CITY OF FORTUNA

TOM COOKE MEMORIAL WASTEWATER TREATMENT PLANT

2011 ANNUAL REPORT

January 5, 2012

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1. Introduction

The Tom Cooke Memorial Wastewater Treatment Plant (WWTP) is operated by the City of Fortuna. The plant is located at 180 Dinsmore Drive, in Fortuna, Humboldt County, California and serves a population of approximately 11,360. Major treatment processes include screening and grit removal, primary treatment, secondary treatment, mixed liquor recycle for biological nutrient removal (BNR), sludge thickening, anaerobic digestion, electrical cogeneration, solids dewatering and composting, sidestream equalization, and effluent disinfection. Treated effluent is currently discharged to the percolation ponds during dry weather, and to Strong's Creek, a tributary of the Eel River, during the wet weather season. Biosolids are composted to Class A Exceptional Quality standards and either prepared for bulk sale in the fall or given away in small quantities for private residential use. Numerous auxiliary systems are required for proper operation of many plant processes including: potable water, process water, HVAC, electrical power distribution, gas, chemicals, instrument air, and others.

The State Water Resources Control Board (SWRCB) has classified the Tom Cooke Memorial Wastewater Treatment Plant as a Class III Secondary Treatment wastewater treatment facility.

The facility currently operates under the SWRCB Order Number R1-2011-0004 issued on January 27, 2011 which expires in January 2016.

This report is a summary of plant operation and performance during 2011. In addition to a discussion of effluent quality and the plant's success in meeting treatment objectives, the report contains summaries of 2011 plant operations, maintenance, chemicals, utilities, and human resources.

2. Summary

The plant generally operated well throughout the entire year. This year's primary efforts have been directed toward meeting compliance with California Toxics Rule limits for Disinfection Byproducts (DBP) and achieving the consistent biological nutrient removal necessary to maintain that compliance and obtain an amended discharge rate to Strongs Creek. Together with careful control of operational processes, addition of ammonia prior to chlorination to form chloramines and aeration of the plant effluent has successfully allowed the facility to temporarily meet Disinfection Byproduct limits for discharge to Strongs Creek.

Historically, the WWTP was allowed to bypass storm flows into the oxidation ponds. Until November of 2007, the facility was permitted to discharge directly from the ponds into Strongs Creek. As such, the WWTP secondary treatment system did not have to treat the volumes that it currently treats during winter flows. Typically, peak flows through the plant prior to 2007 were 1.8 MGD. Currently, peak flows through the plant are in excess of 4 MGD.

Additionally, prior to the issuance of the current permit in January of 2011, the WWTP effluent quality was tested on an 8 hour composite sample collected by hand during the normal work day. Under the current permit, effluent samples are collected automatically over a 24 hour period. As such, variations in flow and fluctuations in the disinfection and dechlorination feed rates as well as solids settling characteristics are evident in the final sample and represent a potential financial impact to the ratepayers. For that reason, staff have begun implementation of a Regulatory Compliance capital improvement project which will moderate flows throughout the day and utilize stored influent to maintain flow rates throughout the night. The project will allow the facility to operate at a near steady state and reduce fluctuations which pose the risk of permit violations during unstaffed hours.

In January, during repair of the earthquake damage sustained in 2010, a sludge pump failed and the SCADA system malfunctioned causing the plant to discharge chlorinated effluent without dechlorination. This resulted in a violation of our discharge permit requirement for maximum chlorine residual in the effluent during discharge to Strong's Creek. The measured residual at the time staff discovered the problem was 2.25 mg/L, above our permit limit of 0.002 mg/L. An updated SCADA program and new hardware was purchased and installed, and the facility utilizes the "RUOK" computer program through the Fortuna Police Department to continuously verify the system is operational during the unstaffed hours.

During the subsequent startup of the plant on January 10th, staff noticed a sudden change in the color of the effluent and immediately rerouted flow back through the plant. Tests conducted on the effluent resulted in >1600 MPN Coliform despite having an adequate chlorine residual in the

contact chamber. The poor quality effluent cleared up within an hour and flow was resumed and the plant functioned well during the rest of the startup period with the exception of a drop in the contact basin residual during routine cleaning operations on January 17th which resulted in less than 1.5 mg/L in the contact basin for a brief period.

