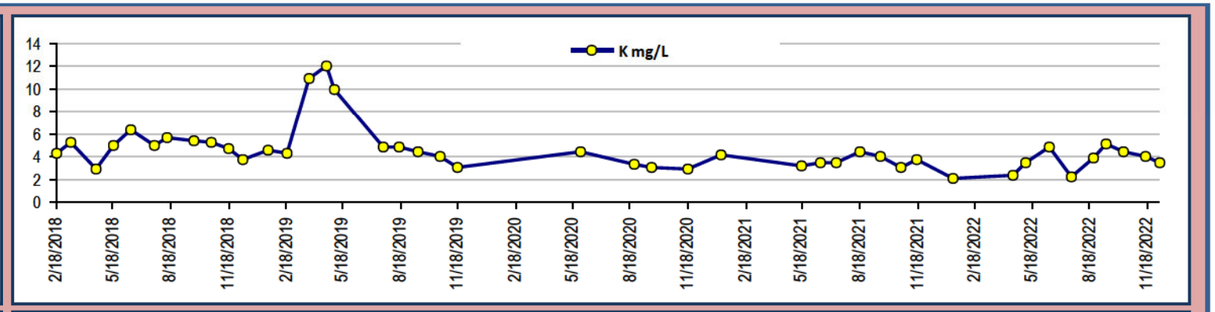

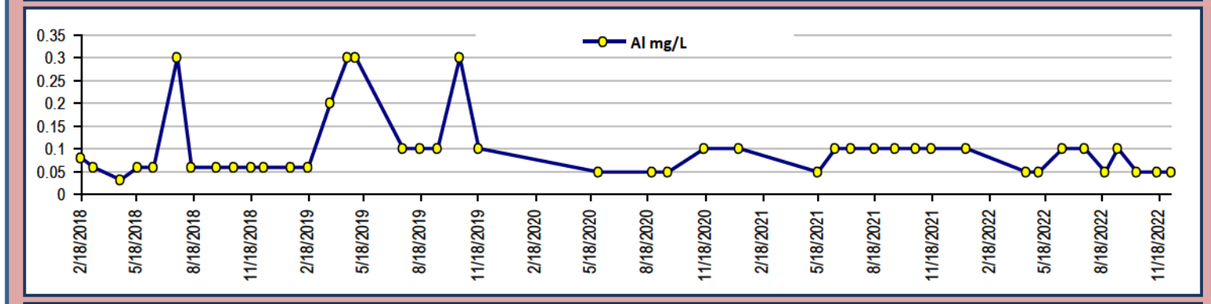

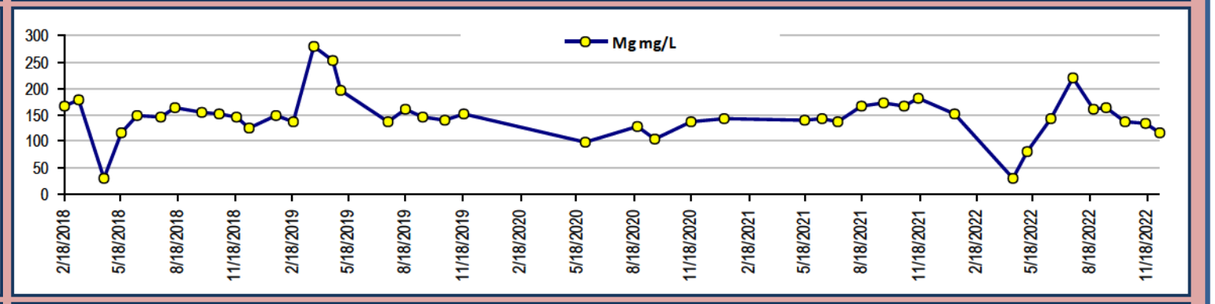

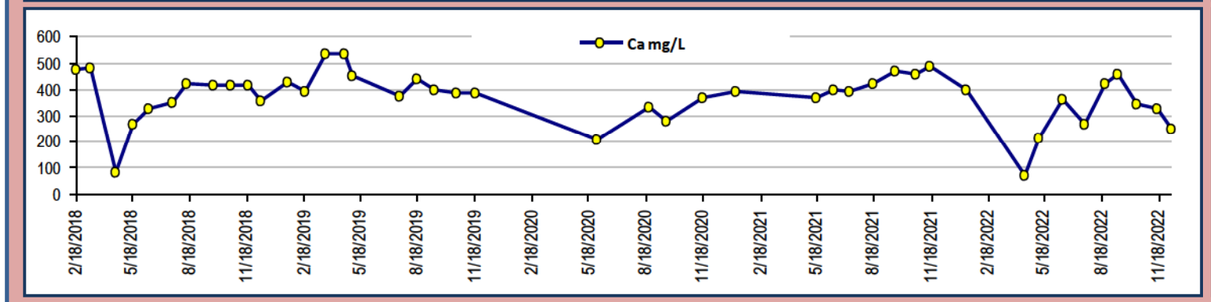

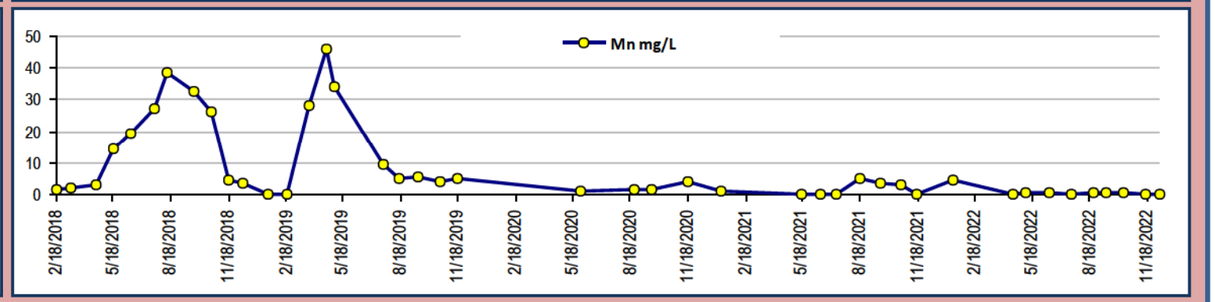

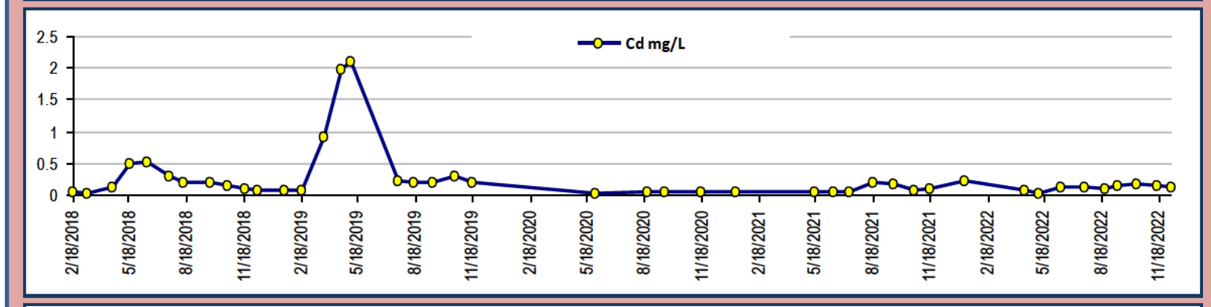

