Hi-Desert Water District

Water Reclamation Facility

2020 ANNUAL REPORT

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Prepared by Doug Culbert
Chief Plant Operator

1. Introduction

The Hi-Desert Water District (District) Water Reclamation Facility (WRF) treats sewage from a new collection system within the Town of Yucca Valley (TOYV). In order to meet effluent water quality and operational objectives, the District constructed a membrane bioreactor (MBR) treatment process for the WRF. The MBR permeate quality allows the District to use the permeate for groundwater recharge and future water reuse in Phase 2 of the project. The Plant processes are designed to operate in compliance with the Waste Discharge Requirements (WDR) and produces Title 22 disinfected tertiary recycled water. The WRF has the ability to treat flows from the collection system equal to an annual average daily flow (AADF) of 1.0 million gallons per day (MGD). The WRF will be expanded in the future to treat collection system flows equal to an AADF of 1.6 MGD.

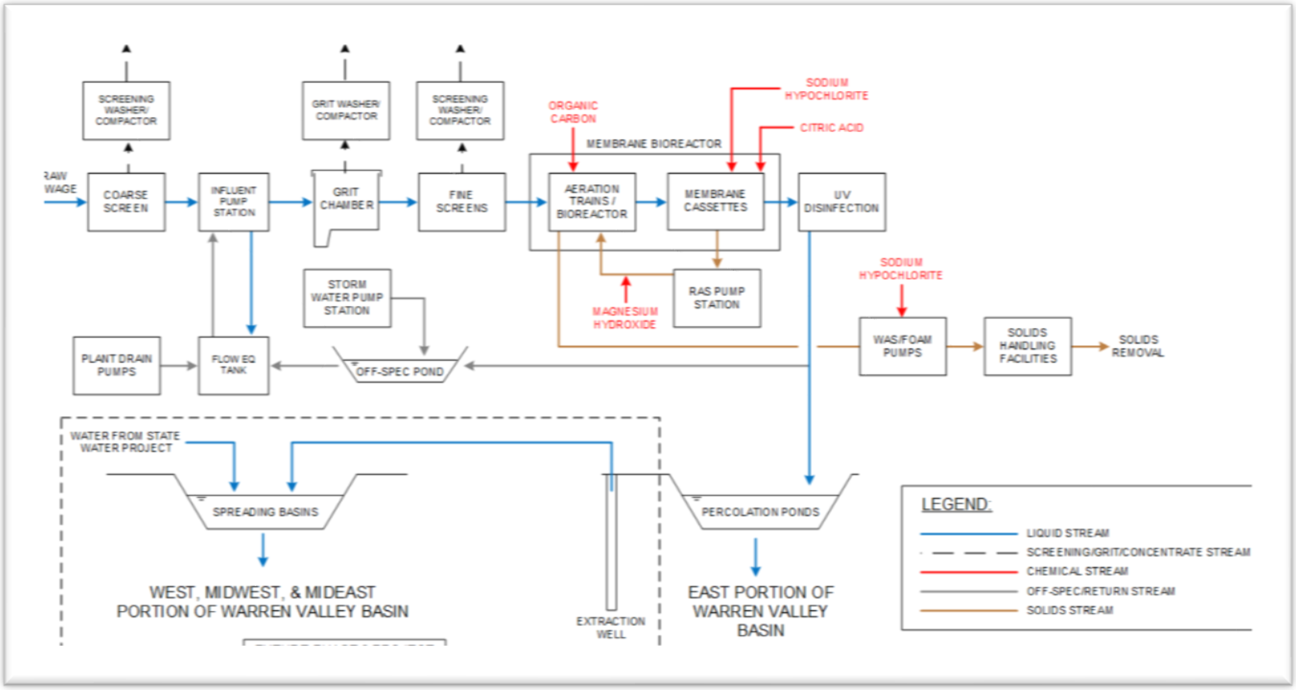
The District is governed by Board Order R7-2015-0043 under the jurisdiction of the California Regional Water Control Board Colorado River Basin Region (Regional Board). Order R7-2015-0043 provides the Waste Discharge Requirements (WDR) for the facility. In addition to the requirements specific to the WDR as mandated by the Regional Board, the District is required to meet discharge standards defined in the California Code of Regulations (CCR) Title 22 due to the future plan to become a Groundwater Reuse and Replenishing Project (GRRP).

2. Summary

The WRF site is constructed on two rectangular 40-acre parcels running north-south for a total of 80-acres located adjacent to and south of State Route 62 (SR 62), Twenty-nine Palms Highway, east of Indio Avenue, and north of Sunnyslope Drive. The WRF consists of preliminary treatment, accomplished through both coarse and fine screens and a grit removal chamber, membrane bioreactor (MBR) treatment, ultraviolet (UV) disinfection for pathogen inactivation, solids dewatering, effluent percolation ponds, and support buildings/facilities. The MBR system is the main process for wastewater treatment. The MBR is a combined biological and filtration process and serves as the location of denitrification and suspended solids removal.

A process flow schematic is included on Figure 2-1. It shows the WRF treatment processes and the disinfected MBR effluent flowing to the percolation ponds. The graphics within the dotted portion represents future plans for a GRRP.

Figure 2-1 Process Flow Schematic:



Following is a list of Sanitary Sewer Overflows (SSO), Effluent Violations (EV) and Order Condition (OC) infractions from 2020:

February
- UV dose fell below 160 mW-s/cm^2 for 17 seconds (OC)

June
- UV dose fell below 160 mW-s/cm^2 for 13 seconds (OC)

July
- Barron Lift Station, <2,000 gallons (SSO)

August
- UV dose fell below 160 mW-s/cm^2 for 14 seconds (OC)
- UV dose fell below 160 mW-s/cm^2 for 11 seconds (OC)

September
- UV dose fell below 160 mW-s/cm^2 for 52 seconds (OC)
- UV dose fell below 160 mW-s/cm^2 for 21 seconds (OC)
- UV dose fell below 160 mW-s/cm^2 for 30 seconds (OC)

November
- UV dose fell below 160 mW-s/cm^2 for 19 seconds (OC)
- 16,276 gallons of partially treated effluent discharged to percolation ponds without UV disinfection. (EV)

3. OPERATIONS

a. Pretreatment

In 2019 the District, with the assistance of Freshwater Environmental Services, put together a Sewer Use Ordinance (SUO) and Source Control Program that was adopted on October 23, 2019. As part of the SUO implementation of the Fats, Oils and Grease (FOG) Control Program (Element 7 of the City's SSMP) staff conducted regular inspections of pretreatment devices at food service establishments (FSE) within the town. The authority to require grease interceptors, when necessary, at food service establishments lies with the Town of Yucca Valley (TOYV) although enforcing the maintenance requirements and Best Management Practices (BMPs) are under the authority of the District.

The District requires that all FES apply for a FOG permit and then they are assessed by District staff to determine whether a permit is needed based on information provided by the applicant in the permit application. The FSEs that are required to have a permit are inspected annually to ensure BMPs are being followed. Inspection procedures includes an informal interview of the food service establishment's Owner or Manager regarding their existing infrastructure and kitchen practices, and an educational discussion of FOG source control as well as inspection of facilities and review of FOG disposal documentation. Violations are documented and proof of corrective actions is required.

Although the collection system is brand new and the potential is low for Influent and Infiltration(I&I), District Collections crews are proactive and inspect the sewer manholes and other infrastructure for I&I that may contribute to unnecessary volumes of wastewater to be treated. Routine maintenance and flushing of the lines are done on a monthly basis.

b. Influent Treatment and Quality

The plant operated at an average dry weather flow of 0.203 Million Gallons per Day (MGD) from February 18th through the end of 2020. Flows in the early months were minimal as customers began to be connected. Flows were 0.330 MGD at the end of the year following connection of 1,907 customers, which represents approximately 48% of the total connections in the first phase.

The treatment plant operates through a series of both gravity and pressurized process streams. Wastewater enters the plant at the influent pump station and flow meter, where the influent first passes through a coarse screen and flows by gravity to the influent pump station wet well. The coarse screen is a mechanically cleaned coarse screen with 6-millimeter (mm) openings. The screen has a hydraulic capacity of 7.3 million gallons per day (MGD), which is the buildout peak hour flow. A manually cleaned bar rack is available as the standby unit for periods when the mechanically cleaned screen may be out of service.

After passing through the primary screens, wastewater flows by gravity to a wet well where variable speed submersible pumps convey the wastewater to either the equalization (EQ) tank or the grit removal structure. The Flow EQ pumps are designed to accommodate the difference between the design influent pumping capacity (peak diurnal flow) and the peak hour wet weather flows.

A summary of annual flow and influent parameter concentrations is shown in Table 1.

Table 1: Influent Parameters

	2020
Mean Influent Flow, MGD	0.203
Total Annual Flow, MG (Feb-Dec)	74.4
Mean Influent TSS, mg/L	222
Mean Influent BOD_5, mg/L	257

c. Preliminary Treatment

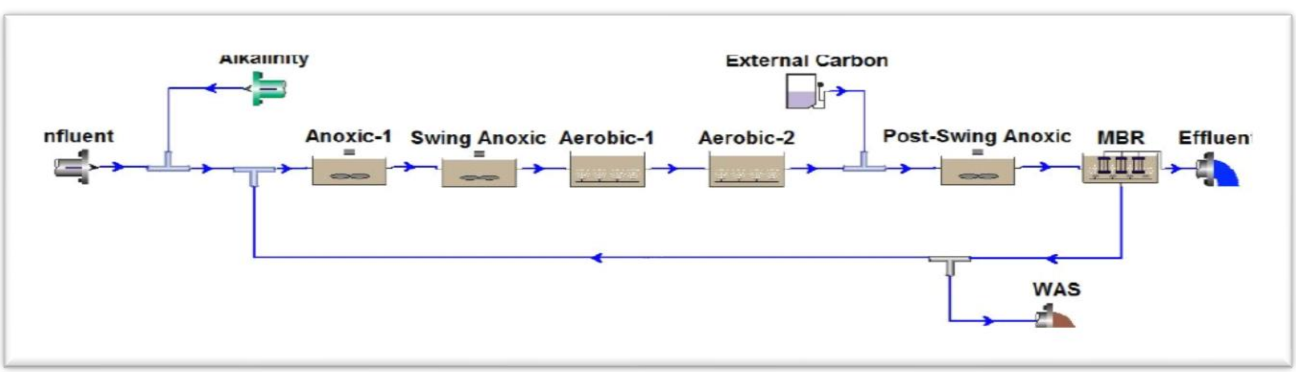
The preliminary treatment process includes screening and grit removal as well as influent flow monitoring. The process water flows by gravity from the grit removal system to the fine screens. The MBR units require upstream fine screening to protect the membranes from damage. Fine screening consists of two screens, operating in a 1 duty + 1 standby configuration, and each are sized for a 2.6 MGD capacity.

d. Biological Treatment

The screened influent flows by gravity from the fine screens to the influent mixing chamber and aeration tank distribution channel. The influent mixing chamber and aeration tank distribution channel are partially separated by a baffle wall. After the screened influent mixes with the return activated sludge in the influent mixing chamber, the process water flows by gravity past the baffle wall into the aeration tank distribution channel. The aeration tank distribution channel distributes the mixed influent and RAS flow. Process water flows from the aeration tank distribution channel and splits into two process streams that feed the two anoxic tanks.

The biological process consists of one anoxic zone, one swing/anoxic zone ahead of two aerobic zones, followed by a post swing/anoxic zone and the MBR tanks. The swing/anoxic zones can be operated as either an anoxic or an aerobic zone and provide some flexibility in adjusting the aerobic and anoxic Sludge Residence Time (SRT) based on effluent water quality and seasonal temperature variations. A Returned Activated Sludge (RAS) recycle stream is connected to the back of the MBR tanks and is pumped to the RAS splitting chamber which then mixes with influent in the Influent Mixing Chamber and is conveyed via the Aeration Tank Distribution Channel to the first anoxic zone to achieve denitrification of nitrate contained in the return stream using readily biodegradable chemical oxygen demand (COD) in the influent wastewater as well as to maintain the desired biomass in the process. For operational flexibility, an Anoxic Bypass Chamber is available for the purpose of conveying influent flow and RAS flow directly into the first aerobic tank. Figure 3-1 represents the flow schematic of the biological process.

Figure 3-1: Biological Flow Schematic



e. Secondary Treatment

Water flows by gravity through the anoxic tanks, aeration tanks, and MBR tanks to the membrane distribution channel. Permeate is drawn through the membranes within the membrane tanks and additional flows enter the membrane distribution channel via an overflow weir. RAS is pumped from the back of the membrane tanks to the beginning of the process trains. The permeate pumps convey secondary effluent through the UV disinfection system and into the back-pulse tank. The treated water then flows from the back-pulse tank through the plant water tank and to the percolation ponds by gravity. The MBR process meets all effluent requirements for BOD^5, TSS, TN, nitrite and pH under all operating conditions. When needed the addition of supplemental alkalinity and external carbon source is added to achieve desired parameters to remain in compliance.

The WRF began taking flows on November 4th but could not begin treating or discharging until enough volume was received to fill the aeration basins. On February 11th the plant began to discharge effluent although flows were minimal and did not allow for 24-hour operation. The plant was operated in "batch mode", storing the influent in the Equalization Basin overnight, starting the facility up in the morning and running all day, discharging into the percolation ponds until the EQ basin was empty at the end of the day. Continuous air was applied at night also to achieve maximum nitrification/denitrification. On November 17th we began receiving the flows needed to run the facility on a 24/7 schedule and continue to do so.

f. Ultraviolet (UV) Disinfection

After the process water has been treated by the MBR, the permeate is pumped to the UV system. The UV system disinfects water for the production of Title 22 disinfected tertiary recycled water. The minimum performance of the UV system meets the Guidelines for ultraviolet disinfection system design in water reuse applications published in the 2012 Ultraviolet Disinfection Guidelines for Drinking Water and Water Reuse, published by the National Water Research Institute (NWRI). Those guidelines include the following:

- Minimum UV dose of 80 millijoules per centimeter squared (mJ/cm^2)
- Effluent Turbidity equal or less than 0.2 NTU 95 percent of the time, not to exceed 0.5 NTU
- Filtered water UV transmittance (UVT) of 55 percent or greater at 254 nanometers (nm)

The UV system consists of two reactors operated in a duty/standby (1+1) configuration with a capacity of 1.6 MGD each. The UV system can take several minutes to warm up during the plant startup or after a power failure. Once the reactors are warmed up the MBRs will activate and permeate will begin to flow through the reactors. The off-spec valve is manually opened, and flow is diverted until all regulatory compliance parameters are met.

Per the WRF project objectives, a performance test is required on the UV system once flows reached 0.500 MGD. Since flows through the plant were not expected to reach that level during the startup of the facility it is required that the UV system run at two times the recommended dose of 80 mJ/cm^2 until the performance test can be conducted. The performance test strategy is being written by Kennedy Jenks, the designer of the project, and once the strategy is approved by the Division of Drinking Water the test will be performed. It is anticipated it will happen in early 2021.

A summary of key UV parameters for 2020 is shown in Table 4. Details of the UV qualities are presented in graphical form in Appendix A.

Table 4: Ultraviolet Disinfection Parameters 2020

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
TURBITITY, S.U.												
Min	NA	0.03	0.00	0.002	0.01	0.00	0.01	0.01	0.02	0.02	0.02	0.02
Max	NA	0.05	0.17	0.13	0.23	0.10	0.08	0.42	0.04	0.42	0.03	0.05
Average	NA	0.03	0.05	0.04	0.03	0.02	0.02	0.02	0.02	0.03	0.03	0.03
UV TRANSMITTANCE												
Min	NA	69	70	71	55	61	65	68	65	63	65	63
Max	NA	73	76	76	75	68	98	75	76	96	96	78
Average	NA	71	74	73	73	68	71	71	72	72	72	74
UV DOSE												
Min	NA	13	174	171	180	159	167	77	151	127	155	216
Max	NA	441	376	424	434	306	650	391	650	523	650	388
Average	NA	222	260	259	243	202	239	221	222	215	255	315

g. Final Effluent Treatment and Quality

After the effluent has been delivered to the Back-pulse and Plant Water Tank, effluent, meeting the quality requirements for discharge, flows into pipelines for conveyance to onsite percolation ponds on the northern side of the site. Effluent that meets all the requirements of the WDR discharges into the ponds and has an engineered outfall to protect against scouring, and the effluent percolates into the ground within the unlined ponds. As mentioned in the previous section, in the unlikely event that effluent does not meet the specified quality for discharge, “off-spec” water will not be discharged into the percolation ponds, but rather is conveyed by gravity to the Off-Spec Basin where it flows by gravity back into the flow equalization tank and reintroduced to the influent stream for treatment. 221.7 acre-feet of treated, Title 22 effluent was discharged into the aquifer in 2020. A summary of other key final treatment parameters for 2020 is shown in Table 5.

Table 5: Key Treatment Parameters 2020

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
INFLUENT BOD, mg/L												
Max	NA	200	240	260	290	320	320	330	260	340	210	320
Mean	NA	195	215	250	250	286	273	300	253	280	290	268
Average lbs/day	NA	131	203	317	406	538	530	584	550	661	658	715
EFFLUENT BOD, mg/L												
Max	NA	2.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mean	NA	2.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Average lbs/day	NA	2.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
INFLUENT TSS, mg/L												
Max	NA	100	320	310	220	350	270	360	310	270	240	400
Mean	NA	90	190	203	175	292	230	315	213	263	174	280
Average lbs/day	NA	60	180	257	284	550	448	613	462	667	444	748
EFFLUENT TSS, mg/L												
Max	NA	2	2	2	2	2	2	ND	2	ND	ND	3.0
Mean	NA	0.5	0.4	0.3	0.5	0.4	0.1	ND	0.2	ND	ND	1.0
Average lbs/day	NA	0.26	0.33	0.30	0.72	1.08	0.15	0	1.23	0	0	2.61

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
INFLUENT FLOW, MGD												
Max	NA	0.090	0.152	0.177	0.237	0.424	0.357	0.310	0.351	0.379	0.384	0.395
Mean	NA	0.080	0.113	0.152	0.195	0.226	0.233	0.233	0.261	0.283	0.306	0.259
TOTAL(MG)	NA	1.980	3.511	4.573	6.043	6.770	7.232	7.232	7.830	8.773	9.171	9.988
EFFLUENT FLOW, MGD												
Max	NA	0.091	0.940	0.172	0.199	0.390	0.270	0.269	0.307	0.337	0.467	0.388
Mean	NA	0.063	0.675	0.144	0.173	0.323	0.204	0.219	0.246	0.269	0.285	0.268
TOTAL(MG)	NA	0.094	3.646	5.033	6.130	6.463	7.034	7.502	7.961	9.286	8.558	9.705
OIL & GREASE, ml/L												
Max	NA	10.0	5.0	ND	ND	ND	ND	ND	7.1	ND	6.1	ND
Mean	NA	4.9	1.2	ND	ND	ND	ND	ND	1.2	ND	0.68	ND
TOTAL COLIFORM, MPN												
Median	NA	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
Max	NA	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
PH, s.u.												
Max pH	NA	7.5	7.4	7.3	7.4	7.6	7.7	7.4	7.4	7.2	7.5	7.5
Min pH	NA	7.1	6.9	6.8	6.8	6.9	6.9	6.9	7.0	7.0	6.9	7.0
TDS, mg/L												
Max	NA	440	490	450	520	510	520	480	460	460	450	430
Mean	NA	435	454	435	483	492	483	458	436	448	430	420
AMMONIA, mg/L												
Max	NA	0.17	0.12	0.11	0.12	0.11	0.22	0.23	0.08	0.30	0.50	0.06
Mean	NA	0.09	0.02	0.06	0.03	0.07	0.15	0.17	0.05	0.18	0.11	0.02
NITRITE, mg/L												
Max	NA	0	0	0	0	0	0	0	0	0	0	0
Mean	NA	0	0	0	0	0	0	0	0	0	0	0
NITRATE, mg/L												
Max	NA	4.6	9.1	3.6	1.2	1.1	0.2	0.4	0.2	0.4	1.2	2.0
Mean	NA	2.73	5.06	0.90	0.59	0.36	0.21	0.33	0.22	0.15	0.20	1.60

4. GROUNDWATER WELL MONITORING

a. Overview

Prior to construction the District installed four groundwater monitoring wells adjacent to the WRF site location. The purpose of the groundwater monitoring wells network in the area of the proposed recharge basins is to determine the water quality conditions on the first encountered groundwater after discharge has been initiated. Four wells were monitored for pH, Coliform, Total Dissolved Solids, Ammonia, Nitrate, Nitrite and Total Nitrogen. The wells were monitored monthly from January through May and then quarterly after that. A summary of results for the respective parameters for 2020 is shown in Table 6.

Table 6: Monitoring Well Parameters 2020

	Jan	Feb	Mar	Apr	May	Jul	Oct
DEPTH TO GROUNDWATER							
YV-3	418.4	418.0	418.3	418.2	413.0	417.6	417.1
YVUZ-4	427.1	427	427.8	427.7	427.6	427.2	427
YVUZ-5	364.00	364.00	364.0	NA	363.3	362.6	362.75
YVUZ-6	326.33	326.00	326.3	NA	326.1	325.6	325.20
PH, S.U.							
YV-3	7.8	7.8	8.0	8.1	8.3	8.5	8.4
YVUZ-4	8.1	7.9	7.7	8.1	8.4	8.6	7.8
YVUZ-5	7.7	8.1	7.0	8.0	8.1	8.4	7.5
YVUZ-6	8.0	7.4	8.0	NA	7.9	8.4	7.5
FECAL COLIFORM, MPN							
YV-3	2	2	<1.8	<1.8	<1.8	<1.8	<1.8
YVUZ-4	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
YVUZ-5	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
YVUZ-6	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
TOTAL COLIFORM, MPN							
YV-3	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
YVUZ-4	2	<1.8	2	<1.8	<1.8	<1.8	<1.8
YVUZ-5	<1.8	<1.8	<1.8	<1.8	2	<1.8	<1.8
YVUZ-6	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
ENTEROCOCCOUS, MPN							
YV-3	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
YVUZ-4	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8
YVUZ-5	<1.8	<1.8	13	<1.8	<1.8	4.5	4
YVUZ-6	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	2
TDS, MG/L							
YV-3	210	230	220	200	210	200	190
YVUZ-4	210	240	220	220	220	230	200
YVUZ-5	210	240	200	220	220	220	220
YVUZ-6	210	200	170	180	180	170	170
AMMONIA AS N, MG/L							
YV-3	ND	ND	ND	ND	ND	ND	ND
YVUZ-4	ND	ND	ND	ND	ND	ND	ND
YVUZ-5	ND	ND	ND	ND	ND	ND	ND
YVUZ-6	ND	ND	ND	ND	ND	ND	ND
NITRATE AS N, MG/L							
YV-3	2.7	2.6	2.3	2.4	2.3	2.6	2.6
YVUZ-4	2.7	2.4	2.4	2.5	2.3	2.6	2.5
YVUZ-5	2.7	2.3	2.3	2.4	2.3	2.4	2.2
YVUZ-6	2.7	3.1	2.3	2.4	3.0	3.0	2.9
NITRITE AS N, MG/L							
YV-3	ND	ND	ND	ND	ND	ND	ND
YVUZ-4	ND	ND	ND	ND	ND	ND	ND
YVUZ-5	ND	ND	ND	ND	ND	ND	ND
YVUZ-6	ND	ND	ND	ND	ND	ND	ND

	Jan	Feb	Mar	Apr	May	Jul	Oct
TOTAL NITROGEN, MG/L							
YV-3	2.7	2.6	2.3	2.4	2.3	2.6	2.6
YVUZ-4	2.7	2.4	2.4	2.5	2.3	2.6	2.5
YVUZ-5	2.7	2.3	2.3	2.4	2.3	2.4	2.2
YVUZ-6	2.7	3.1	2.3	2.4	3.0	3.0	2.9

5. MAINTENANCE

a. Maintenance Summary

The WRF performed a variety of scheduled, preventative, predictive and breakdown maintenance on a wide variety of equipment. The main goal of maintenance activities is to ensure equipment availability to meet plant process operation requirements.