The basin residual fell below the permit level twice in February and three times in March during routine cleaning operations due to the increased presence of organic material in the effluent. Staff have endeavored throughout the year to maintain a minimum of organic material in the effluent in order to decrease the chance of Disinfection By Product (DBP) formation. During cleaning operations, sudden increases in organic material reduce the contact chamber residual briefly and increase the chance of DBP formation.

As a result, during March our Dichlorobromomethane concentration in the effluent was above both the daily and monthly average limits of our permit during discharge to Strong's Creek. The Dichlorobromomethane concentration was not measured during the six days when the plant was discharging to Strong's Creek in April, but the monthly average was above the discharge permit limit.

While conducting routine inspection of the M001 discharge point on March 23rd, staff discovered that water was leaking through the abandoned and capped M002 discharge point into Strong's Creek. Staff were not able to determine if the leakage was accumulated rain water or sewage that had infiltrated from the equalization pond, and reported it as sewage to the Regional Board and via the CIWQS and the M002 discharge point was filled in with concrete to prevent any future leaks.

Throughout the early part of the year, the facility continued the public compost giveaway program and as of April 30th all but approximately 30 cubic yards of the compost generated during 2010 was provided to the ratepayers for use in residential landscaping.

During May the contact chamber residual briefly fell below our permit level of 1.5 mg/L on the 13th, 15th, and 16th due to equipment failure in the chloramination process. On the 20th and 29th staff made repairs to the system which required shutdown of the ammonia feed system and resulted in approximately an hour each day with a residual less than 1.5 mg/L.

Despite the adequate residual on June 28th, the Coliform MPN exceeded the permit daily maximum with a result of 300 MPN.

Despite the increased frequency of cleaning the contact chamber and secondary settling tanks, the chlorine residual fell below 1.5 during cleaning operations on July 3rd, August 12th and 18th, September 6th and 9th, October 5th, and November 3rd. The residual test for November 28th resulted in 0.29 mg/L, but an immediate retest indicated a residual of 4.2, consistent with the disinfection dosage at the time.

As indicated by the multiple drops in chlorine residual throughout the year, the greatest difficulty with DBP compliance has been maintaining an effluent free of organic material. Cleaning operations routinely cause a spike in chlorine demand and result in periods with minimal residual. Staff have proposed the addition of a filtration system and UV or Ozone disinfection,

and studies are currently being conducted on the feasibility and fundability of producing a Title 22 compliant effluent.

Further complicating the issue, maintaining a sufficient biomass to affect consistent nutrient removal during colder weather or higher flows drastically impacts the level of organic material due to the formation of pin floc, and failing to adequately control the ammonia and nitrite levels of the secondary effluent drastically affect both the maintenance of a chlorine residual and DBP formation.

The remarkable performance this year in regard to DBP formation has been a major challenge, especially with a majority of the staff being Operators in Training and new to the facility. The plant has performed beyond expectations, but the City is aggressively pursuing alternatives that will reliably allow compliance without impacting other plant processes. Staff will continue to conduct internal monitoring and make process control adjustments to maintain the highest level of compliance, and the City hopes to implement automated and continuous controls in the near future.

3. OPERATIONS

a. Pretreatment

In 2011 the City of Fortuna, with the assistance of Freshwater Environmental Services, continued implementing the Fats, Oils and Grease (FOG) Control Program (Element 7 of the City's draft SSMP) by conducting regular inspections of pretreatment devices at food service establishments within the City. This work was conducted under the authority of the current Fortuna Municipal Code which requires interceptors, when necessary, at food service establishments and also requires that they be regularly maintained. Inspection procedure 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. The Owner or Manager may be provided with informational posters or literature regarding kitchen procedures and Best Management Practices during the inspection. Grease traps and interceptors are inspected and maintenance records are requested to provide proof of servicing. If applicable, sewer laterals may be scoped by a hand-held camera to determine the presence of FOG buildup. Violations are documented and proof of corrective actions is required. While these compliance inspections are in their early stages, staff has preliminarily identified the South Fortuna Boulevard area as a potential "hot spot" for FOG discharge based upon the presence of multiple fast food establishments and other purveyors of greasy food. No particular food service establishments in this area are under surveillance by the City; however, staff continues to gather evidence to identify potential sources of FOG in this area, and throughout the City.