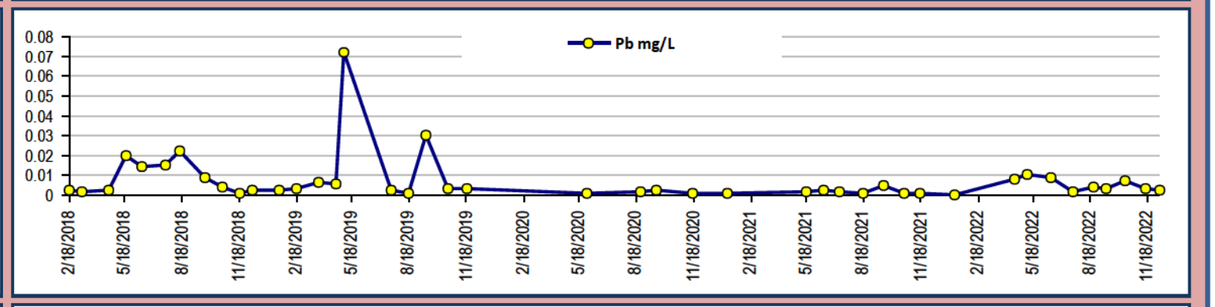

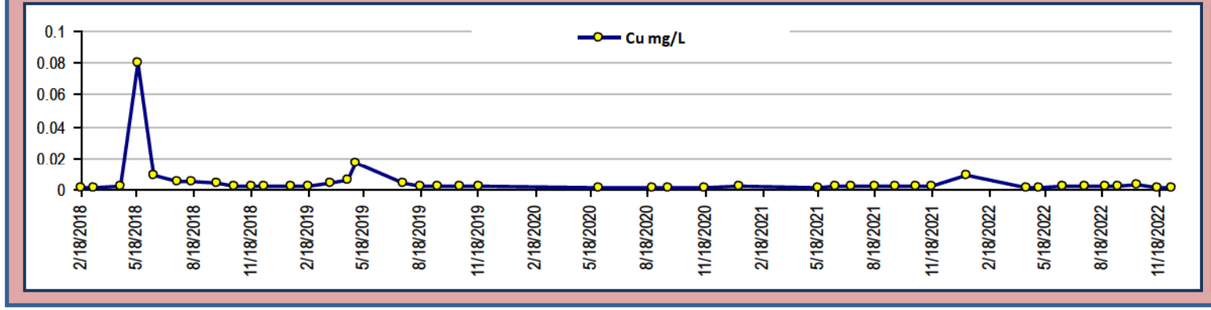

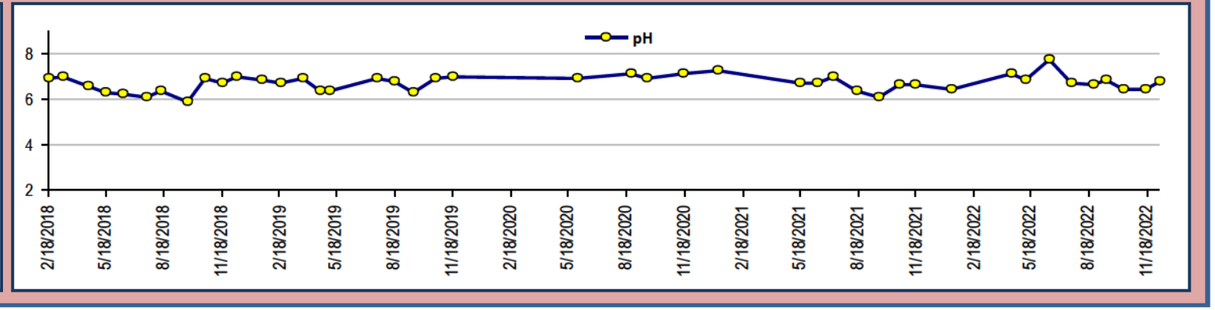

Mill Pad Runoff - Profile II: Dissolved

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