The WRF work area includes all major and auxiliary processes. Maintenance minimizes callouts, reduces overtime costs, limits potential for discharge violations due to mechanical failure, and costs associated with repairs are significantly lower than replacement costs. In addition to routine lubrication and preventative maintenance activities, the following notable predictive maintenance was completed in 2020:

- Valves were installed throughout the facility to isolate plant water in the event of a process water shutdown
- The grit disposal chutes were modified to prevent clogging the classifier
- Fine screen block off plates installed to prevent screen overflow going to the process and to block a large portion of screened flow from returning to the influent Pump Station
- Off Spec overflow pipe installed at higher elevation to prevent Plant Water storage from draining during off spec conditions
- Floor drains installed in the grit building
- Dump station was installed for collections solids disposal

b. Flow Meter Calibration Record

Flow to the plant is measured at the head works. Meters are checked annually for accuracy and functionality. A comprehensive calibration will be completed per meter specification.

6. CHEMICALS AND UTILITIES

a. Chemicals

When needed, several chemicals are used for a variety of treatment processes at the plant. Major process chemicals are discussed below and include:

- Magnesium Hydroxide
- Sodium Hypochlorite
- Citric Acid
- MicroC 2000™

i. Magnesium Hydroxide for Nutrient Removal and pH Adjustment

Magnesium hydroxide is added to the screened influent as it enters the aeration tank distribution channel in order to increase the alkalinity to support the biological conversion of ammonia to nitrate. Magnesium hydroxide is delivered as a slurry and the chemical injection point is in the aeration tank distribution channel.

ii. Sodium Hypochlorite/Citric Acid

Sodium hypochlorite is injected at three locations: (1) plant water pipeline downstream of the plant water pumps, (2) MBR permeate line for MBR Clean-In-Place (CIP), and (3) foam/ waste activated sludge (WAS) pipeline downstream of the foam/ WAS blowers. The membrane filters require periodic chemical cleaning to remove foulants from the membrane surface. Sodium hypochlorite and citric acid are used for chemical CIP maintenance and recovery cleanings of the MBR system. The recovery clean soaks the membranes in a chemical solution for several hours and is performed twice per year.

iii. MicroC 2000™

When needed, MicroC 2000™ is added to the anoxic tank in order to supplement the biological oxygen demand (BOD) for the nitrate converting microbes in the biological treatment.

7. HUMAN RESOURCES

a. Staffing

The Wastewater Department includes treatment operations and collection maintenance staff. In 2020, the treatment plant employed 7 employees.

Plant staffing for 2020 is shown in Table 7.

Table 7: Plant Staffing

Chief Plant Operator	1
Lead Operator	1
WRF Operator	1
OIT Full Time[1]	1
Collection Maintenance Lead Technician[2]	1
Collection Maintenance Technician[2]	1
Administrative Assistant	1

[1] OIT completed enough hours and obtained Grade II certification in October.
[2] Also holds Grade I OIT Certification

b. Safety Training

Weekly safety meetings are conducted to discuss relevant safety topics, resulting in better service to the public and better, more efficient safe operation of the facility.

Notable safety training conducted by WRF operating staff:

- Wastewater Maintenance Safety
- Fall Protection
- Shower and Eyewash Use
- H^2S Safety Training

- Lockout/Tagout
- Bloodborne Pathogen Safety Training
- First Aid Explained by a Professional
- Confined Space, Deadly Space
- Overhead Cranes and Hoists
- Workplace Violence Prevention
- PPE-An Overview of the Basics

c. Operator Certification

The WRF functions with three Grade IV and one Grade II operator and operates 7 days a week. While operating daily only, staff is split into two crews with one crew of two operators working a 4/10 schedule Monday through Thursday and the second two-person crew works the same schedule Tuesday through Friday. All four operators share Standby duties with the operator on duty covering abbreviated operations on Saturday and Sunday.

Table 8 summarizes the status of operator certification held by WRF operators at the facility during 2020.

Table 8: Wastewater Treatment Certifications

Grade IV	3
Grade II	1
O.I.T.	2

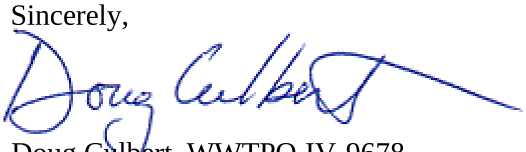
Additional certifications held by WRF staff include Laboratory Analyst, Collection System Maintenance & Cross Connection Specialist.

8. Certification of Report

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate, and complete. I am aware there are significant penalties for submitting false information, including fine and imprisonment for withholding information regarding permit violations.

If you have any questions or need additional information, please feel free to contact me at dougc@hdwd.com or (760)228-6278.

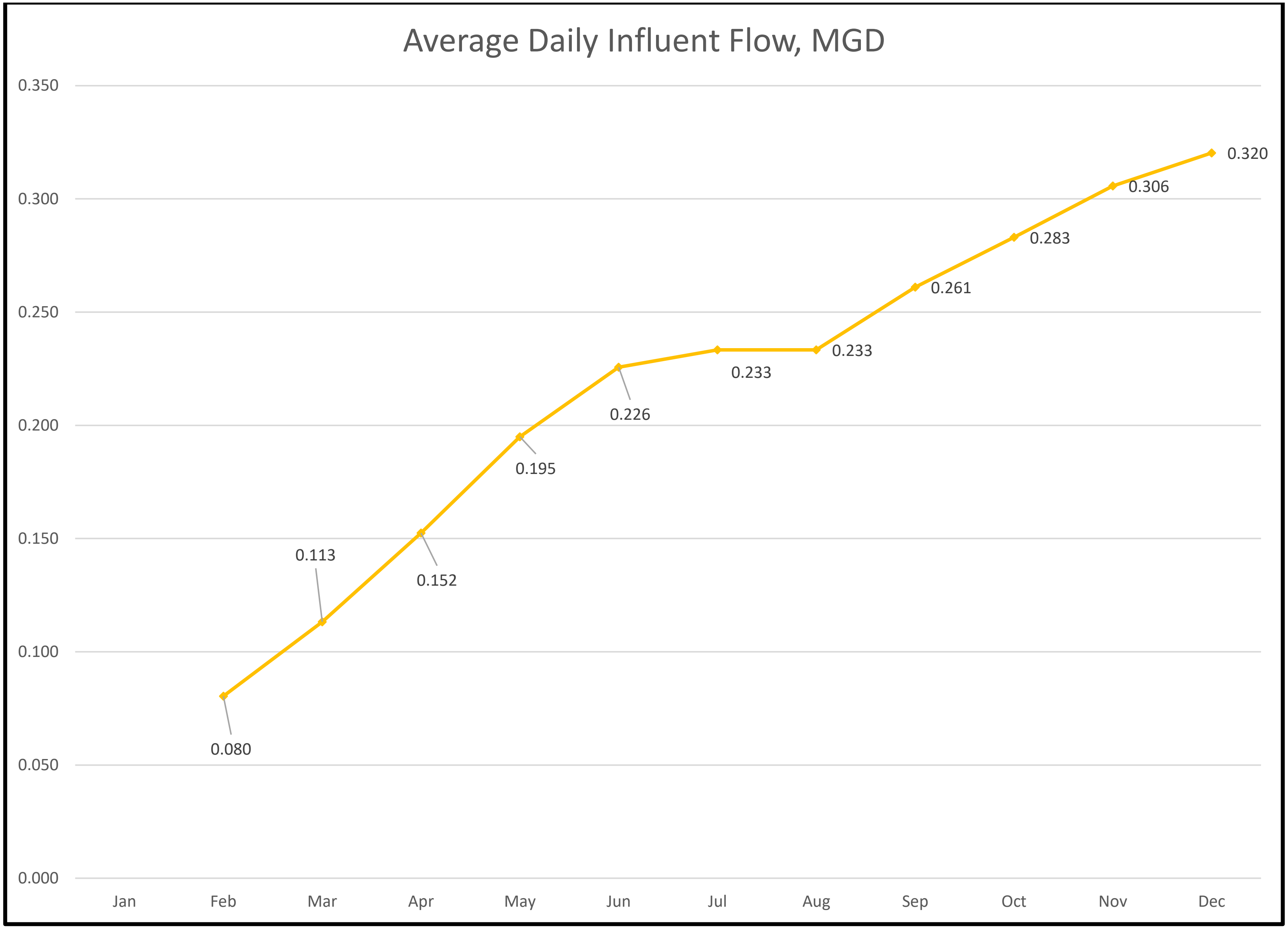
Sincerely,

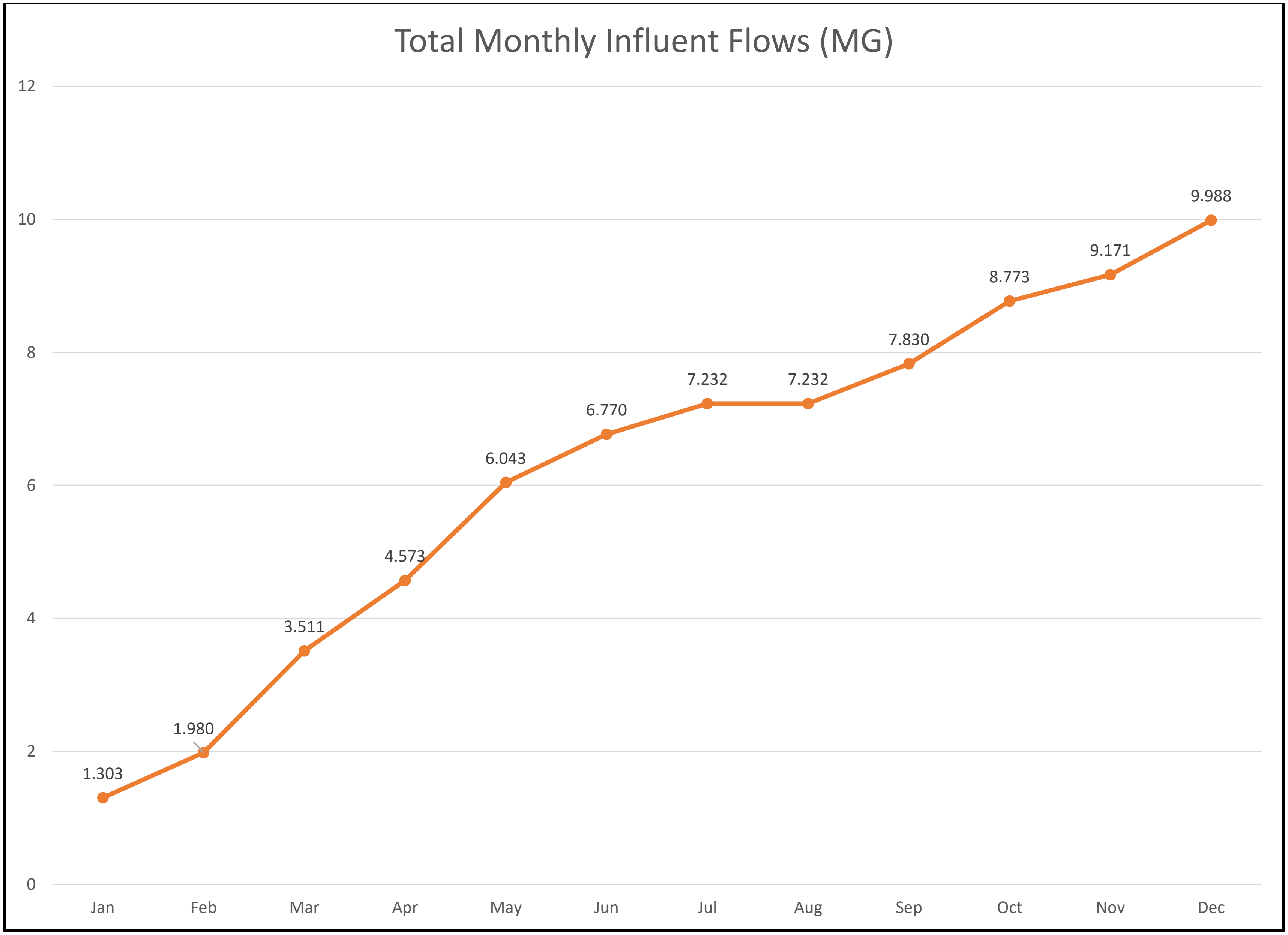


Doug Culbert, WWTPO IV-9678
Chief Plant Operator
Hi-Desert Water District Water Reclamation Facility

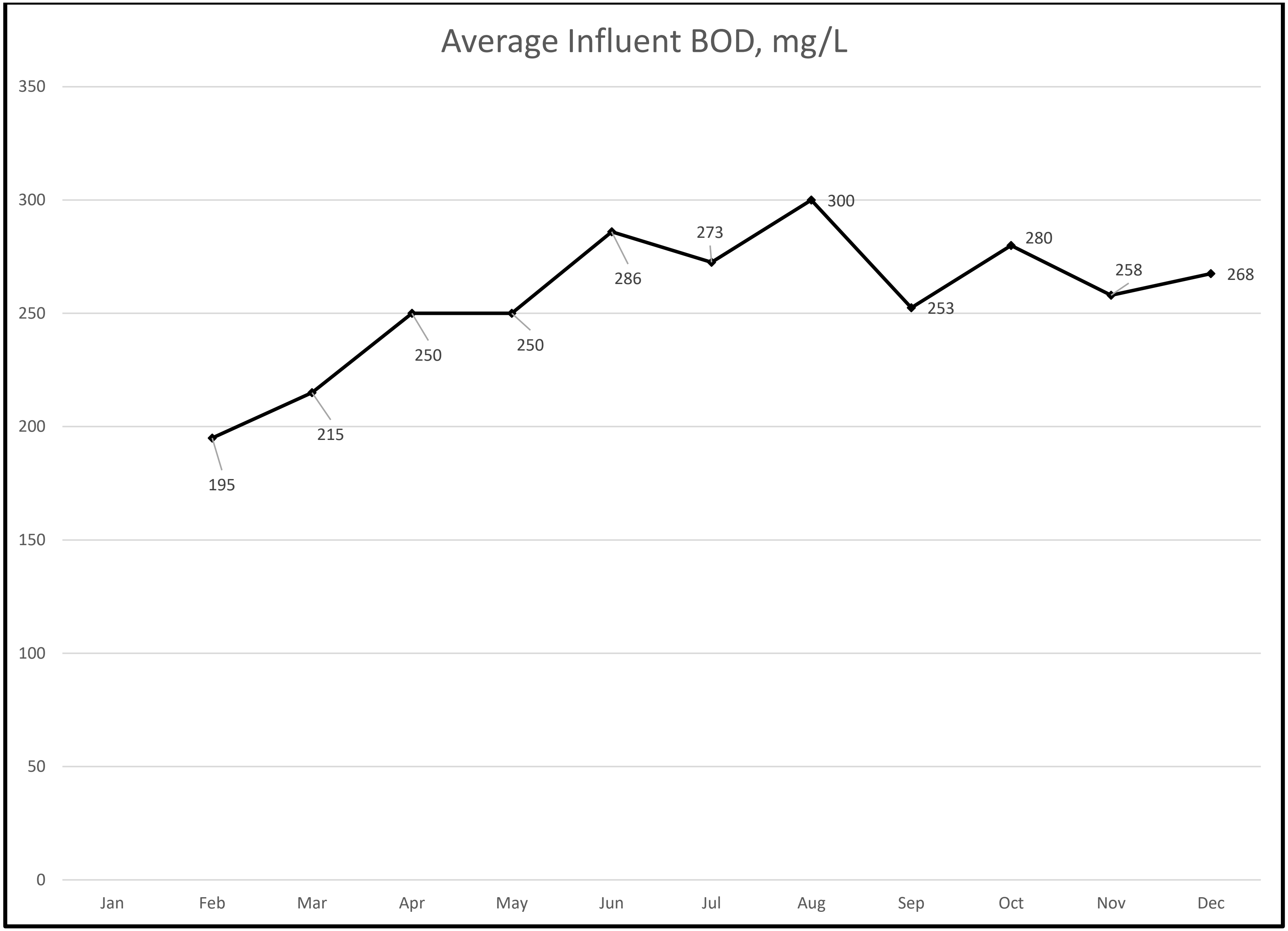
Appendix A

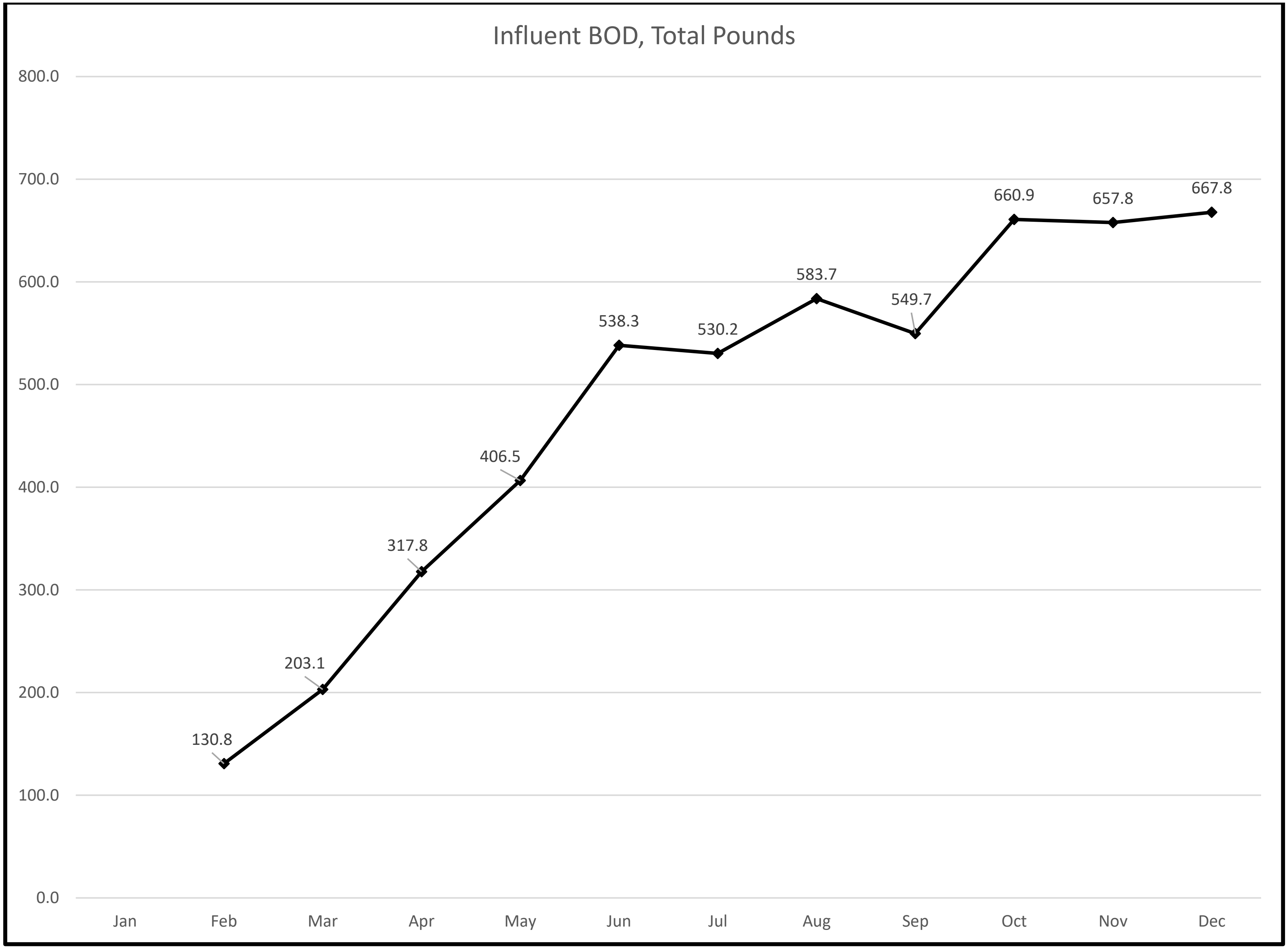
WRF Performance Charts

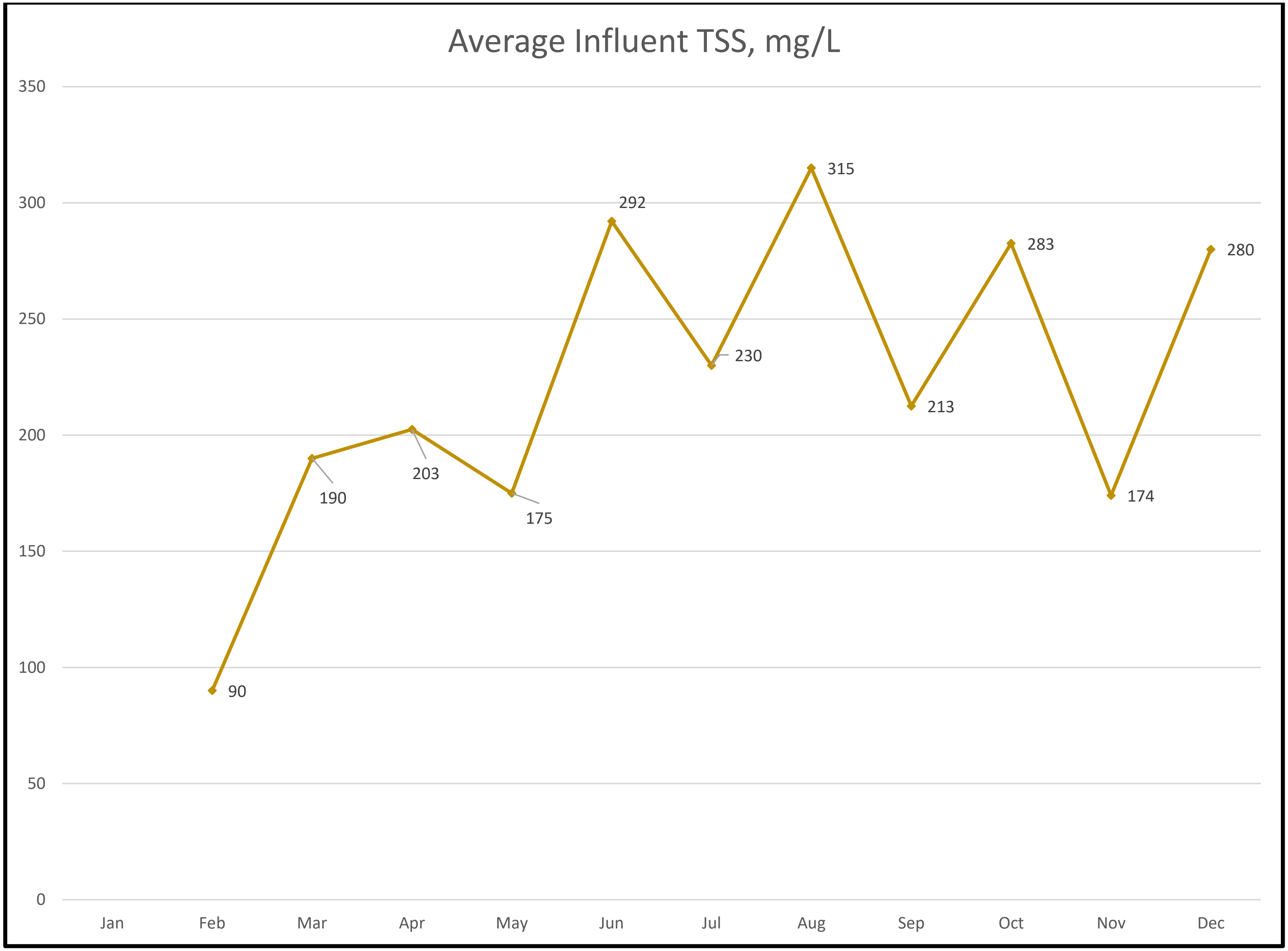

Average Daily Influent Flow, MGD
0.350
0.300
0.250
0.200
0.150
0.100
0.050
0.000
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
0.080
0.113
0.152
0.195
0.226
0.233
0.233
0.261
0.283
0.306
0.320