The City of Fortuna is continuing to develop a FOG source control policy which would look to amend the City's Sewer Use Ordinance to include a FOG Ordinance as well as a Grease Hauler Permit Ordinance. A FOG enforcement response plan will be included to provide additional enforcement authority, and to outline a permitting process for FOG dischargers as well as for licensed grease haulers.

City of Fortuna utilities crews continued to inspect sanitary sewer manholes and other infrastructure for inflow and infiltration that may contribute to unnecessary volumes of waste water to be treated.

b. Influent Treatment and Quality

The plant operates at an average dry weather flow of 1.0 Million Gallons per Day (MGD), and during wet weather can experience flows above 6.5 MGD. During high flow periods, plant influent is partially diverted to flow equalization ponds to allow the plant flow to remain at a controlled uniform rate below the plant's current wet weather operational capacity of 3.0 MGD. During 2011, staff identified an additional treatment process that would enhance biological nutrient removal while adding hydraulic capacity to the existing treatment basins. This Integrated Fixed Film Activated Sludge (IFAS) system was approved as a Capital Improvement Project, but has not yet been implemented.

A summary of annual flow and influent parameter concentrations for the past three years is shown in Table 1. The plant experienced an 11% decrease in influent flow from 2010 to 2011, in part due to the heavy use of the equalization pond during plant repairs in January. Since that time, the facility has begun upgrading old meters and installing new meters to adequately measure all sources of inflow to the plant as part of a Regulatory Compliance Project. Over the next year, monthly monitoring reports will include combined flow data as well as parameter concentrations for each source of inflow.

Table 1: Influent Parameters

	2009	2010	2011
Mean Influent Flow, MGD	**1.115**	**1.216**	**1.083**
Total Annual Flow, MG	**421.1**	**443.7**	**395.2**
Mean Influent SS, mg/L	**348**	**396**	**330**
Mean Influent BOD_5, mg/L	**311**	**307**	**346**

c. Preliminary Treatment

The preliminary treatment process includes screening and grit removal as well as influent flow monitoring.

Wastewater enters the treatment facility at the headworks structure, which provides a grit and screenings removal operation. There is one automatic stair-stepper type bar screen. This screening machine removes rags and large pieces of debris from the wastewater. Grit channels located downstream of the screen remove sand, gravel and similar heavy inorganic material by gravity separation. The grit channel operates at a lower velocity than standard because organics allowed to fall out of the waste stream are separated by a cyclone grit classifier and returned to the plan influent wet well. The grit and screenings are collected and hauled to a sanitary landfill site.

The quantity of grit and screenings removed by the grit channels and mechanical bar screen averaged approximately 4 ft^3/day in 2011.

d. Primary Treatment

After the grit channels, the next wastewater treatment process is primary sedimentation where the velocity of flow entering the clarifier tanks is reduced, allowing the heavier solids in the wastewater to settle to the bottom by gravity. Sludge collectors in the tanks sweep the settled sludge (primary sludge) into a sludge hopper located on the bottom of the tank, from where the sludge is pumped either to the anaerobic digester or the Gravity Belt sludge thickener. There are three circular primary clarifiers. By varying the number of units online, staff implemented a control strategy to optimize secondary treatment and provide additional carbon material to effect nutrient removal. The viability of utilizing primary sludge elutriation, rinsing carbon rich volatile acids out and back into the secondary system via the gravity belt thickener, hinges on the ability to perform this process without undue odor formation.

Table 2 contains a summary of key primary treatment effluent parameter concentrations over the previous three years.