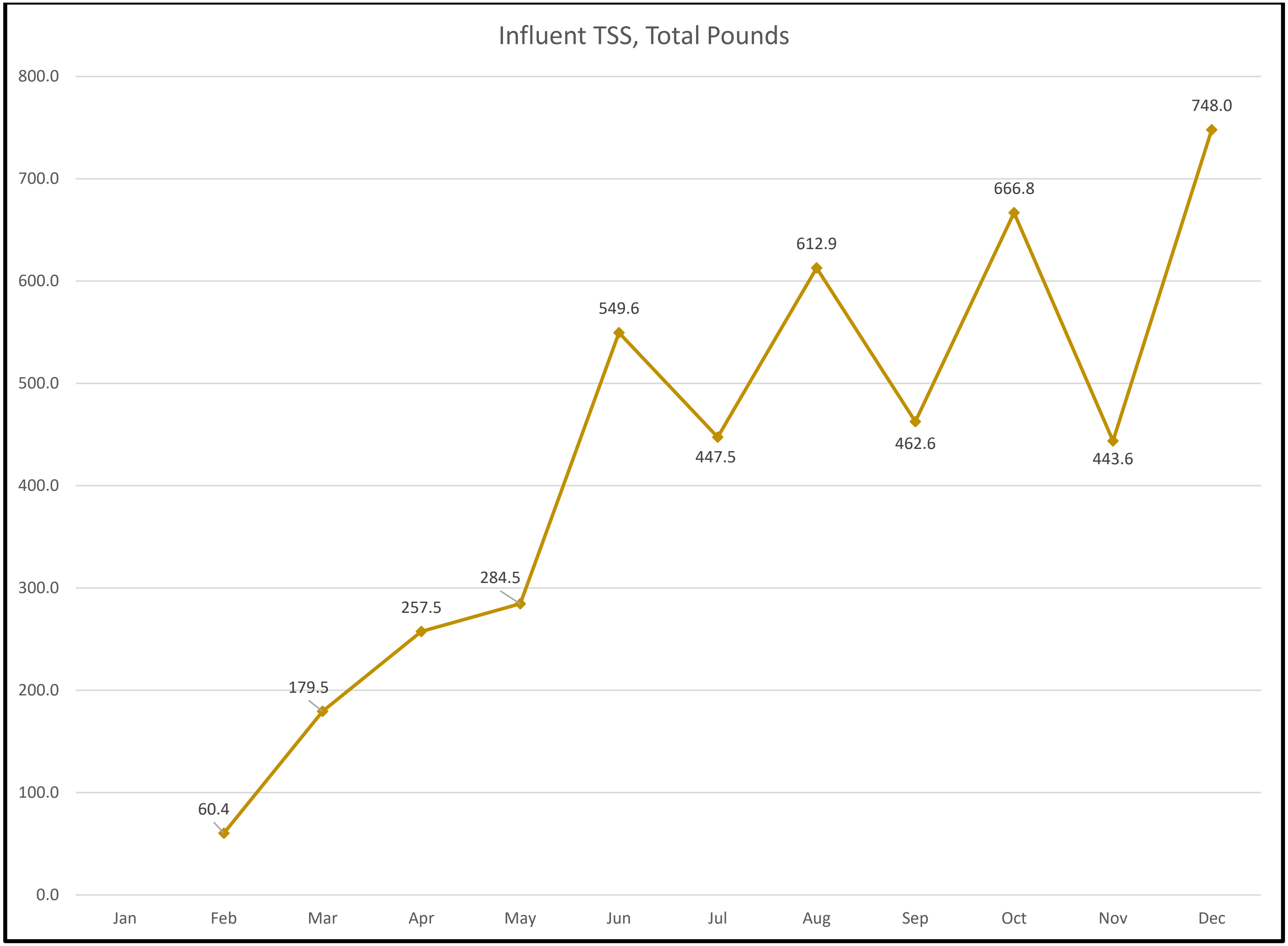


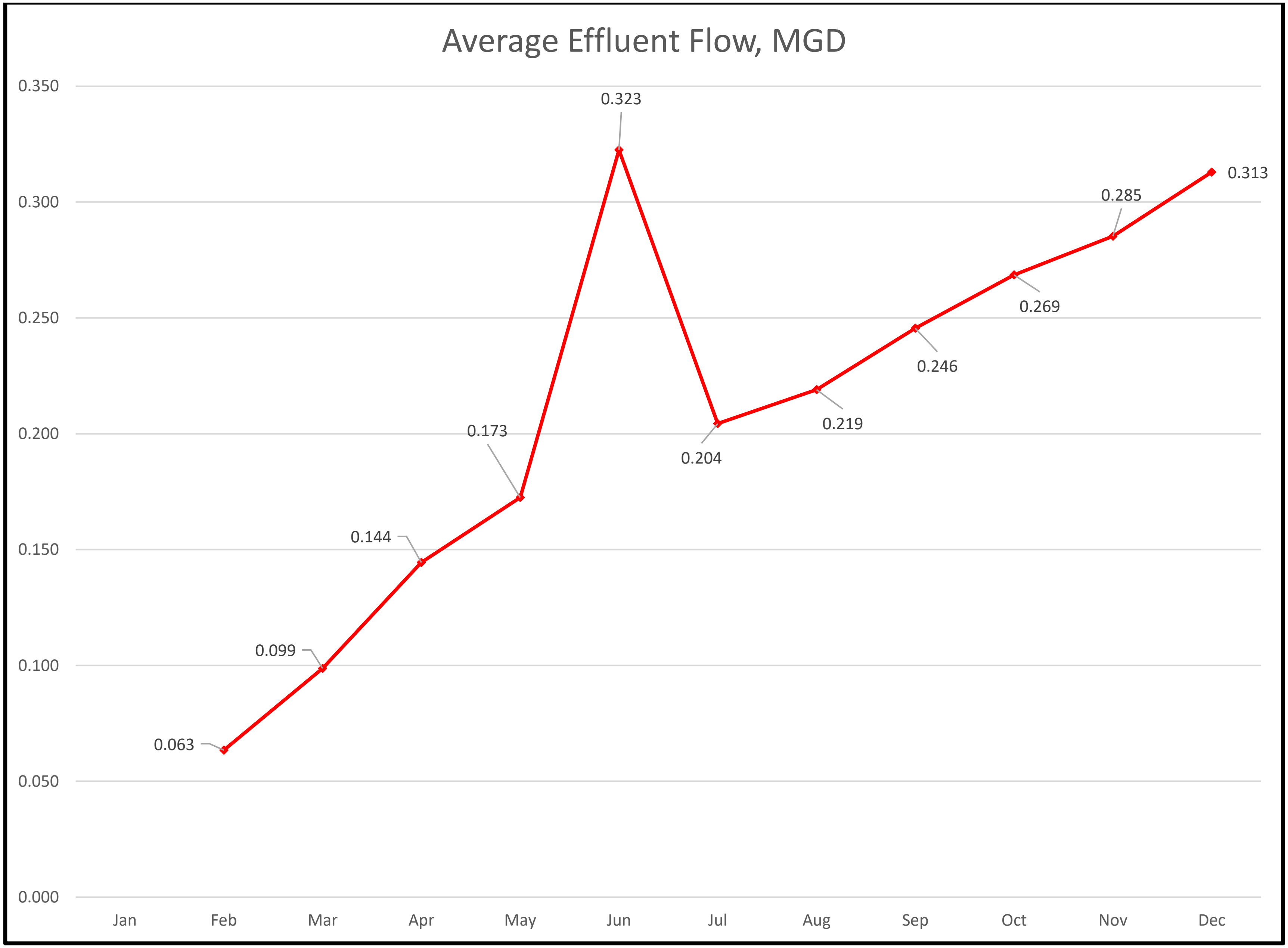
Total Monthly Influent Flows (MG)
12
10
8
6
4
2
0
1.303
1.980
3.511
4.573
6.043
6.770
7.232
7.232
7.830
8.773
9.171
9.988
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

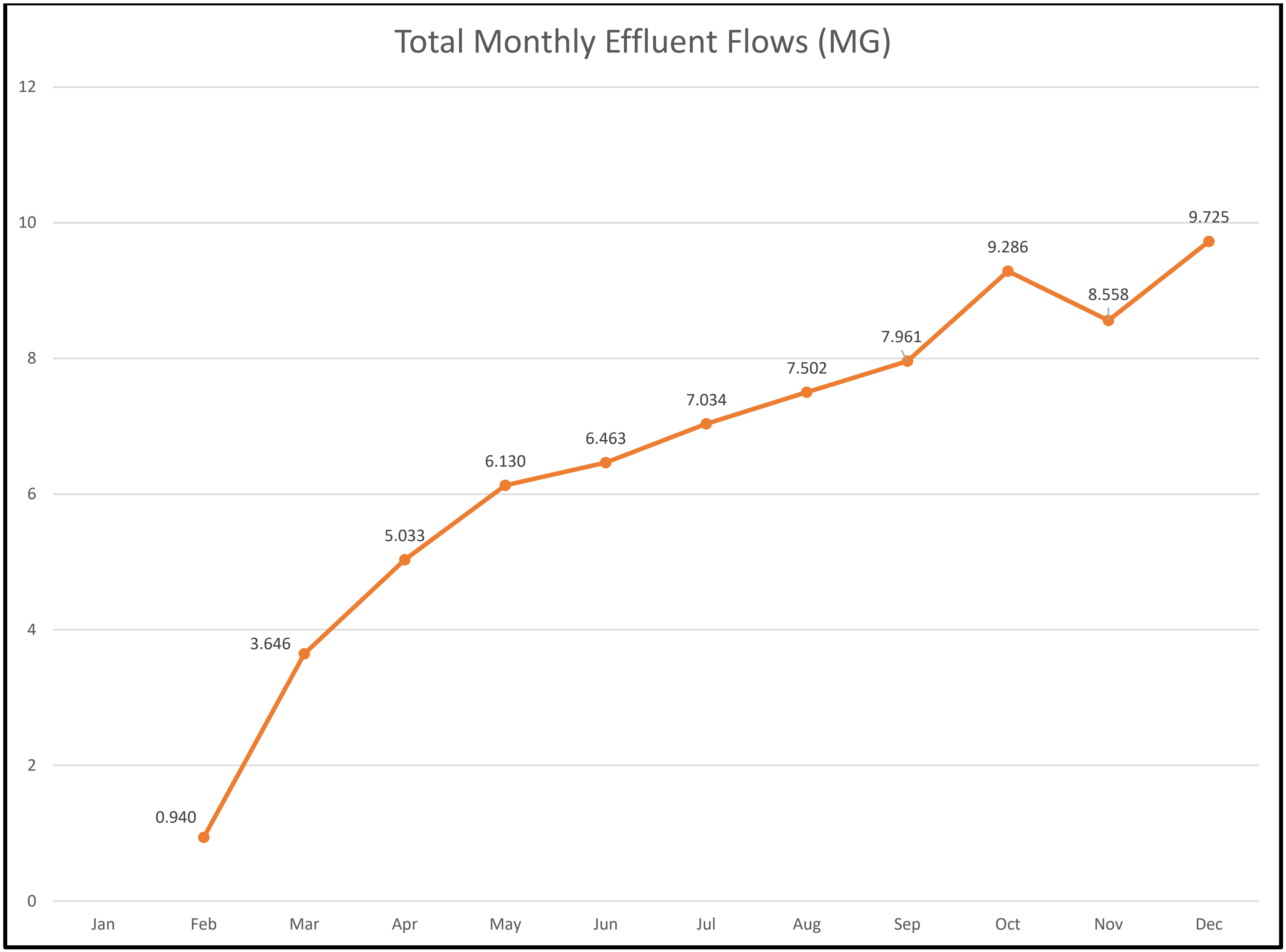

Average Influent BOD, mg/L
350
300
250
200
150
100
50
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
195
215
250
250
286
273
300
253
280
258
268

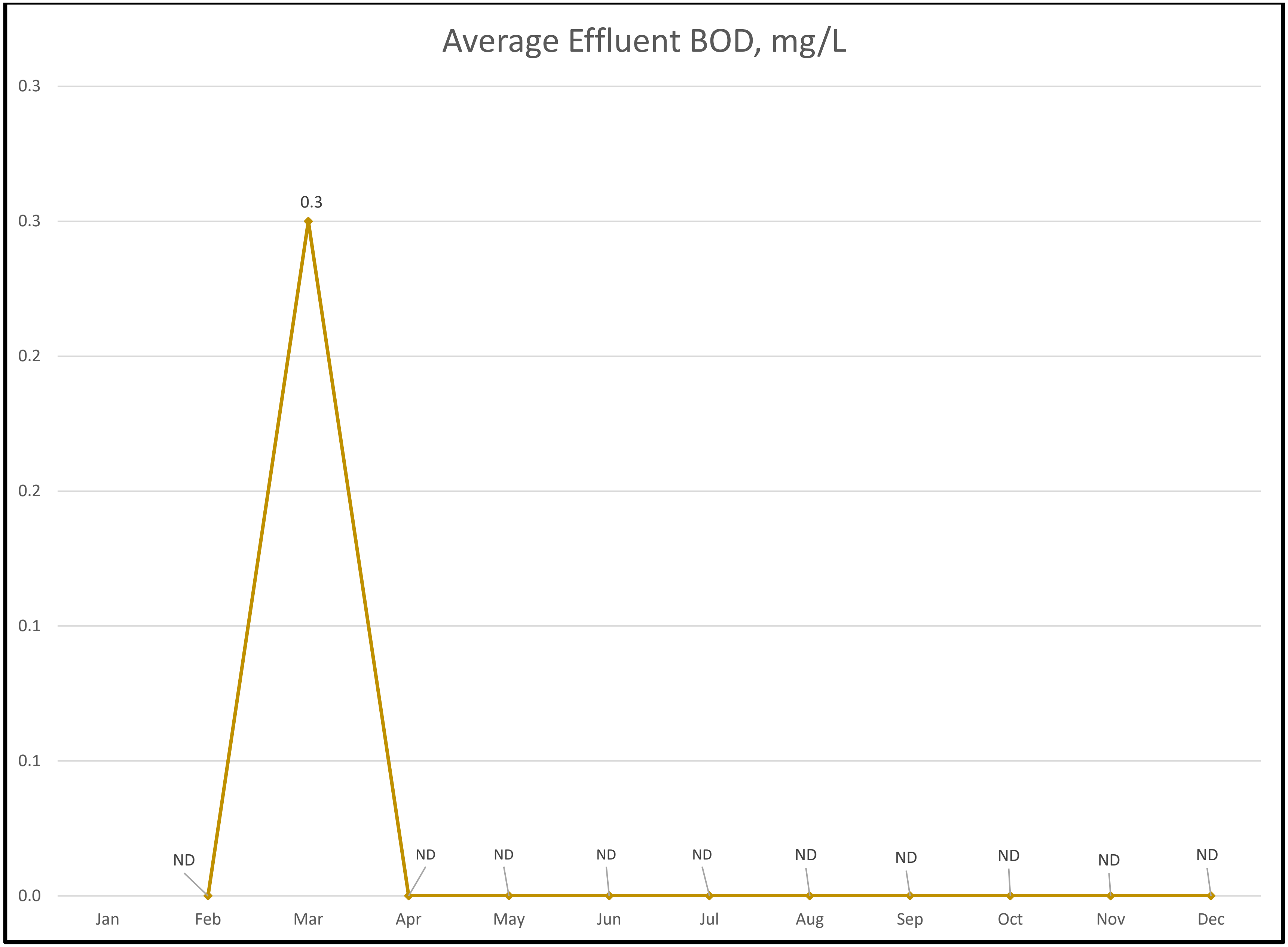

Influent BOD, Total Pounds
800.0
700.0
600.0
500.0
400.0
300.0
200.0
100.0
0.0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
130.8
203.1
317.8
406.5
538.3
530.2
583.7
549.7
660.9
657.8
667.8

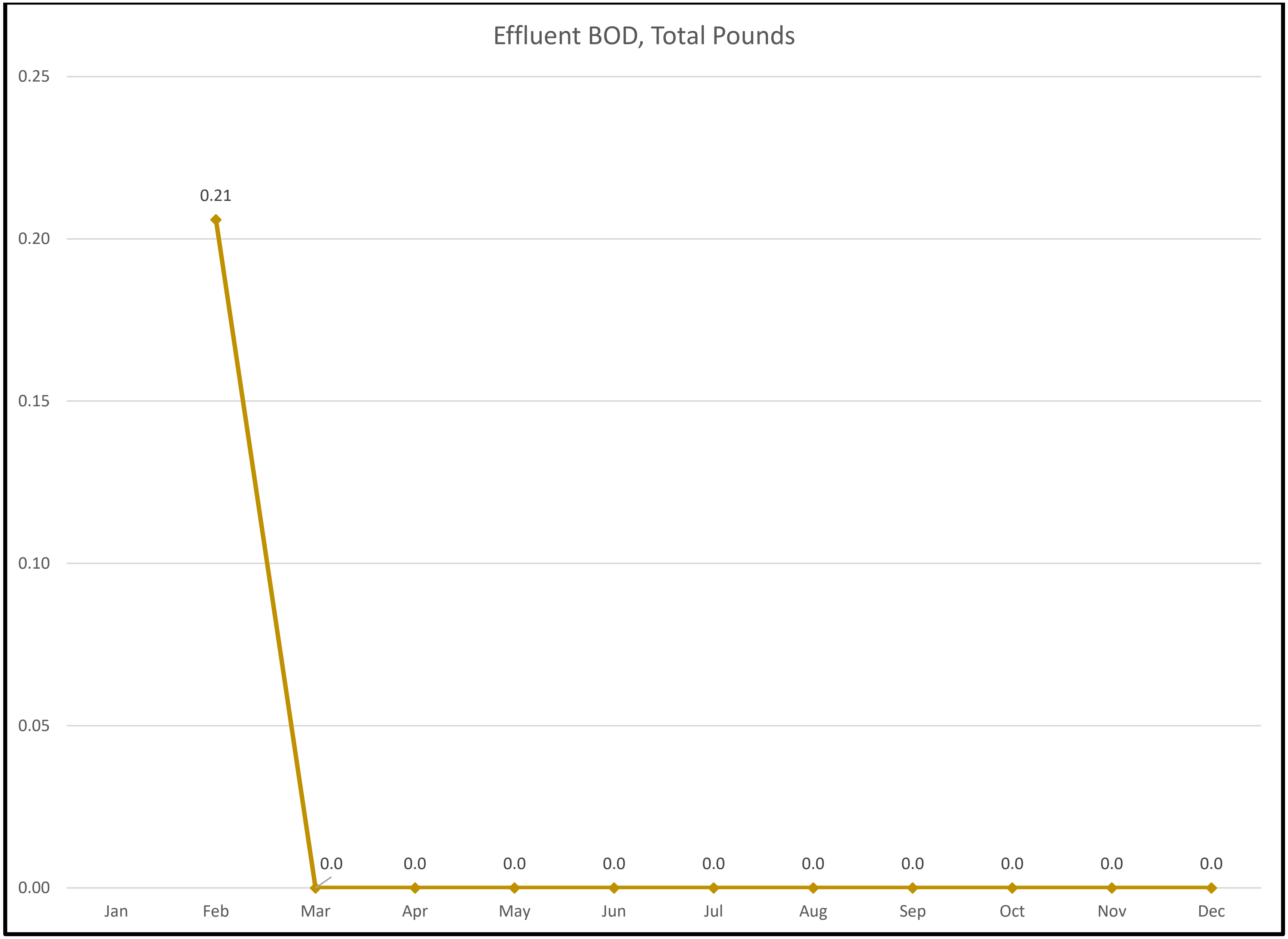

Average Influent TSS, mg/L
350
300
250
200
150
100
50
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
90
190
203
175
292
230
315
213
283
174
280

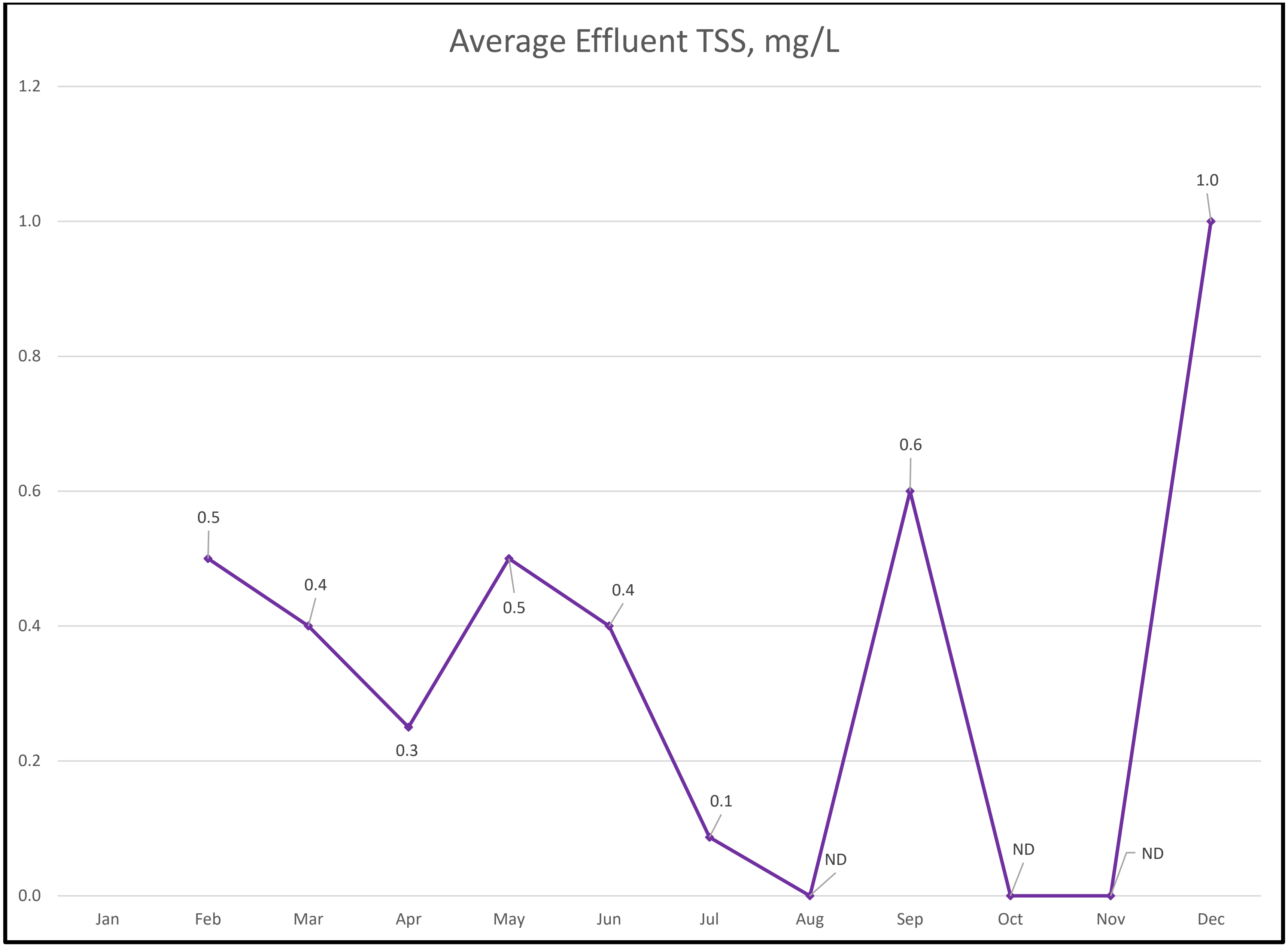

Influent TSS, Total Pounds
800.0
700.0
600.0
500.0
400.0
300.0
200.0
100.0
0.0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
60.4
179.5
257.5
284.5
549.6
447.5
612.9
462.6
666.8
443.6
748.0

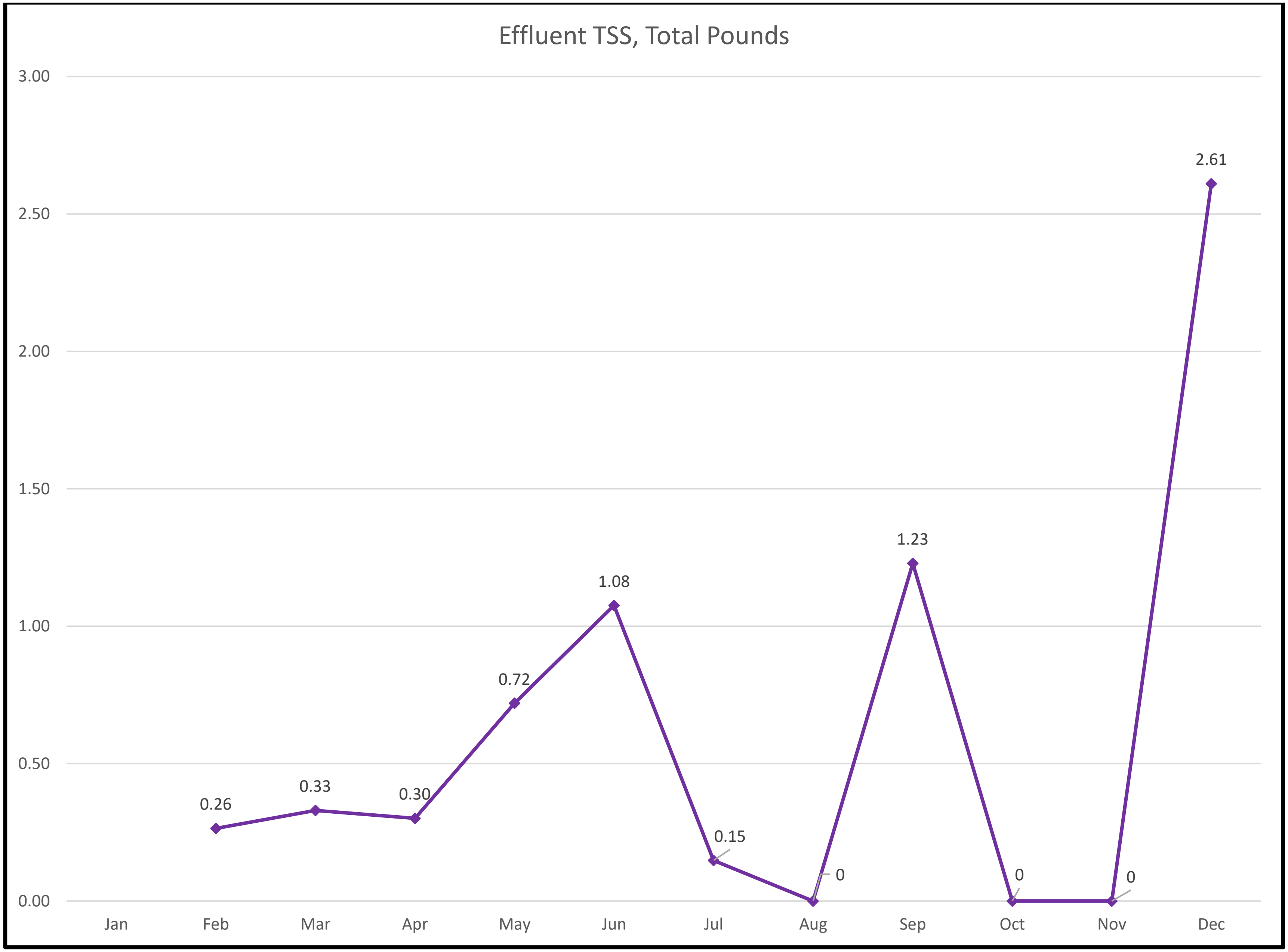

Average Effluent Flow, MGD
0.350
0.300
0.250
0.200
0.150
0.100
0.050
0.000
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
0.063
0.099
0.144
0.173
0.323
0.204
0.219
0.246
0.269
0.285
0.313

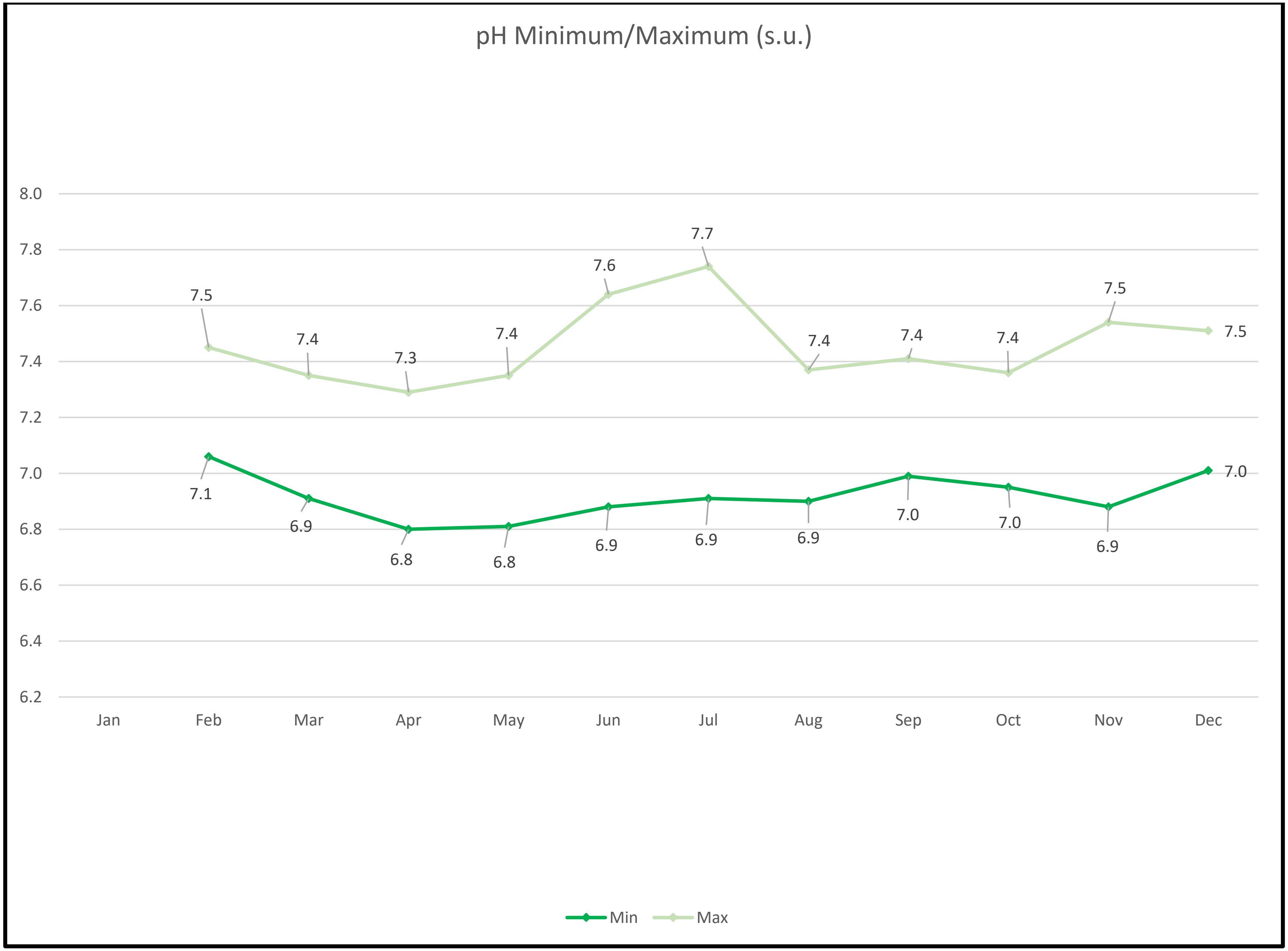

Total Monthly Effluent Flows (MG)
0
2
4
6
8
10
12
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
0.940
3.646
5.033
6.130
6.463
7.034
7.502
7.961
9.286
8.558
9.725

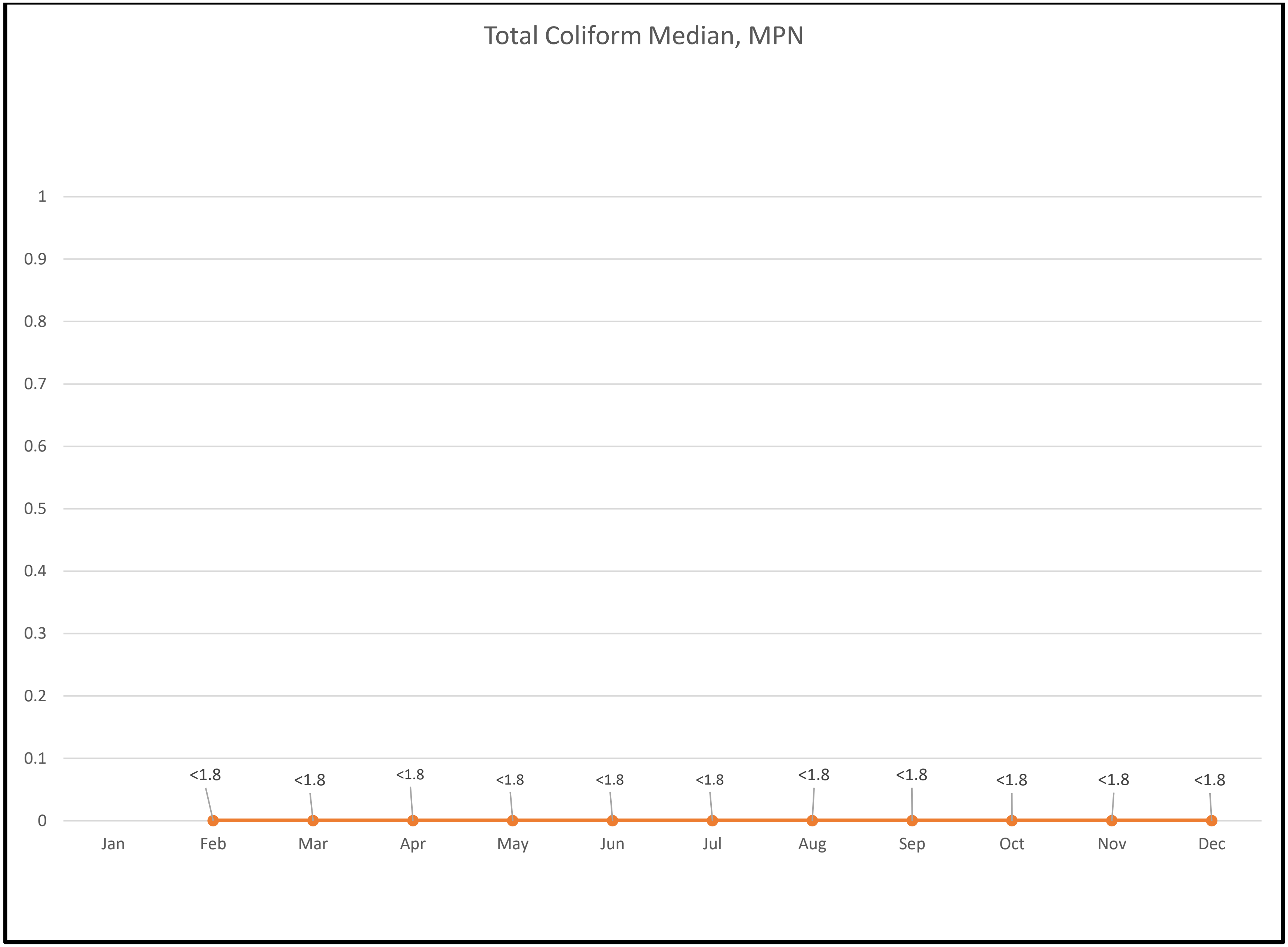

Average Effluent BOD, mg/L
0.3
0.3
0.2
0.2
0.1
0.1
0.0
0.3
ND
ND
ND
ND
ND
ND
ND
ND
ND
ND
ND
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

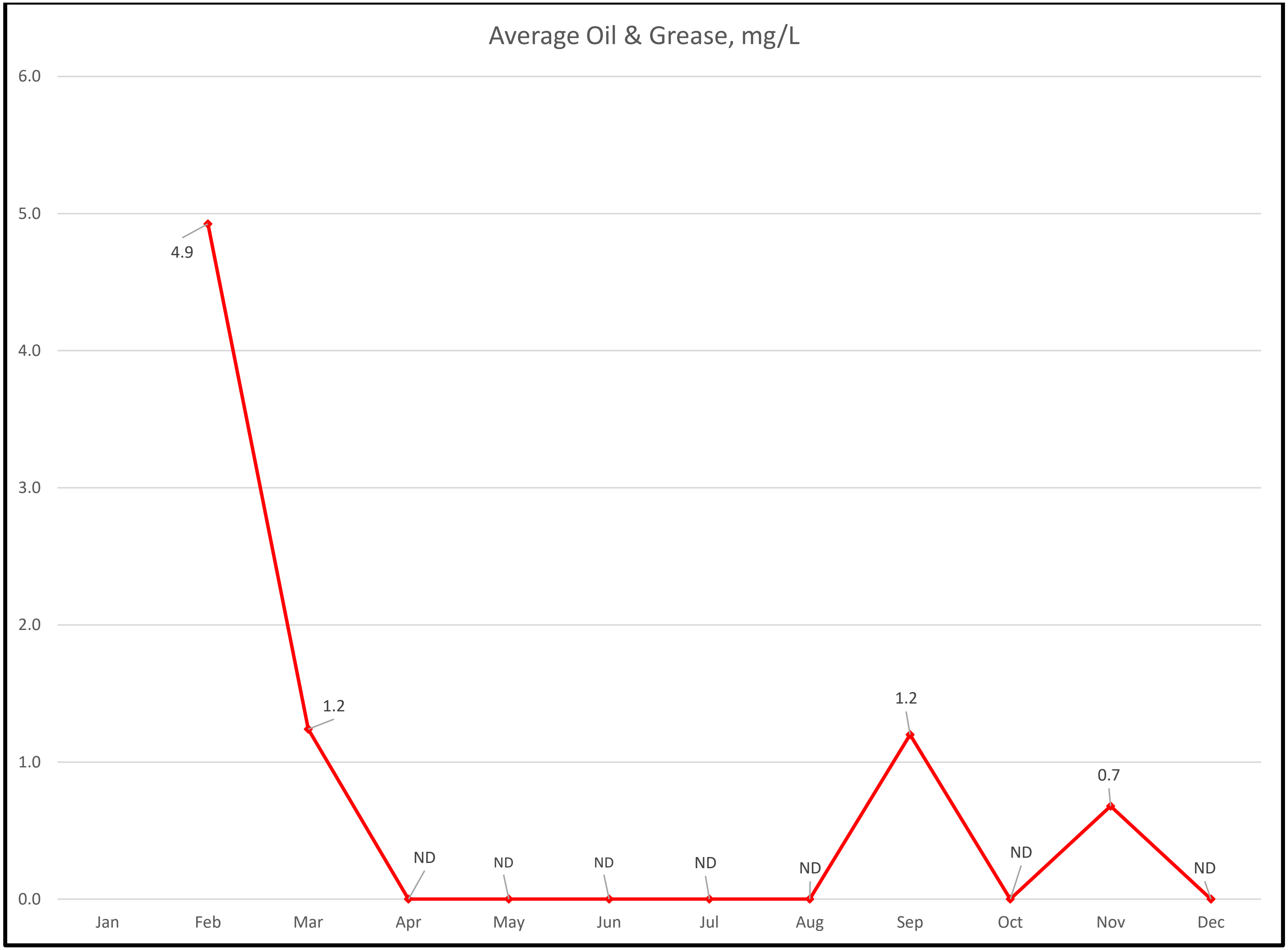

Effluent BOD, Total Pounds
0.25
0.20
0.15
0.10
0.05
0.00
0.21
0.0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

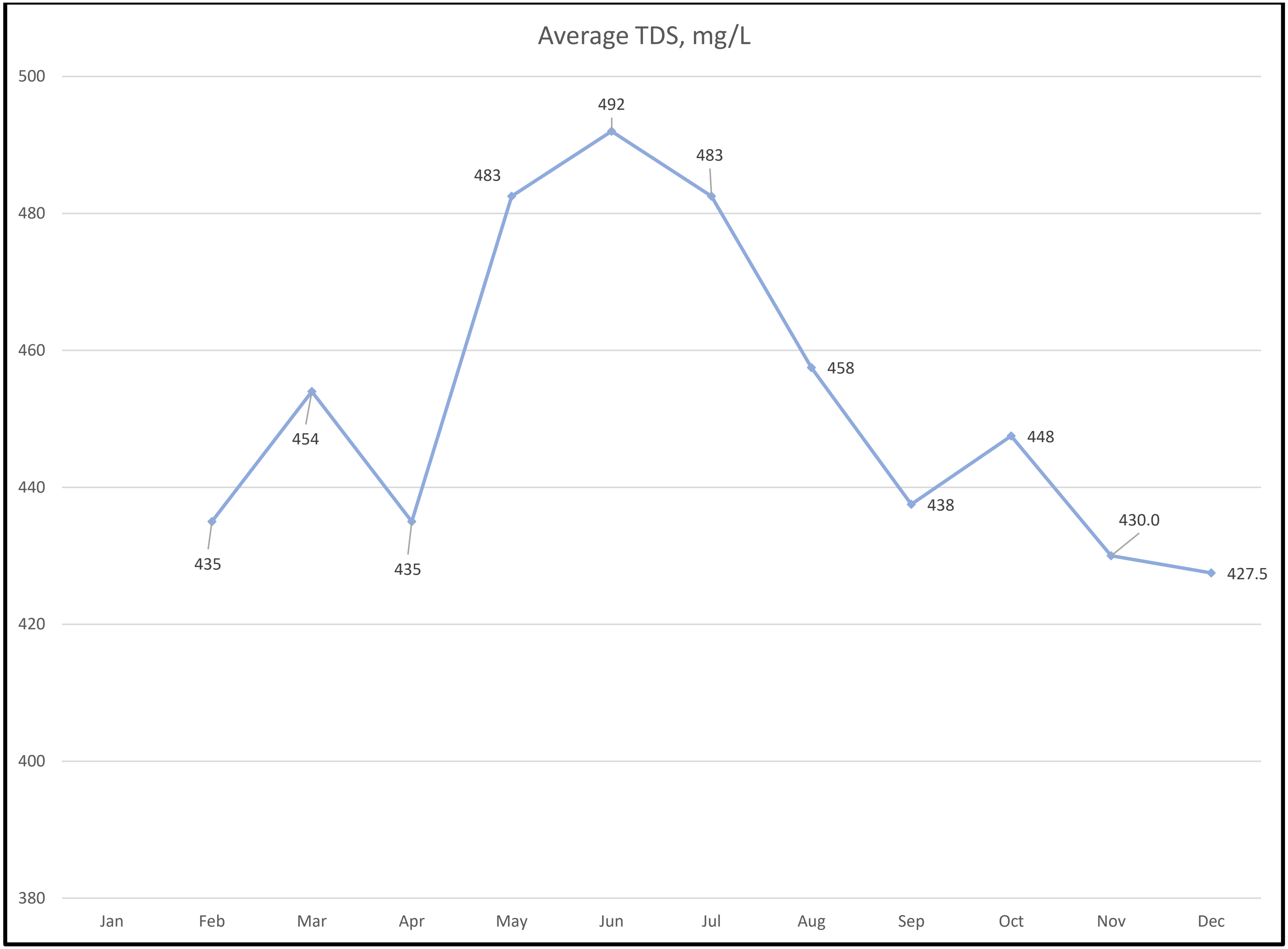

Average Effluent TSS, mg/L
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
0.5
0.4
0.3
0.5
0.4
0.1
ND
0.6
ND
ND
1.0

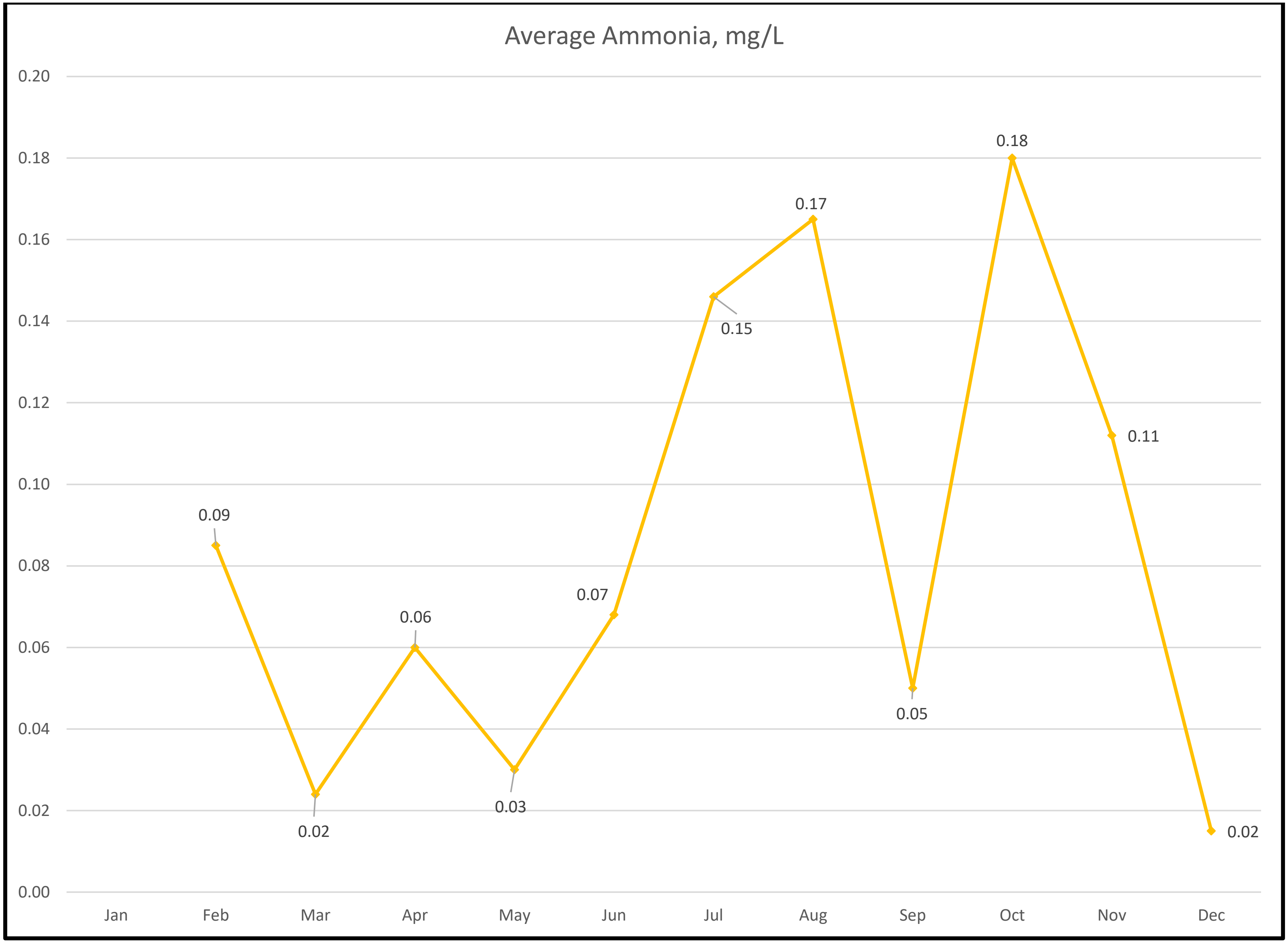

Effluent TSS, Total Pounds
3.00
2.50
2.00
1.50
1.00
0.50
0.00
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
0.26
0.33
0.30
0.72
1.08
0.15
0
1.23
0
0
2.61

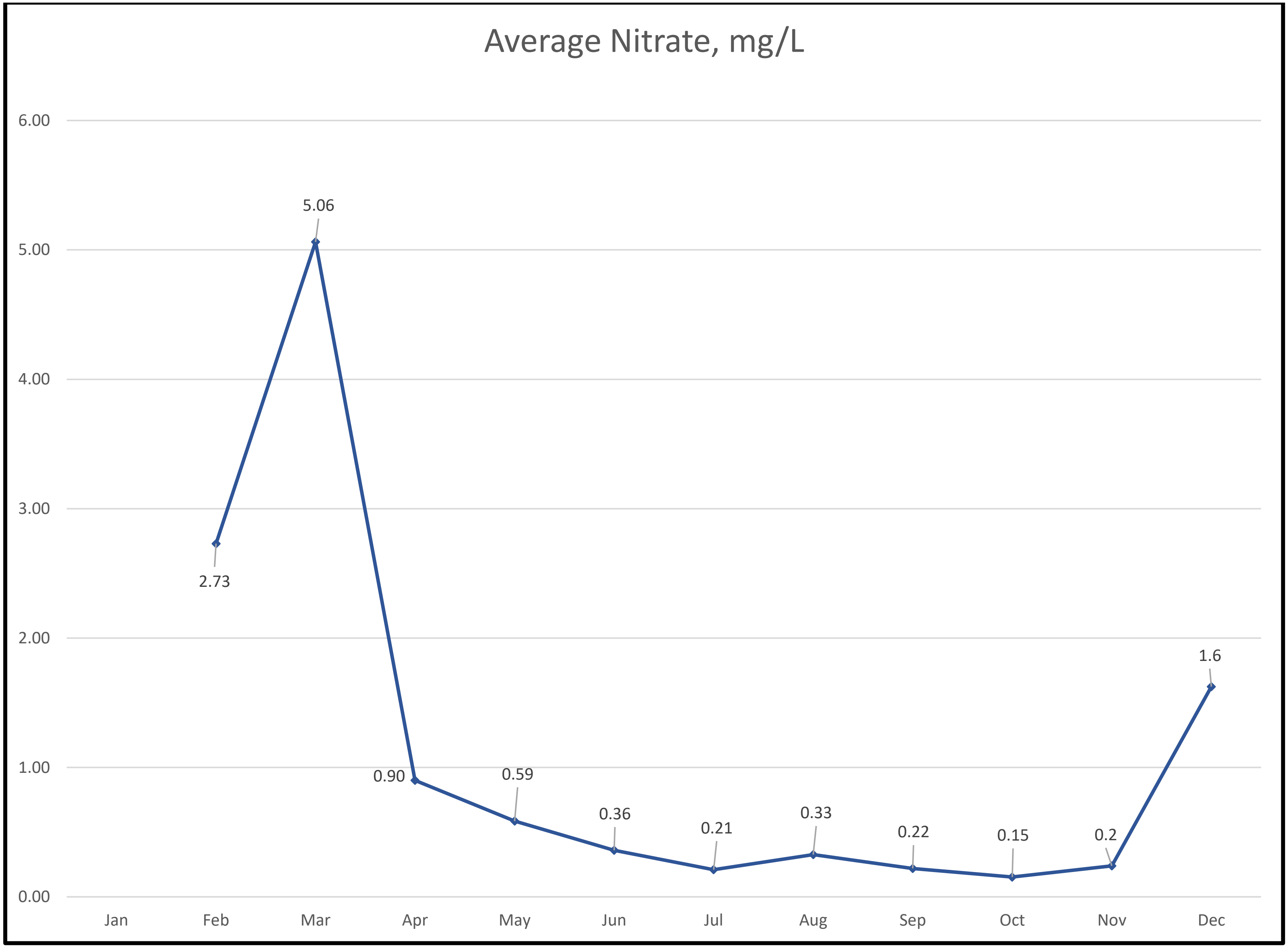

pH Minimum/Maximum (s.u.)
8.0
7.8
7.6
7.4
7.2
7.0
6.8
6.6
6.4
6.2
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
7.5
7.4
7.3
7.4
7.6
7.7
7.4
7.4
7.4
7.5
7.5
7.1
6.9
6.8
6.8
6.9
6.9
6.9
7.0
7.0
6.9
7.0
Min
Max

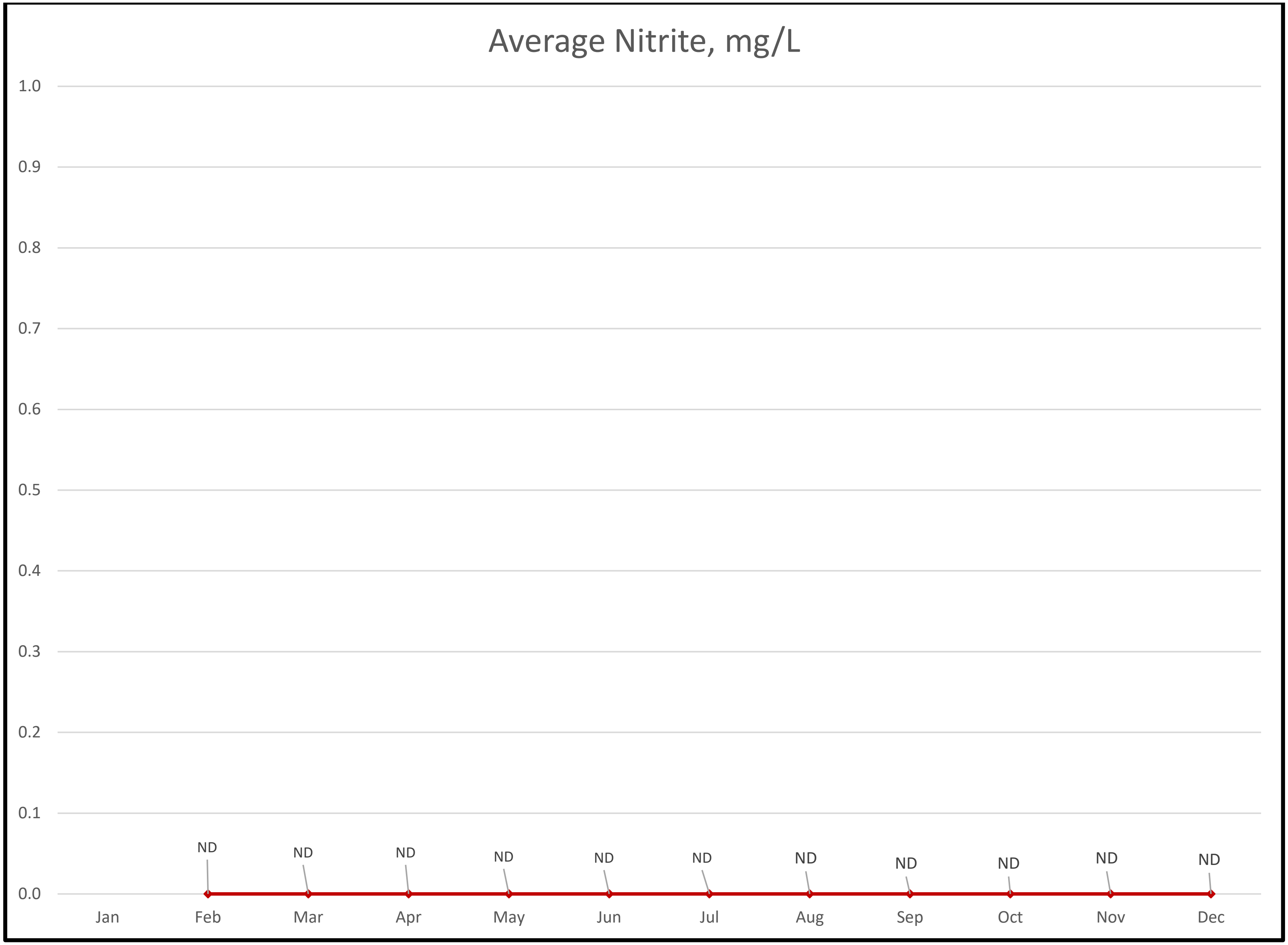

Total Coliform Median, MPN
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
<1.8
<1.8
<1.8
<1.8
<1.8
<1.8
<1.8
<1.8
<1.8
<1.8
<1.8
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

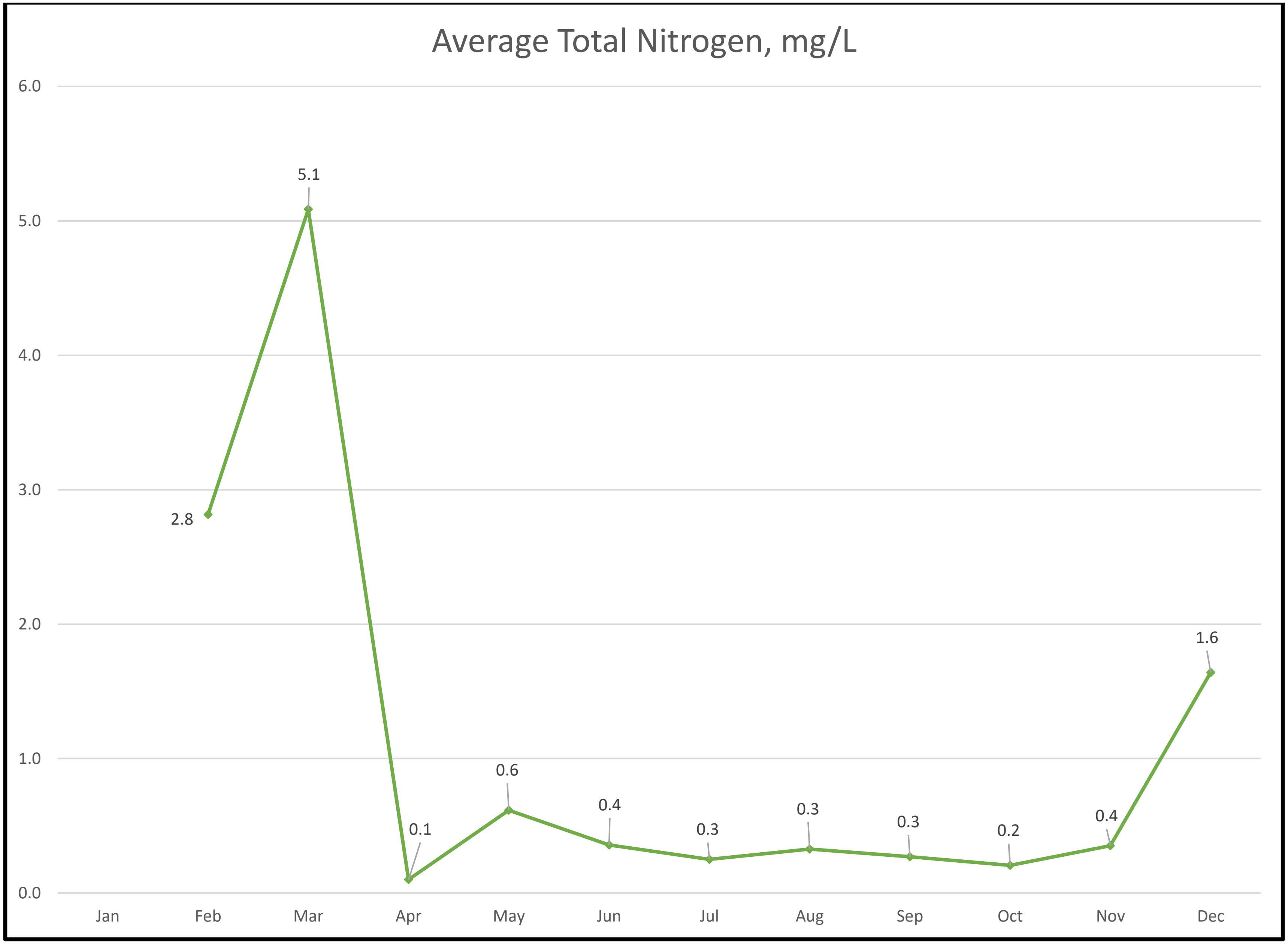

Average Oil & Grease, mg/L
6.0
5.0
4.0
3.0
2.0
1.0
0.0
4.9
1.2
ND
ND
ND
ND
ND
1.2
ND
0.7
ND
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

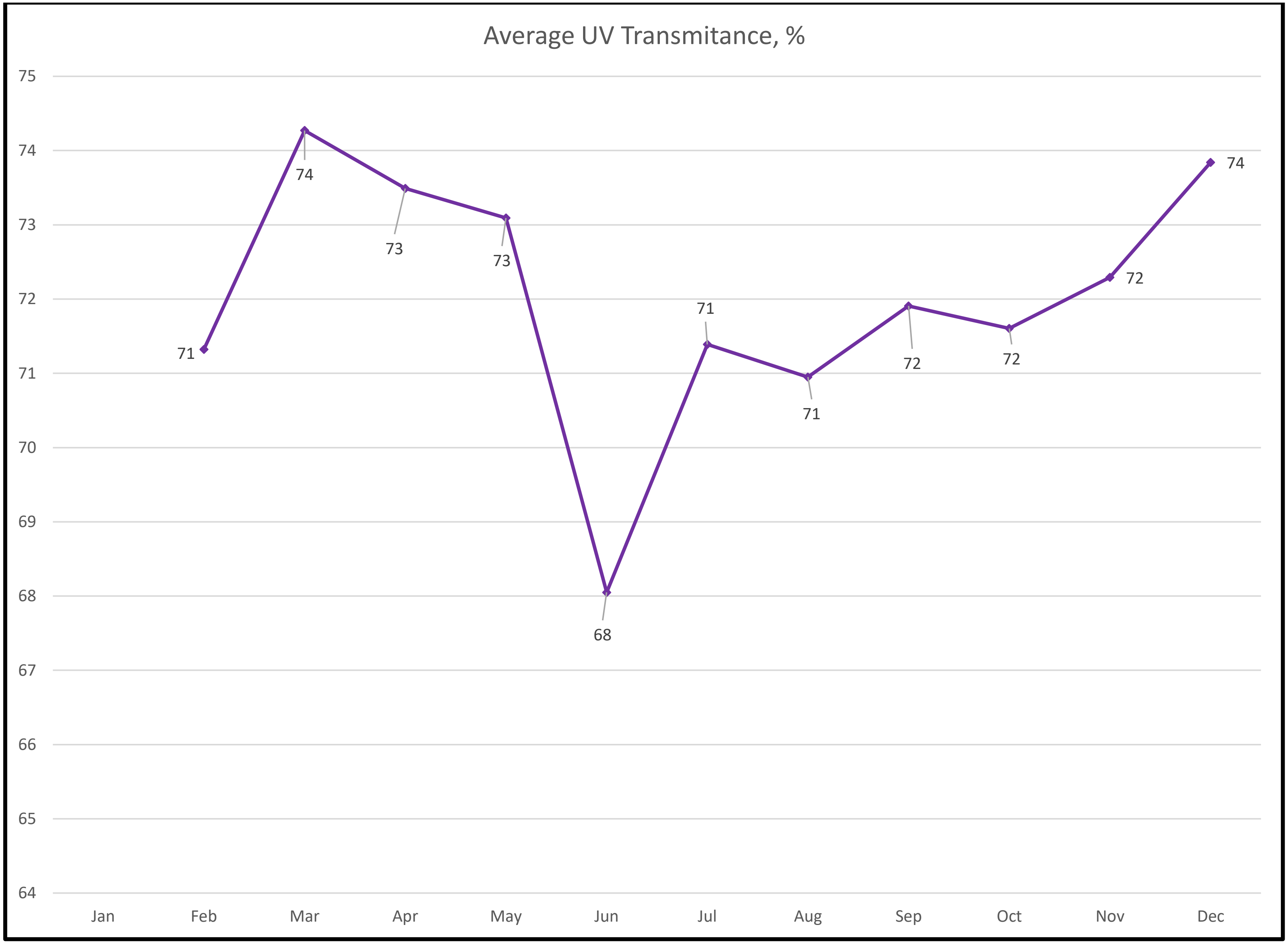

Average TDS, mg/L
500
480
460
440
420
400
380
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
435
454
435
483
492
483
458
438
448
430.0
427.5

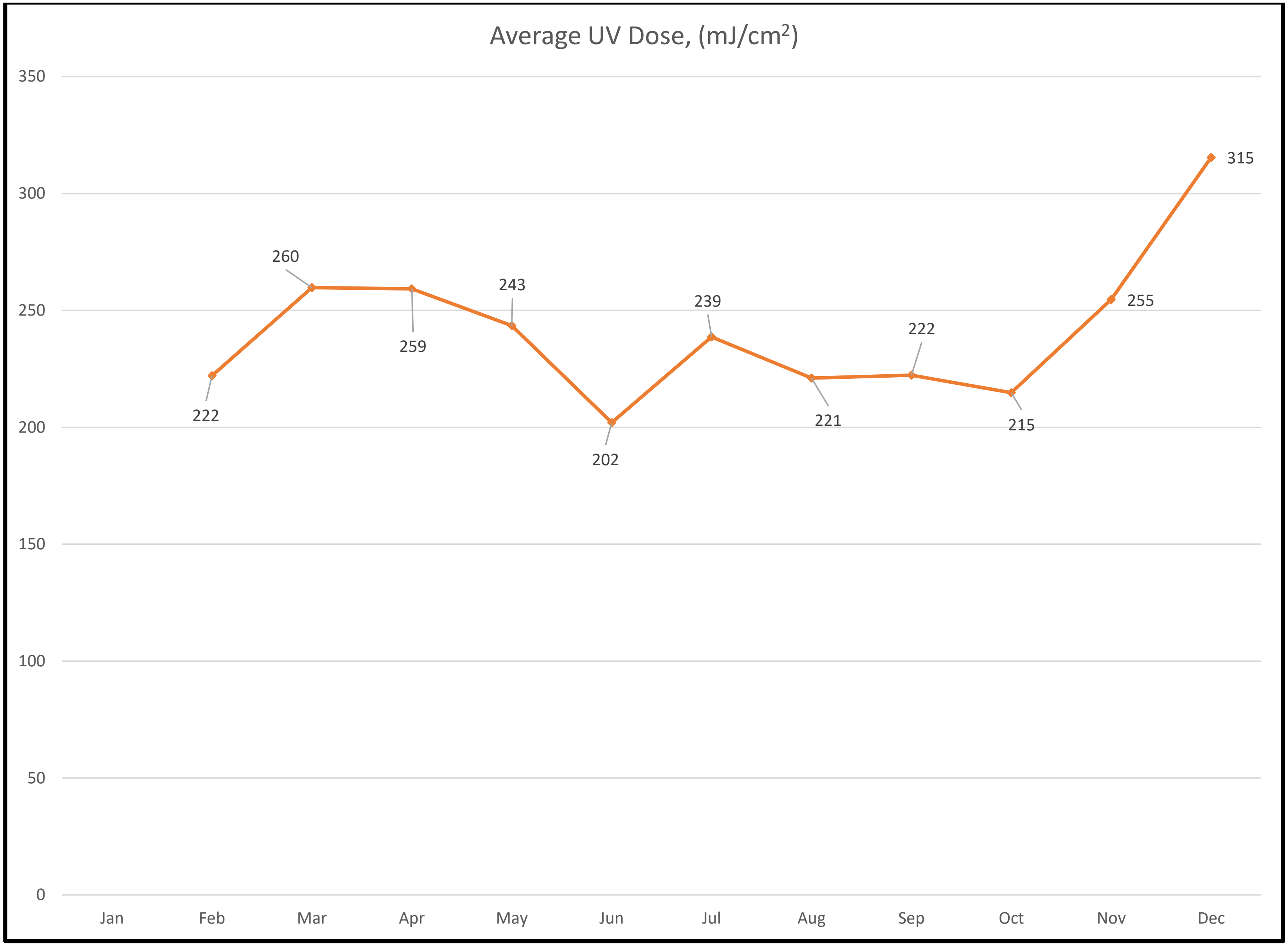

Average Ammonia, mg/L
0.20
0.18
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
0.09
0.02
0.06
0.03
0.07
0.15
0.17
0.05
0.18
0.11
0.02

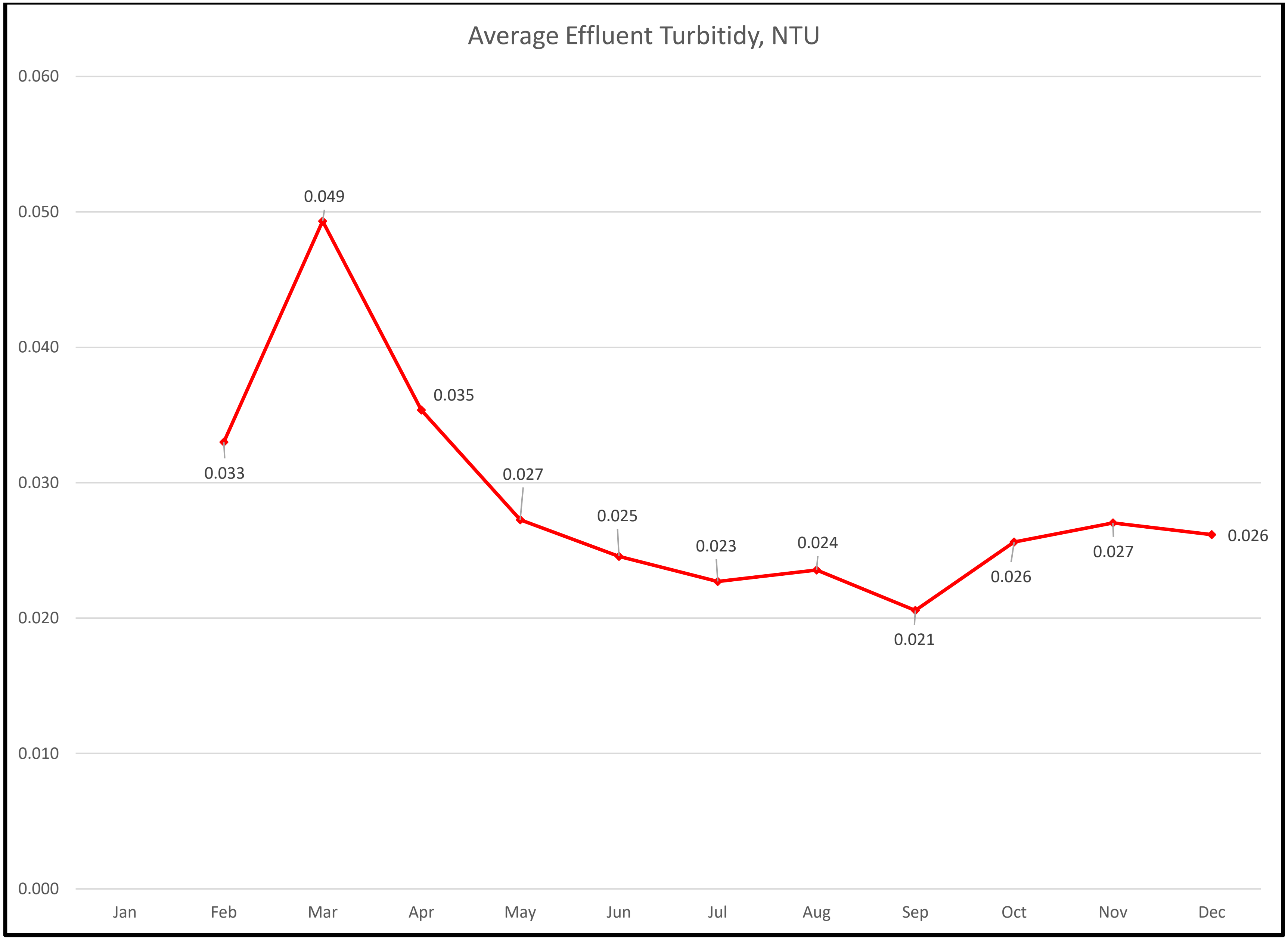

Average Nitrate, mg/L
6.00
5.00
4.00
3.00
2.00
1.00
0.00
5.06
2.73
0.90
0.59
0.36
0.21
0.33
0.22
0.15
0.2
1.6
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

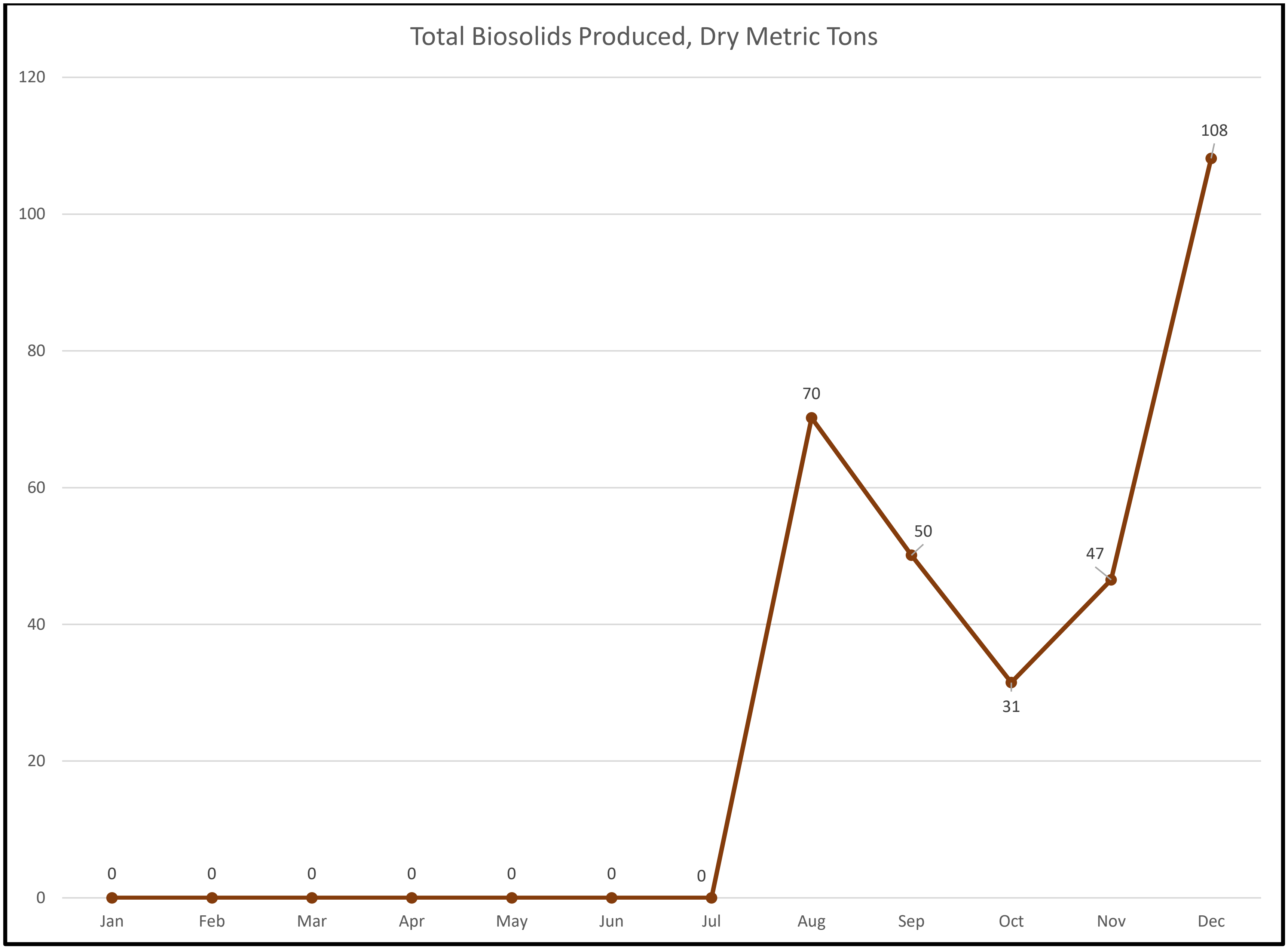

Average Nitrite, mg/L
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
ND
ND
ND
ND
ND
ND
ND
ND
ND
ND
ND
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Average Total Nitrogen, mg/L
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
2.8
5.1
0.1
0.6
0.4
0.3
0.3
0.3
0.2
0.4
1.6


Average UV Transmitance, %
75
74
73
72
71
70
69
68
67
66
65
64
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
71
74
73
73
68
71
71
72
72
72
74

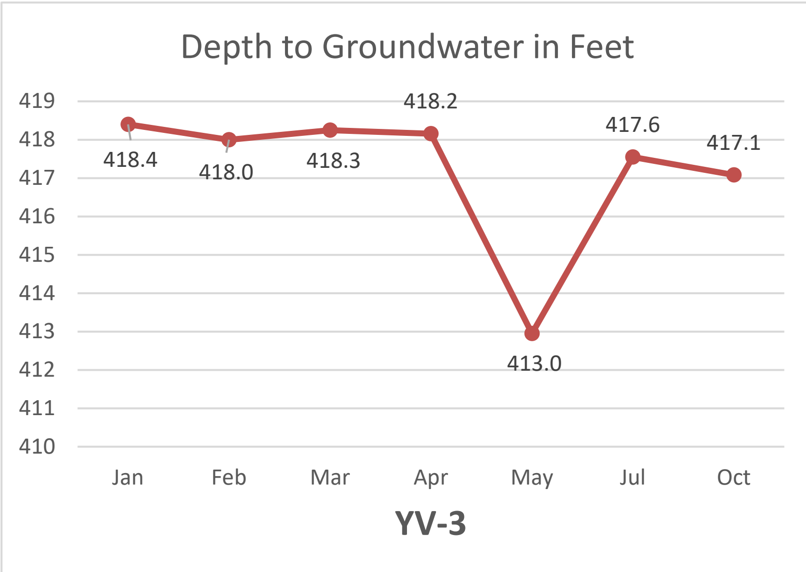

Average UV Dose, (mJ/cm2)
350
300
250
200
150
100
50
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
222
260
259
243
202
239
221
222
215
255
315

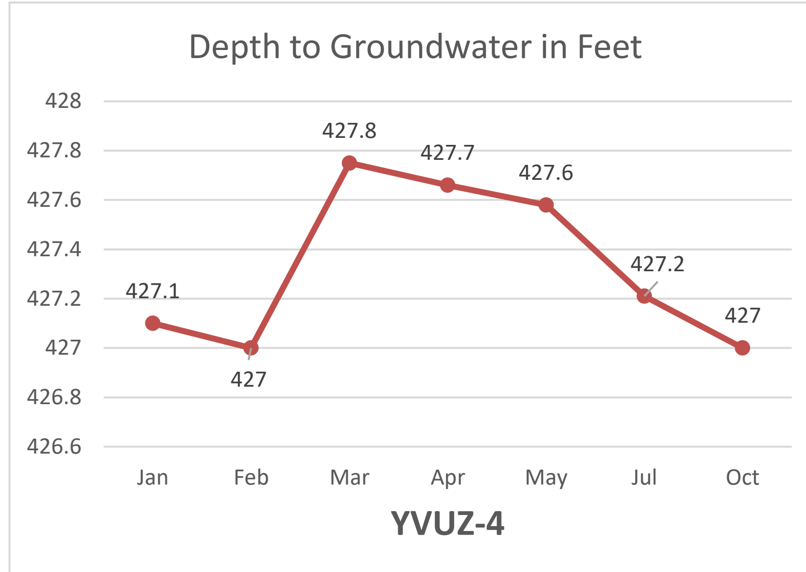

Average Effluent Turbitidy, NTU
0.060
0.050
0.040
0.030
0.020
0.010
0.000
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
0.033
0.049
0.035
0.027
0.025
0.023
0.024
0.021
0.026
0.027
0.026

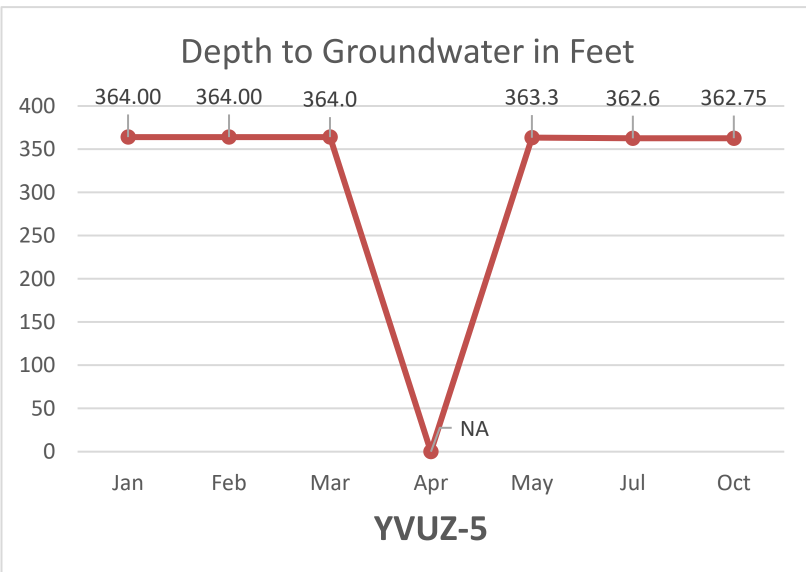

Total Biosolids Produced, Dry Metric Tons
120
100
80
60
40
20
0
108
70
50
47
31
0
0
0
0
0
0
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec

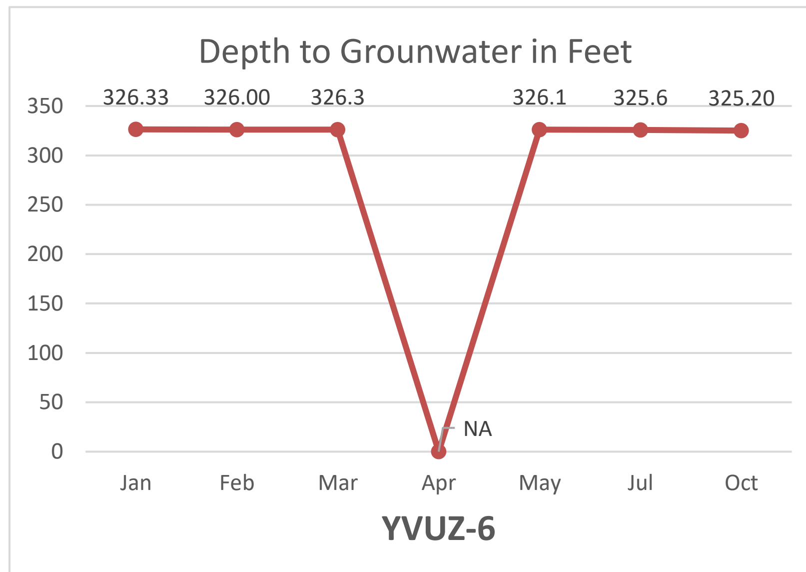
Appendix B

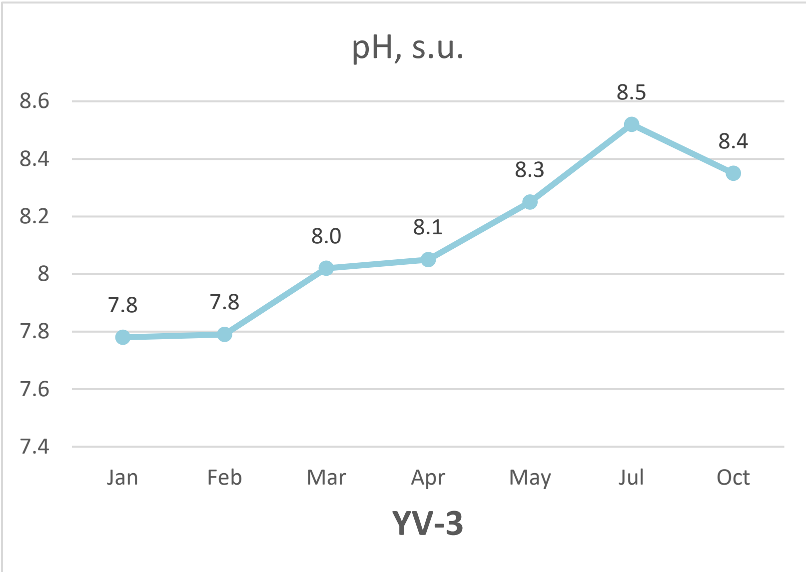
Monitoring Well Performance Charts

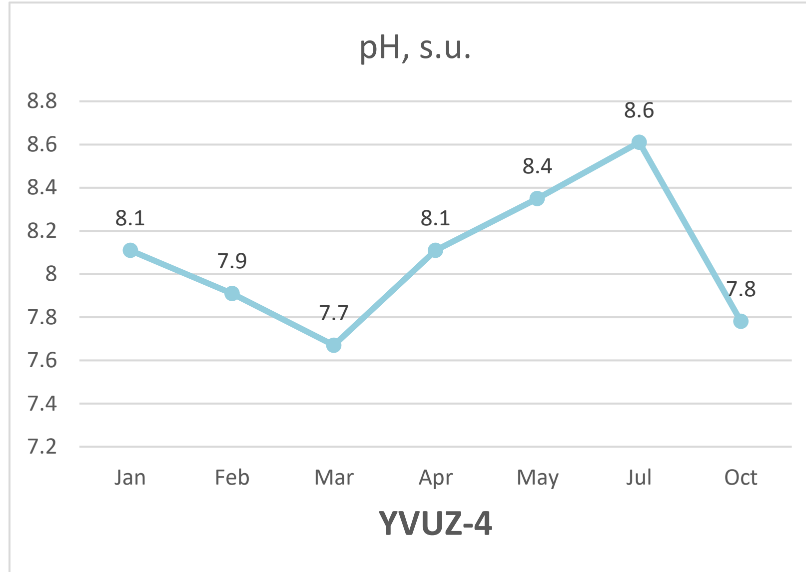

Depth to Groundwater in Feet
419
418
417
416
415
414
413
412
411
410
418.4
418.0
418.3
418.2
413.0
417.6
417.1
Jan
Feb
Mar
Apr
May
Jul
Oct
YV-3

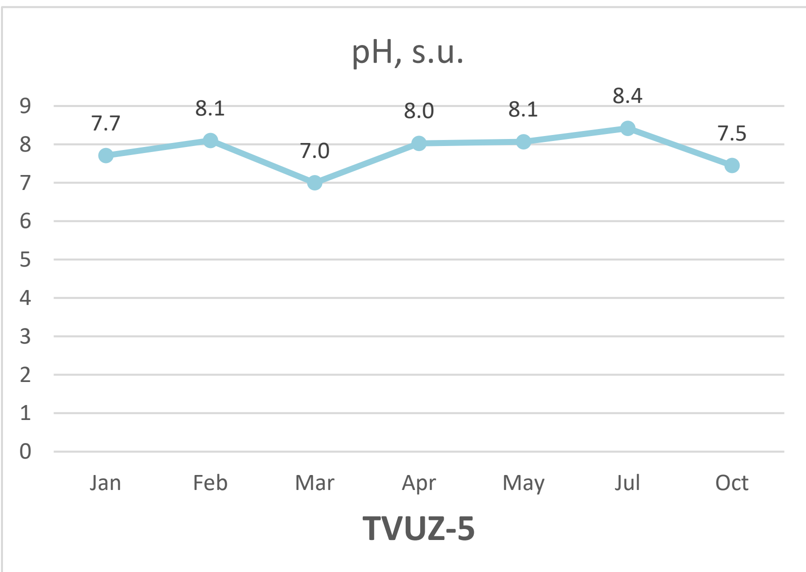

Depth to Groundwater in Feet
428
427.8
427.6
427.4
427.2
427
426.8
426.6
427.1
427
427.8
427.7
427.6
427.2
427
Jan
Feb
Mar
Apr
May
Jul
Oct
YVUZ-4

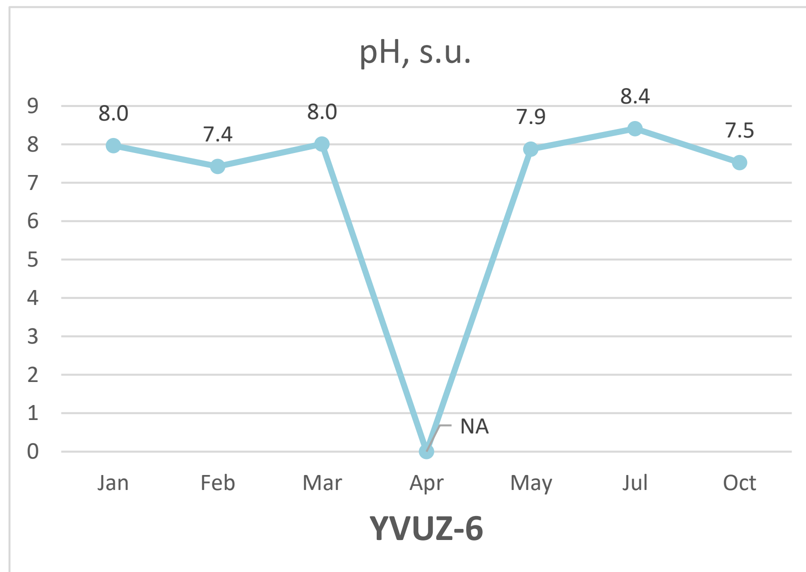

Depth to Groundwater in Feet
400
350
300
250
200
150
100
50
0
364.00
364.00
364.0
NA
363.3
362.6
362.75
Jan
Feb
Mar
Apr
May
Jul
Oct
YVUZ-5

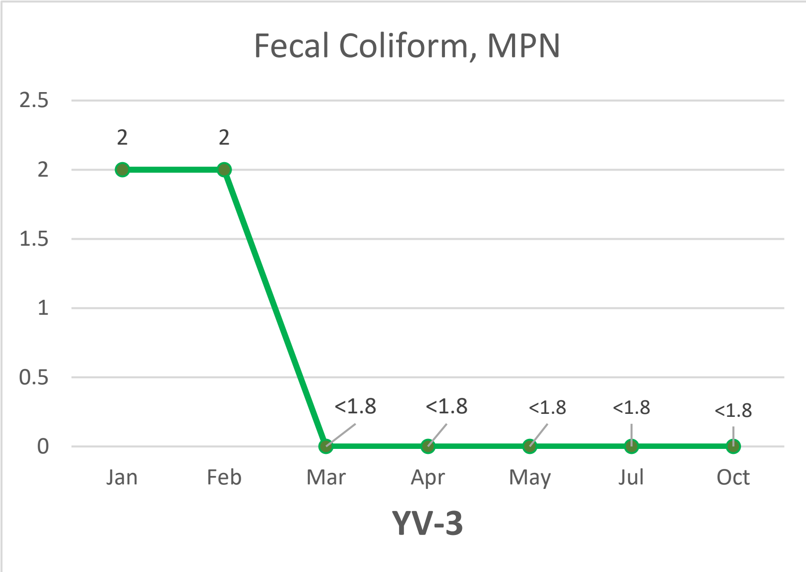

Depth to Grounwater in Feet
350
300
250
200
150
100
50
0
326.33
326.00
326.3
NA
326.1
325.6
325.20
Jan
Feb
Mar
Apr
May
Jul
Oct
YVUZ-6

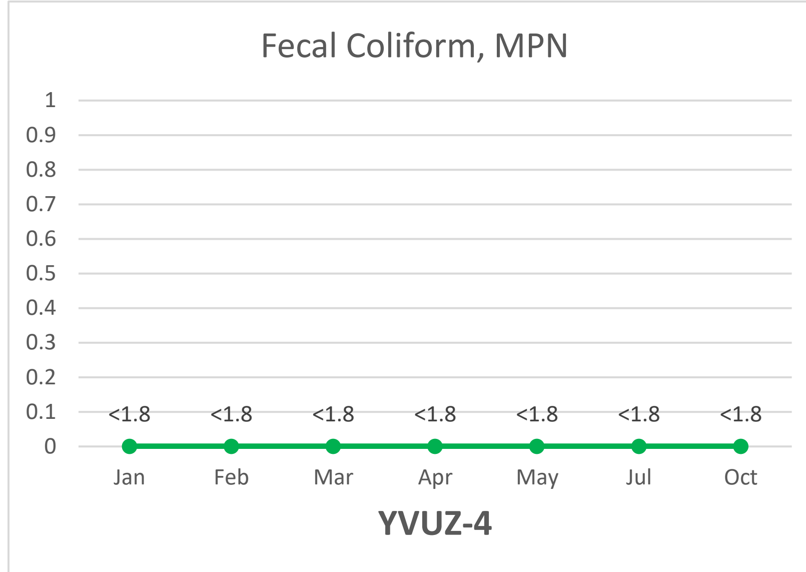

pH, s.u.
8.6
8.4
8.2
8
7.8
7.6
7.4
7.8
7.8
8.0
8.1
8.3
8.5
8.4
Jan
Feb
Mar
Apr
May
Jul
Oct
YV-3

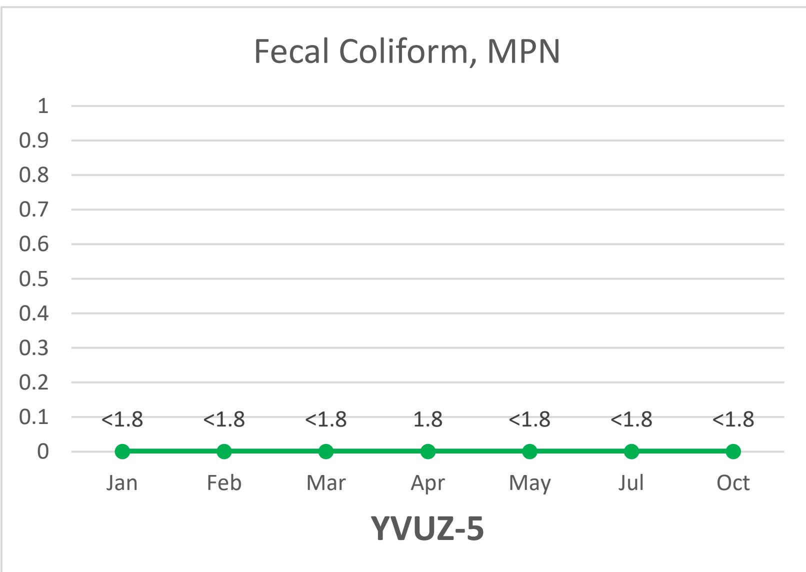

pH, s.u.
8.8
8.6
8.4
8.2
8
7.8
7.6
7.4
7.2
8.1
7.9
7.7
8.1
8.4
8.6
7.8
Jan
Feb
Mar
Apr
May
Jul
Oct
YVUZ-4

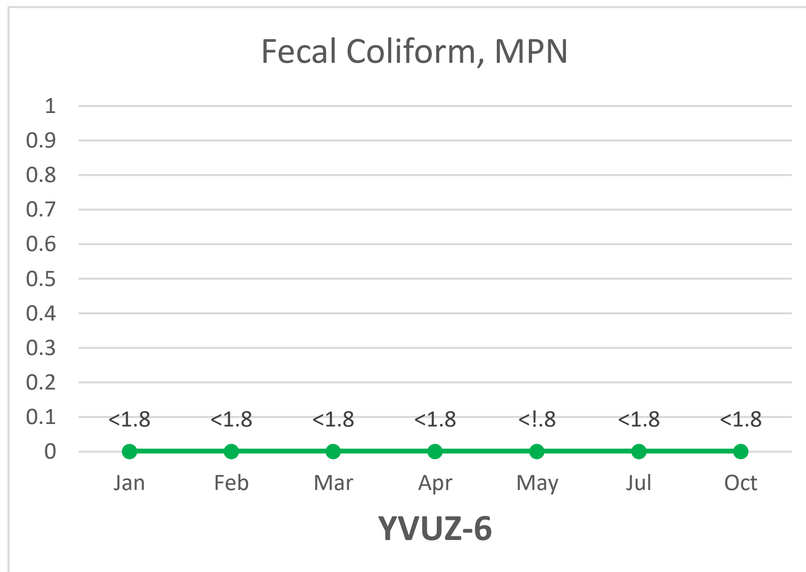

pH, s.u.
9
8
7
6
5
4
3
2
1
0
7.7
8.1
7.0
8.0
8.1
8.4
7.5
Jan
Feb
Mar
Apr
May
Jul
Oct
TVUZ-5

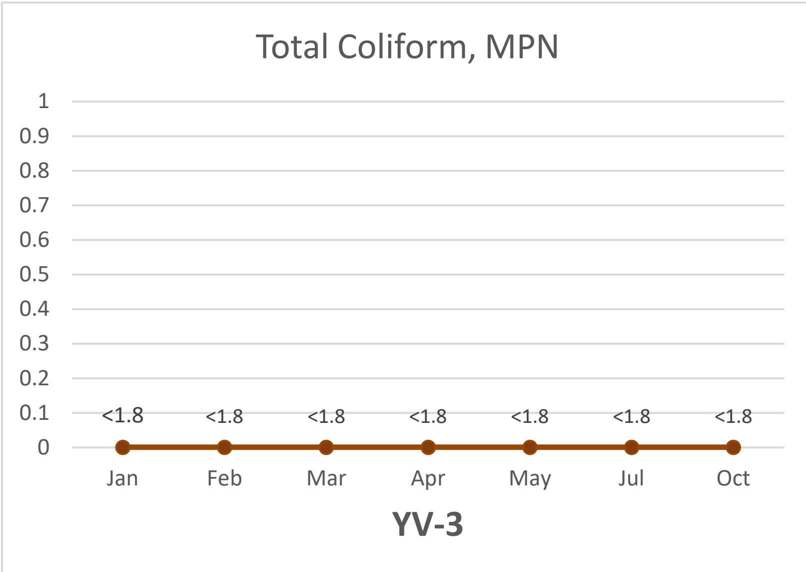

pH, s.u.
9
8
7
6
5
4
3
2
1
0
8.0
7.4
8.0
NA
7.9
8.4
7.5
Jan
Feb
Mar
Apr
May
Jul
Oct
YVUZ-6

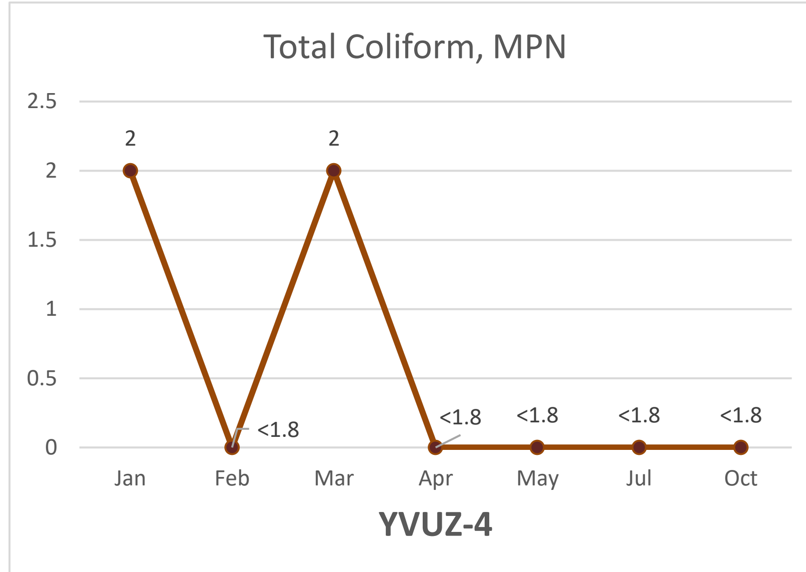

Fecal Coliform, MPN
2.5
2
1.5
1
0.5
0
2
2
<1.8
<1.8
<1.8
<1.8
<1.8
Jan
Feb
Mar
Apr
May
Jul
Oct
YV-3

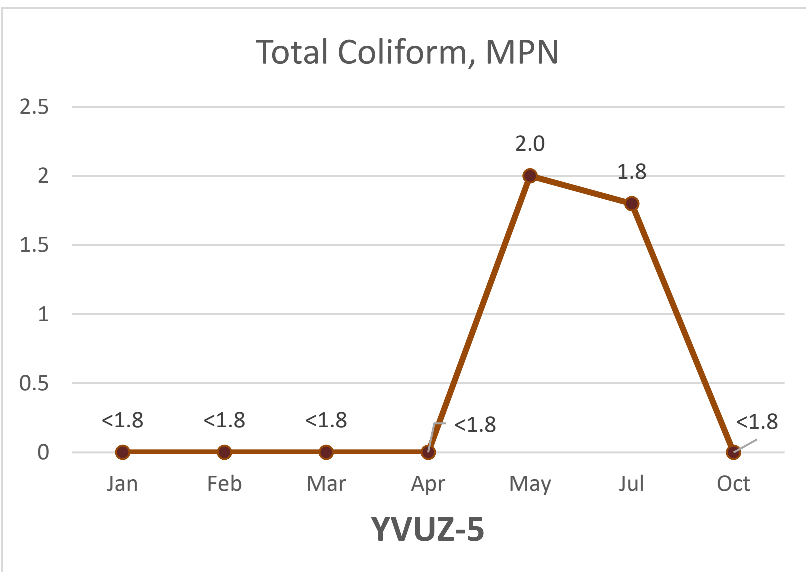

Fecal Coliform, MPN
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
<1.8
<1.8
<1.8
<1.8
<1.8
<1.8
<1.8
Jan
Feb
Mar
Apr
May
Jul
Oct
YVUZ-4

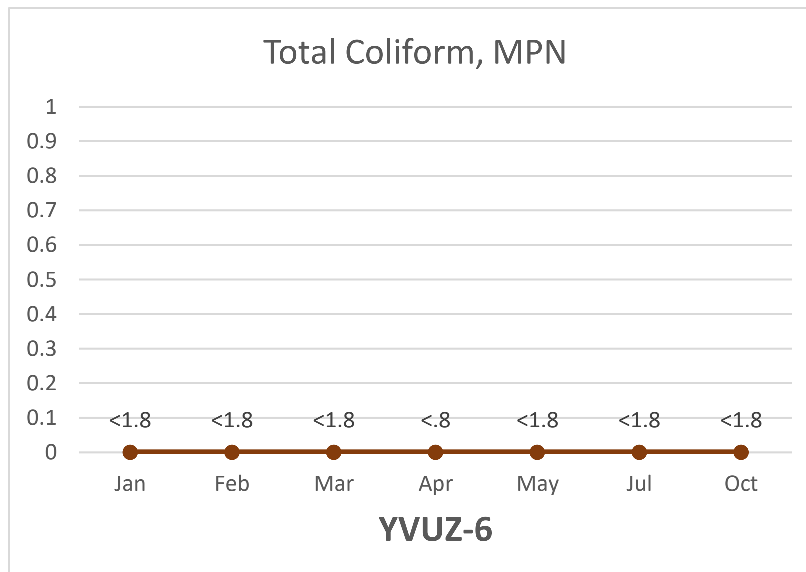

Fecal Coliform, MPN
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
<1.8
<1.8
<1.8
1.8
<1.8
<1.8
<1.8
Jan
Feb
Mar
Apr
May
Jul
Oct
YVUZ-5

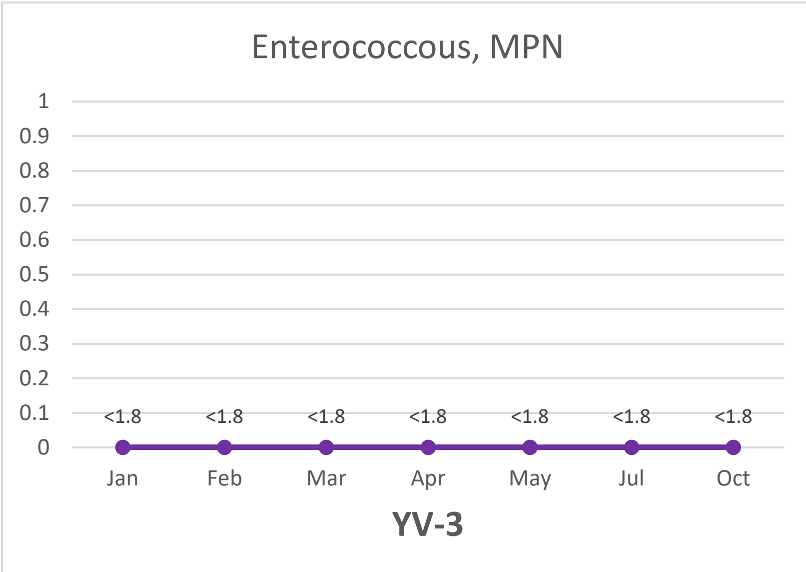

Fecal Coliform, MPN
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
<1.8
<1.8
<1.8
<1.8
<!.8
<1.8
<1.8
Jan
Feb
Mar
Apr
May
Jul
Oct
YVUZ-6

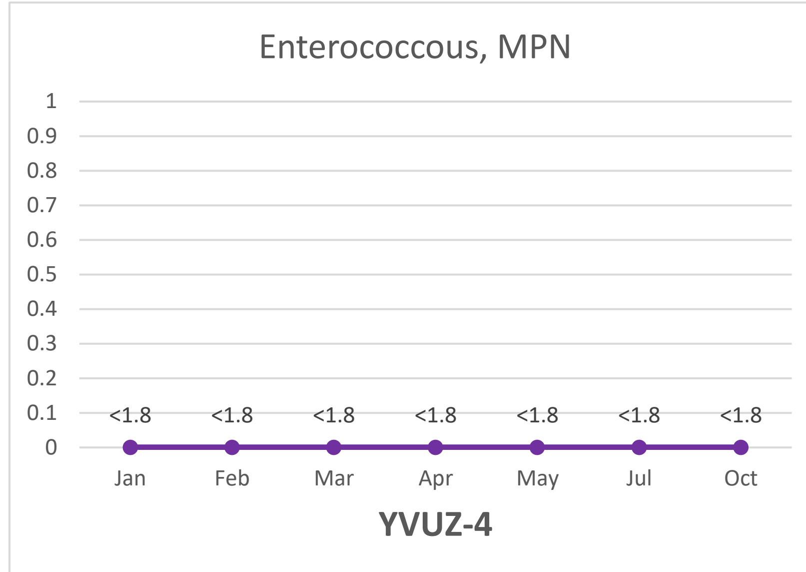

Total Coliform, MPN
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
<1.8 <1.8 <1.8 <1.8 <1.8 <1.8 <1.8
Jan Feb Mar Apr May Jul Oct
YV-3

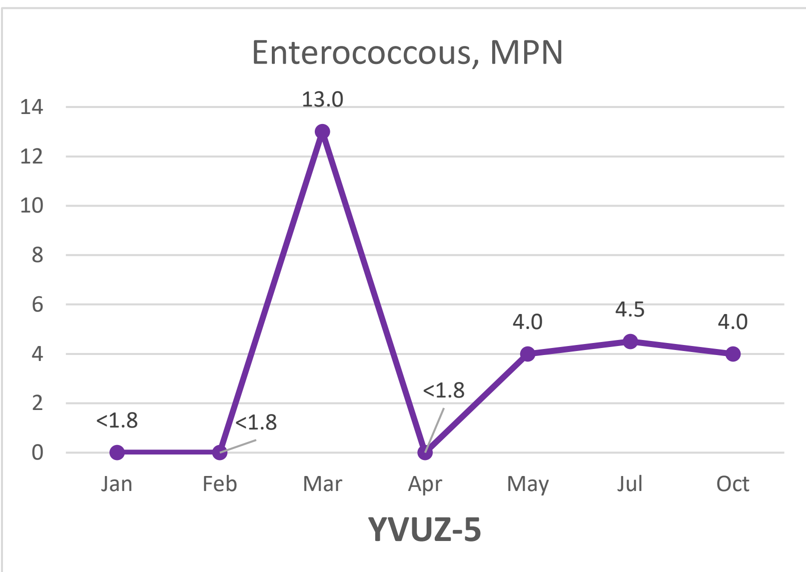

Total Coliform, MPN
2.5
2
1.5
1
0.5
0
2
<1.8
2
<1.8 <1.8 <1.8 <1.8
Jan Feb Mar Apr May Jul Oct
YVUZ-4

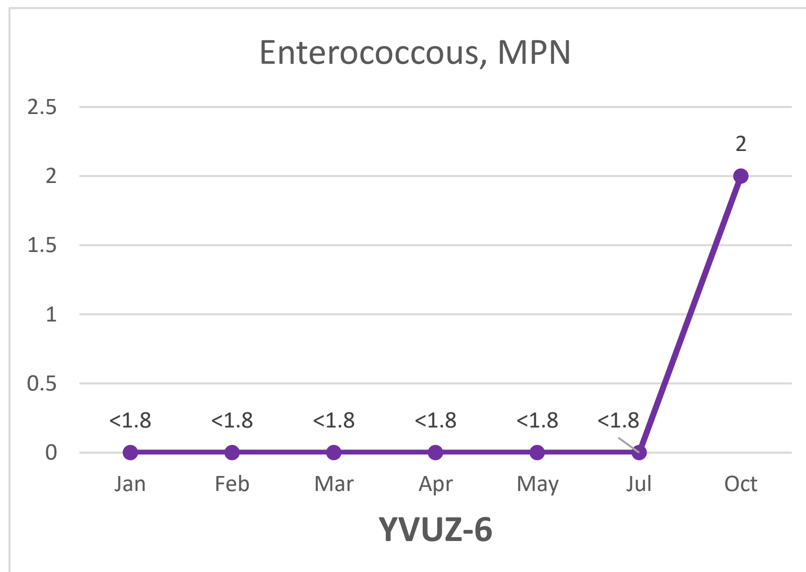

Total Coliform, MPN
2.5
2
1.5
1
0.5
0
<1.8 <1.8 <1.8 <1.8
2.0
1.8
<1.8
Jan Feb Mar Apr May Jul Oct
YVUZ-5

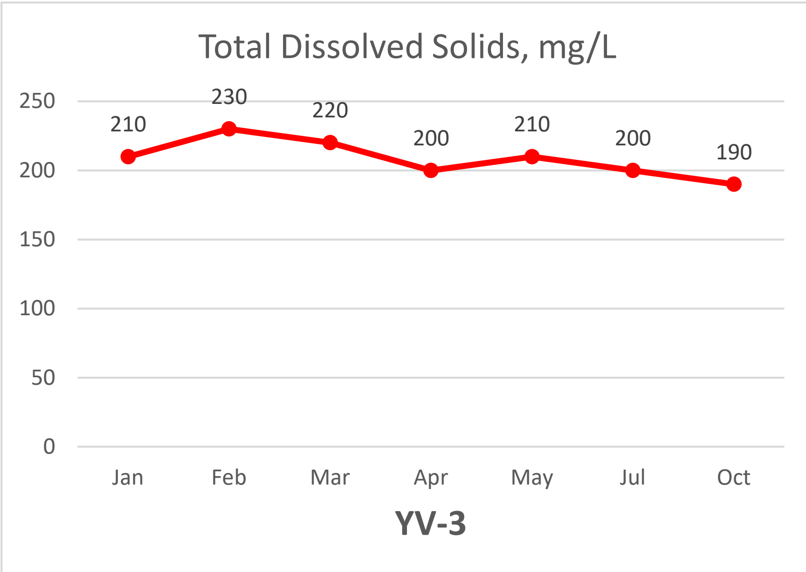

Total Coliform, MPN
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
<1.8 <1.8 <1.8 <.8 <1.8 <1.8 <1.8
Jan Feb Mar Apr May Jul Oct
YVUZ-6

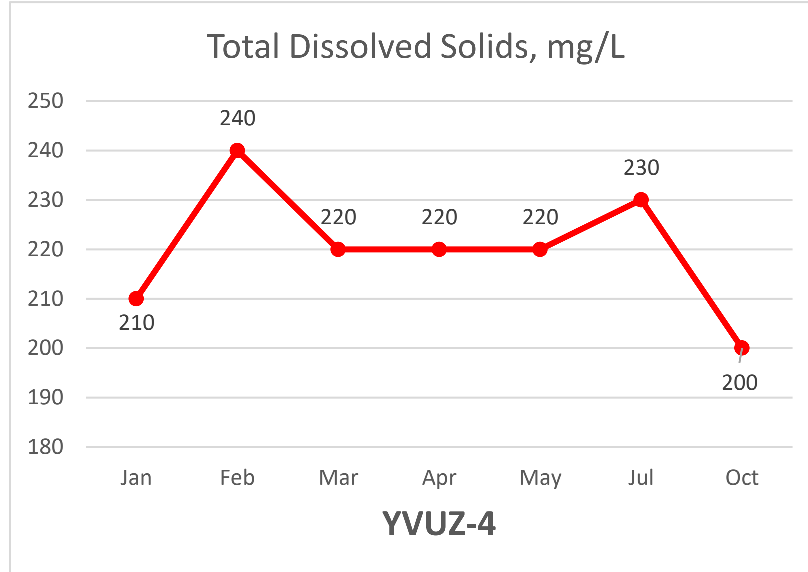

Enterococcous, MPN
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
<1.8 <1.8 <1.8 <1.8 <1.8 <1.8 <1.8
Jan Feb Mar Apr May Jul Oct
YV-3

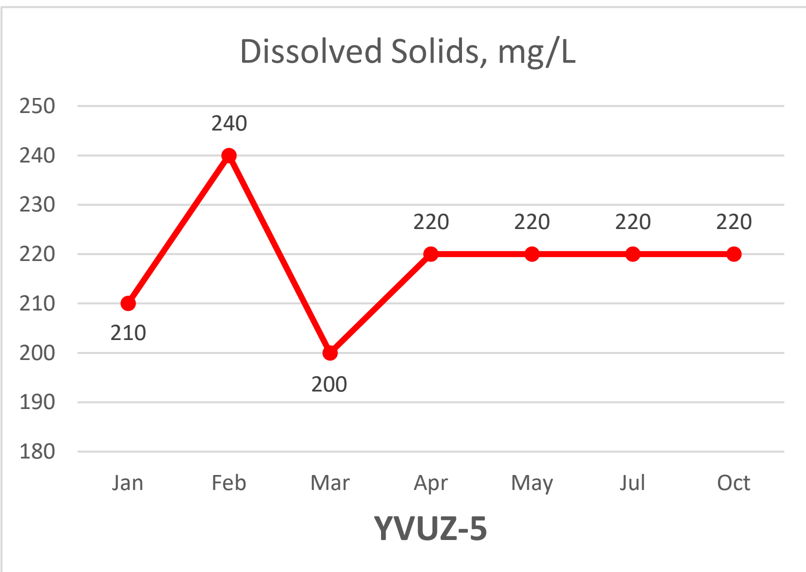

Enterococcous, MPN
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
<1.8 <1.8 <1.8 <1.8 <1.8 <1.8 <1.8
Jan Feb Mar Apr May Jul Oct
YVUZ-4

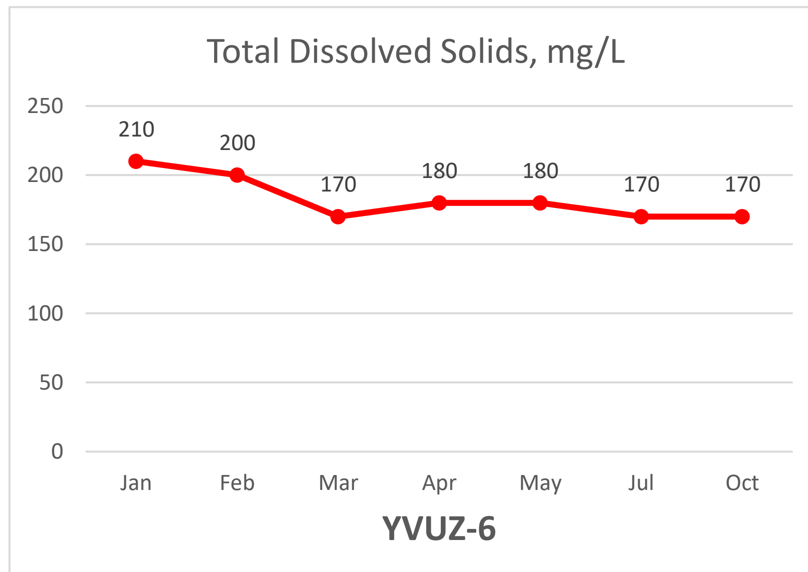

Enterococcous, MPN
14
12
10
8
6
4
2
0
<1.8 <1.8 13.0 <1.8 4.0 4.5 4.0
Jan Feb Mar Apr May Jul Oct
YVUZ-5

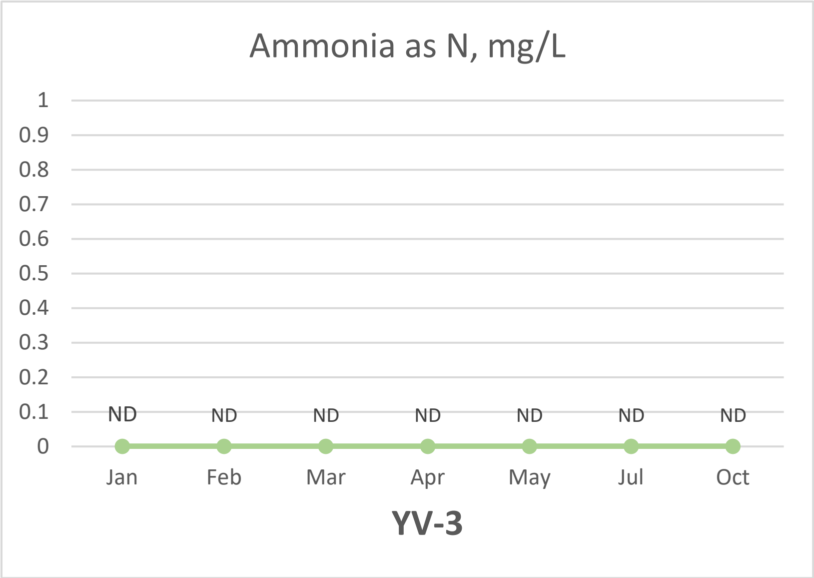

Enterococcous, MPN
2.5
2
1.5
1
0.5
0
<1.8 <1.8 <1.8 <1.8 <1.8 <1.8 2
Jan Feb Mar Apr May Jul Oct
YVUZ-6

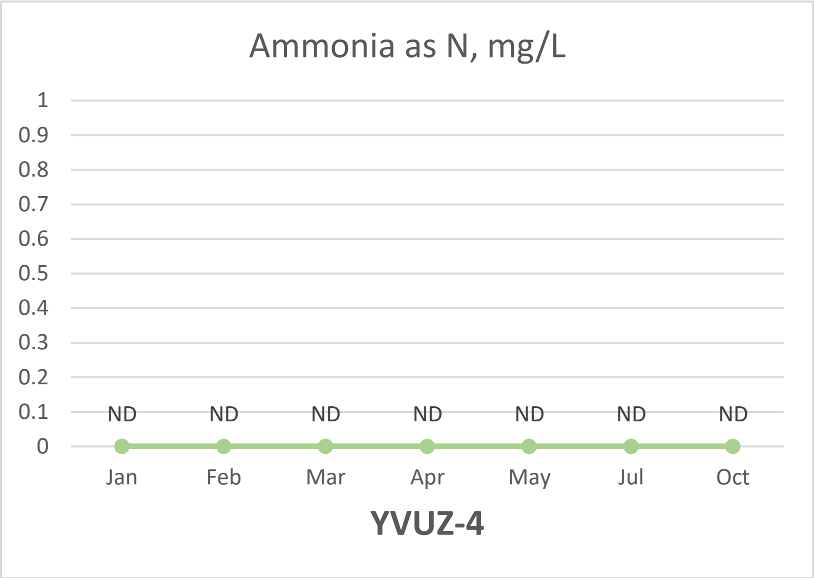

Total Dissolved Solids, mg/L
250
200
150
100
50
0
210
230
220
200
210
200
190
Jan
Feb
Mar
Apr
May
Jul
Oct
YV-3

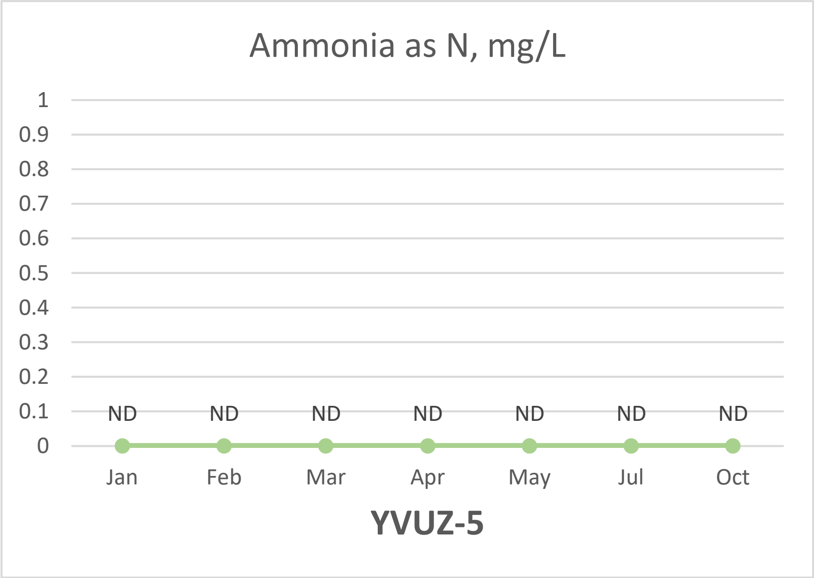

Total Dissolved Solids, mg/L
250
240
230
220
210
200
190
180
210
240
220
220
220
230
200
Jan
Feb
Mar
Apr
May
Jul
Oct
YVUZ-4

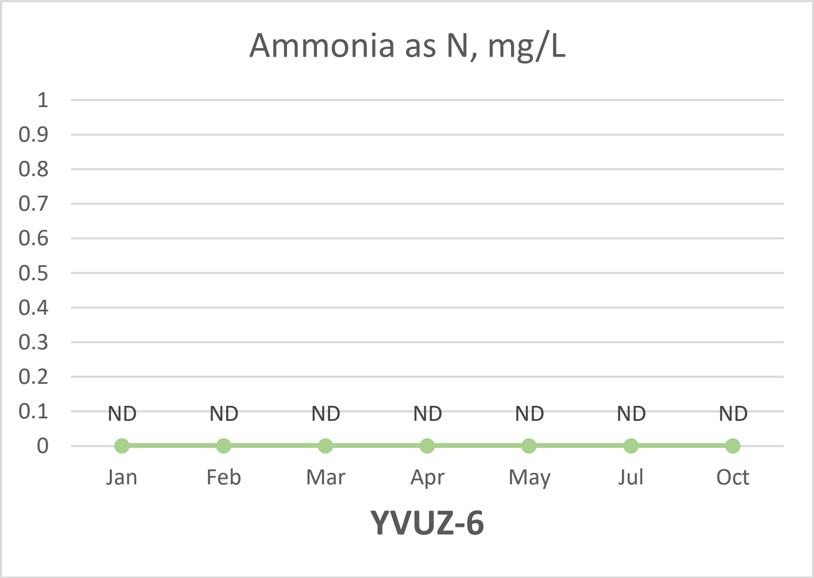

Dissolved Solids, mg/L
250
240
230
220
210
200
190
180
210
240
200
220
220
220
220
Jan
Feb
Mar
Apr
May
Jul
Oct
YVUZ-5

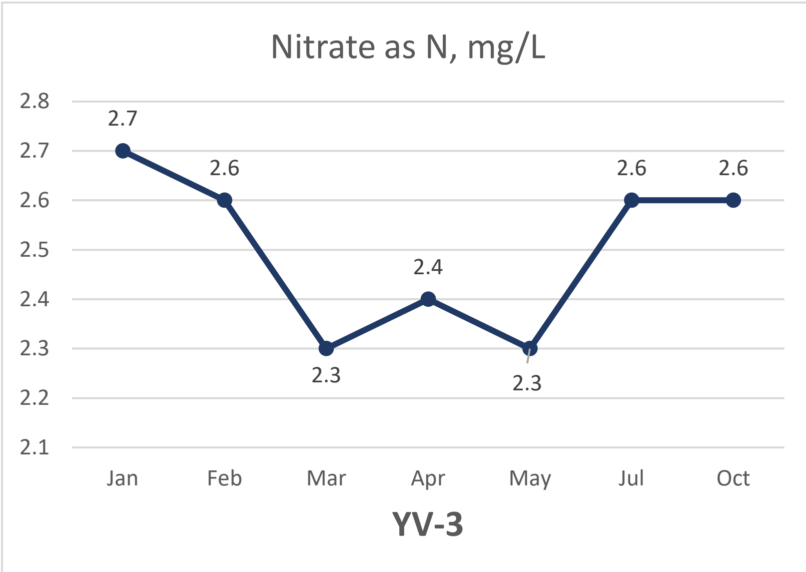

Total Dissolved Solids, mg/L
250
200
150
100
50
0
210
200
170
180
180
170
170
Jan
Feb
Mar
Apr
May
Jul
Oct
YVUZ-6


Ammonia as N, mg/L
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
ND ND ND ND ND ND ND
Jan Feb Mar Apr May Jul Oct
YV-3


Ammonia as N, mg/L
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
ND ND ND ND ND ND ND
Jan Feb Mar Apr May Jul Oct
YVUZ-4


Ammonia as N, mg/L
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
ND ND ND ND ND ND ND
Jan Feb Mar Apr May Jul Oct
YVUZ-5


Ammonia as N, mg/L
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
ND ND ND ND ND ND ND
Jan Feb Mar Apr May Jul Oct
YVUZ-6


Nitrate as N, mg/L
2.8
2.7
2.6
2.5
2.4
2.3
2.2
2.1
2.7
2.6
2.3
2.4
2.3
2.6
2.6
Jan
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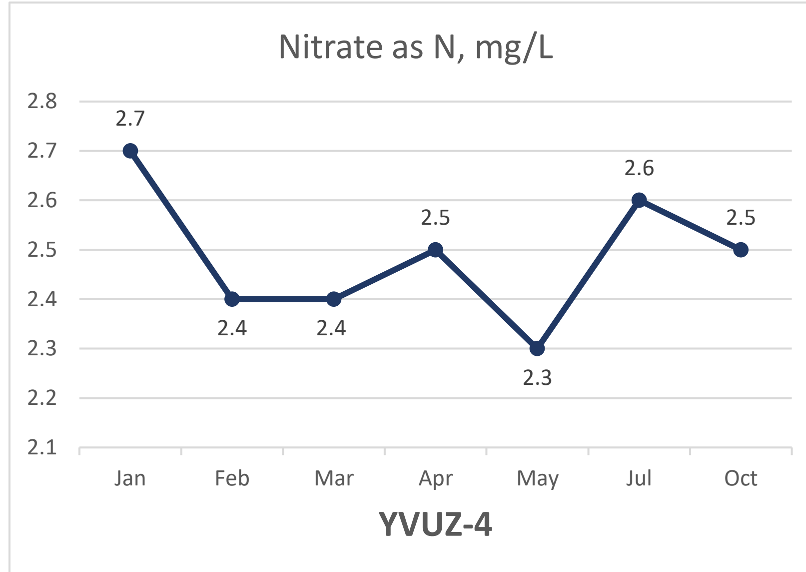
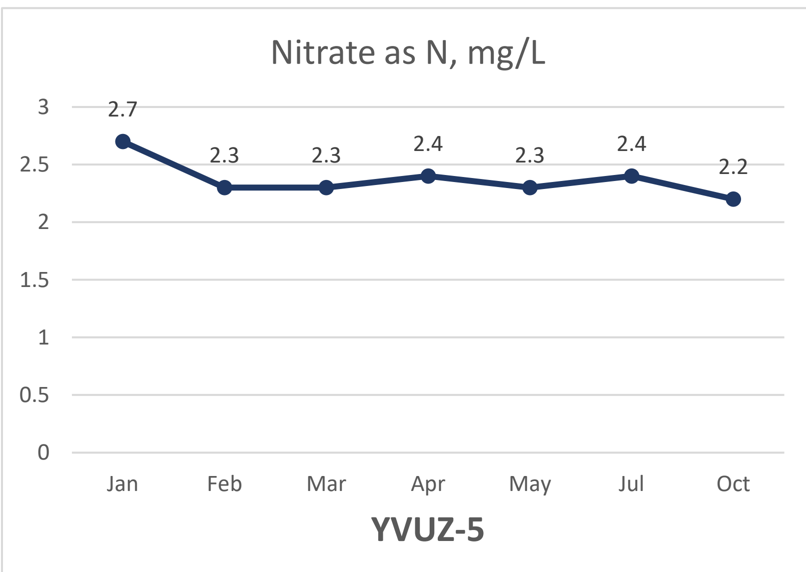
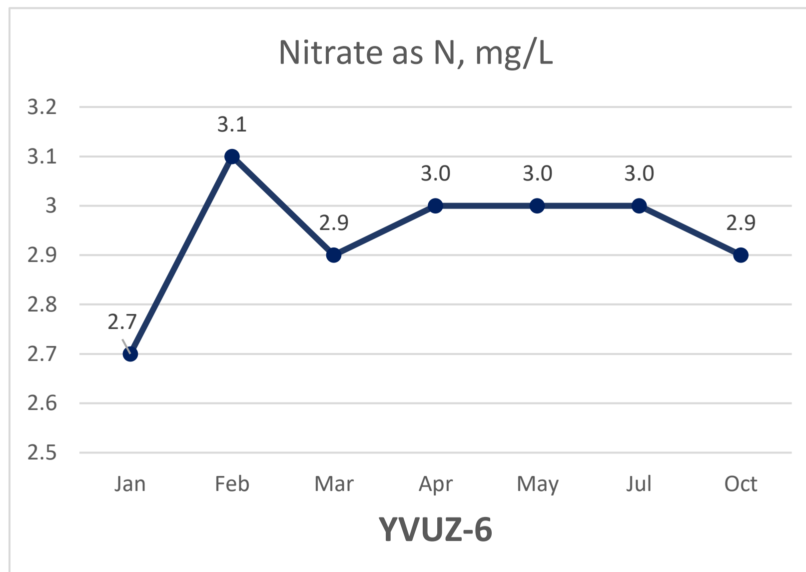
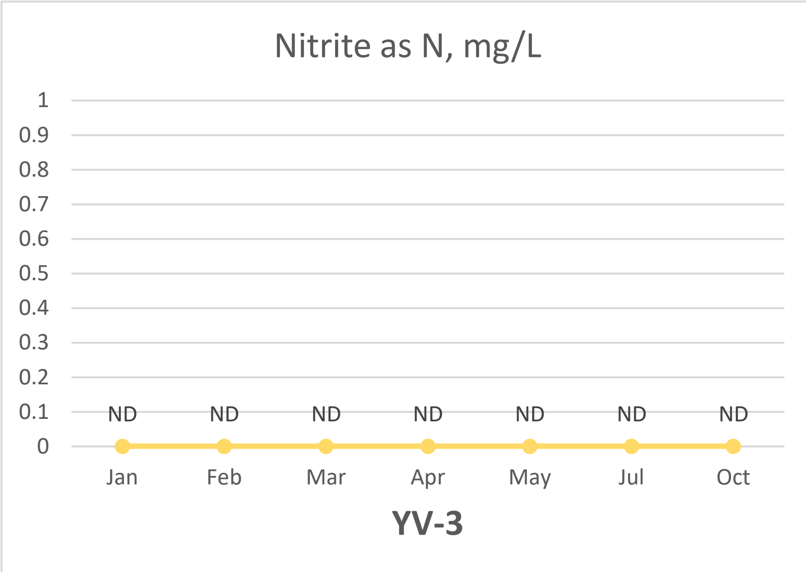
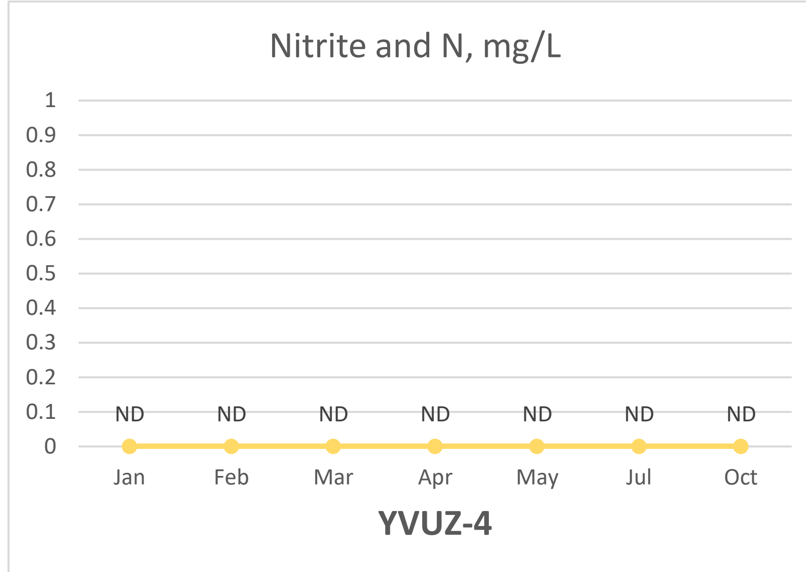
May
Jul
Oct
YV-3

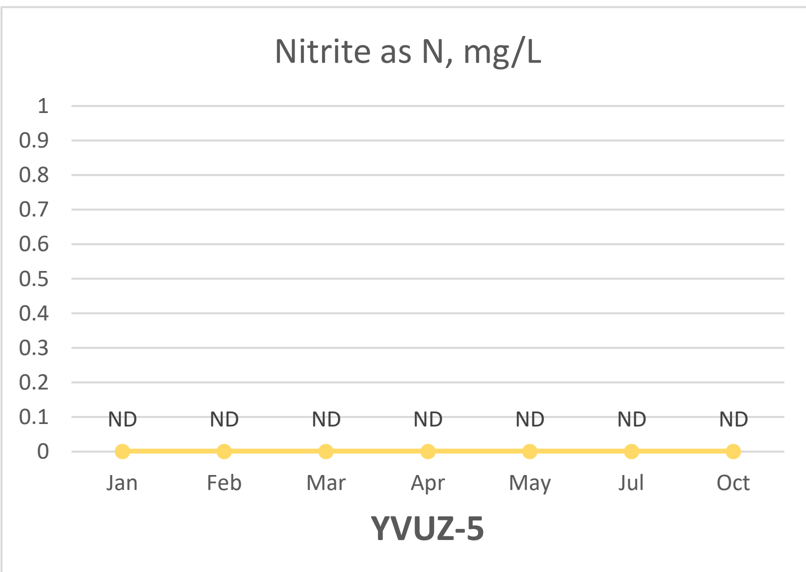

Nitrate as N, mg/L
2.8
2.7
2.6
2.5
2.4
2.3
2.2
2.1
2.7
2.4
2.4
2.5
2.3
2.6
2.5
Jan
Feb
Mar
Apr
May
Jul
Oct
YVUZ-4

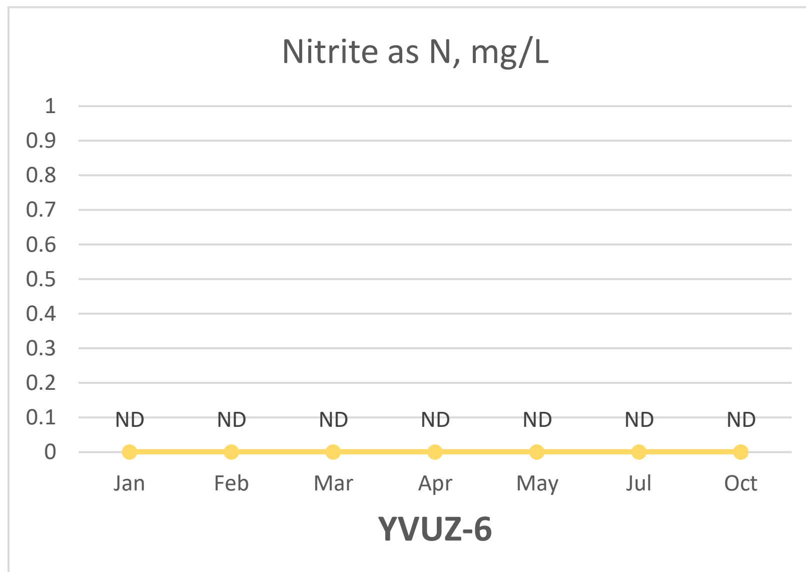

Nitrate as N, mg/L
3
2.5
2
1.5
1
0.5
0
2.7
2.3
2.3
2.4
2.3
2.4
2.2
Jan
Feb
Mar
Apr
May
Jul
Oct
YVUZ-5

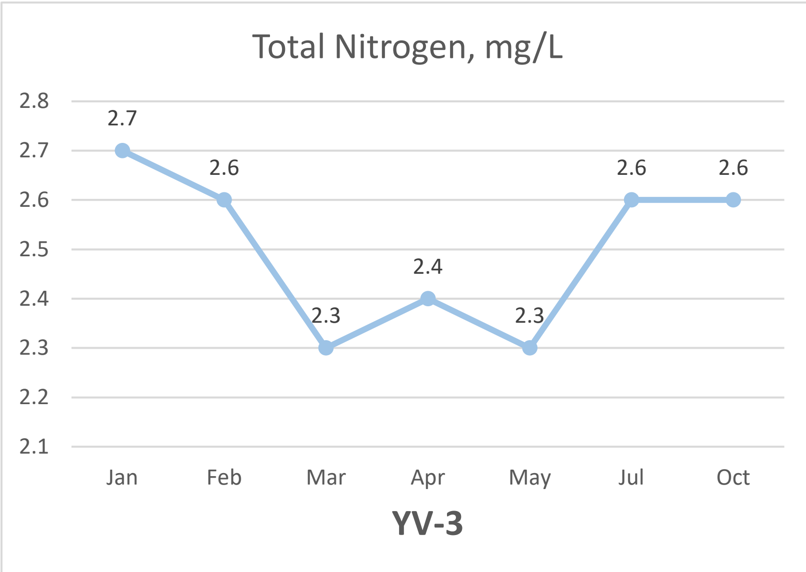

Nitrate as N, mg/L
3.2
3.1
3
2.9
2.8
2.7
2.6
2.5
2.7
3.1
2.9
3.0
3.0
3.0
2.9
Jan
Feb
Mar
Apr
May
Jul
Oct
YVUZ-6


Nitrite as N, mg/L
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
ND ND ND ND ND ND ND
Jan Feb Mar Apr May Jul Oct
YV-3


Nitrite and N, mg/L
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
ND ND ND ND ND ND ND
Jan Feb Mar Apr May Jul Oct
YVUZ-4


Nitrite as N, mg/L
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
ND ND ND ND ND ND ND
Jan Feb Mar Apr May Jul Oct
YVUZ-5


Nitrite as N, mg/L
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
ND ND ND ND ND ND ND
Jan Feb Mar Apr May Jul Oct
YVUZ-6


Total Nitrogen, mg/L
2.8
2.7
2.6
2.5
2.4
2.3
2.2
2.1
2.7
2.6
2.3
2.4
2.3
2.6
2.6
Jan
Feb
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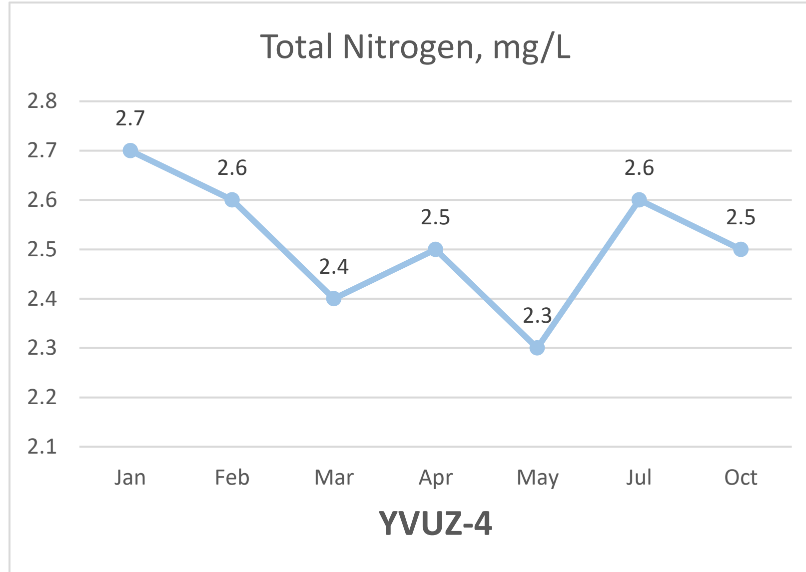
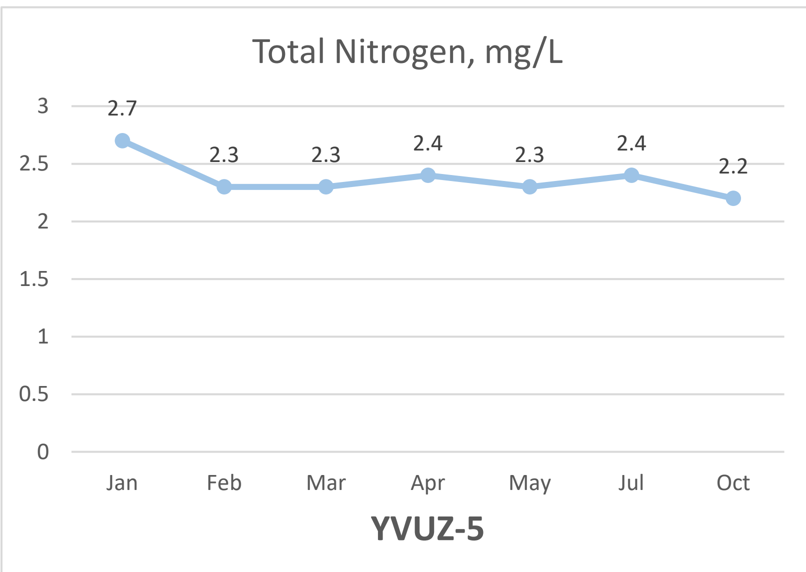
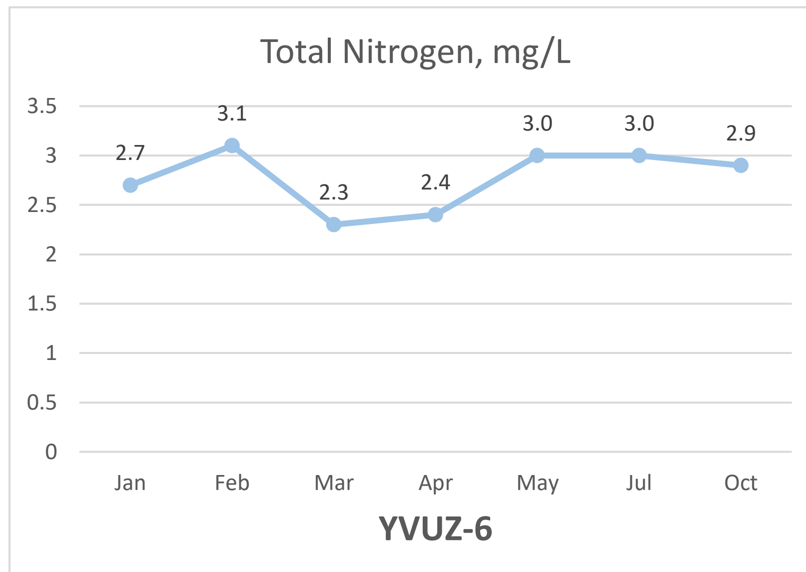
May
Jul
Oct
YV-3


Total Nitrogen, mg/L
2.8
2.7
2.6
2.5
2.4
2.3
2.2
2.1
2.7
2.6
2.4
2.5
2.3
2.6
2.5
Jan
Feb
Mar
Apr
May
Jul
Oct
YVUZ-4


Total Nitrogen, mg/L
3
2.5
2
1.5
1
0.5
0
2.7
2.3
2.3
2.4
2.3
2.4
2.2
Jan
Feb
Mar
Apr
May
Jul
Oct
YVUZ-5


Total Nitrogen, mg/L
3.5
3
2.5
2
1.5
1
0.5
0
2.7
3.1
2.3
2.4
3.0
3.0
2.9
Jan
Feb
Mar
Apr
May
Jul
Oct
YVUZ-6