Table 2: Primary Treatment Effluent Parameters

	2009	2010	2011
Mean Primary Effluent SS, mg/L	**63**	**94.4**	**283**
Mean Primary Effluent BOD_5, mg/L	**98.2**	**266**	**346**

e. Secondary Treatment

The secondary treatment process includes biological treatment of the waste stream as well as solids separation processes.

In the activated sludge process, effluent from the primary clarifiers is mixed with Return Activated Sludge (RAS) from final clarifiers and is aerated in aeration basins. The activated sludge is primarily comprised of micro-organisms and bacteria, which are a natural part of wastewater and are used to break down the organic solids in the wastewater. Micro-organism are monitored microscopically weekly by operations and laboratory staff to confirm number, type, and general health of the process.

A mixed liquor recycle system allows denitrification for removal of Nitrate Nitrogen from the waste stream. This process improves the secondary treatment process by returning a portion of the alkalinity removed during the nitrification process and reducing the need for caustic soda addition. At present, the process continues to require some caustic addition due to the inadequate supply of carbon which is necessary for anoxic conversion of Nitrate into Nitrogen gas. The facility has begun a pilot project to determine the viability of utilizing whey, a cheese production waste product, as a supplemental source of carbon in lieu of purchasing methanol, which is the industry standard.

The mixed liquor from the aeration basins flows to large quiescent final clarifiers where the activated sludge is allowed to settle. A controlled quantity of this sludge is "returned" to the aeration basins as Return Activated Sludge (RAS) to repeat the treatment process, and excess quantities are removed as Waste Activated Sludge (WAS) to the WAS holding tank. There are five final clarifiers, and the number in operation is adjusted to optimize performance during varying flow conditions.

A summary of key aeration basin parameters for the previous two years is shown in Table 3.

Table 3: Secondary Treatment Process Parameters

	2009	*2010*	*2011*
Mean Aeration Loading, lb BOD_5/day	**1400**	**2700**	**3120**
Mean Mixed Liquor Suspended Solids, mg/L	**3000**	**2180**	**2250**
F:M Ratio	**0.05**	**0.25**	**0.20**
Mean Cell Residence Time, days	**28**	**16**	**23**

f. Final Effluent Treatment and Quality

Chlorine gas is combined with ammonia to form chloramines which are used to disinfect the final effluent before it is discharged. Ammonia is fed into the chlorine feed water at a carefully controlled dosage to limit the formation of Disinfection Byproducts. Aeration has been added immediately prior to discharge to further reduce Disinfection Byproducts and raise effluent pH and Dissolved Oxygen. In 2011, the plant continued to produce a high quality effluent. A summary of key final effluent parameters for 2011 is shown in Table 4. Details of the final effluent qualities are presented in graphical form in Appendix A. A summary of other key treatment parameters for 2011 is shown in Table 5.

Table 4: Treated Wastewater Parameters 2011

(Results in red indicate violation of discharge permit requirements)

	Jan	Feb	Mar	April	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Ammonia Nitrogen (mg/L)	14	0.73	0.68	6.7	4	23	ND	ND	3.1	2.1	6.5	0.73
Unionized Ammonia Nitrogen (mg/L)	0.016	0.00063	0.0012	0.016	0.013	0.17	ND	ND	0.0023	0.0057	0.0099	0.0031
Nitrate as nitrogen (mg/L)	14	8.3	10	9.4	5.7	1.4	20	13	24	12	19	27
Total Phosphate Phosphourous (mg/L)	4.2	1.4	1.3	NO TEST	0.6	3.8	2.6	3.8	6.3	3.4	4.4	4.5
Copper (ug/L)	10	7.4	8.3	8.8	6.5	11	12	10	13	9.9	10	13
Bromodichloromethane (ug/L)	ND	1.4	1.8	0.69	ND	ND	11	15	ND	ND	0.71	1.2
Dibromochloromethane (ug/L)	ND	ND	ND	ND	ND	ND	1.6	1.4	ND	ND	ND	ND
Nitrate, lbs/day average	217	116	237	144	53	12	175	107	184	108	190	223

Table 5: Key Treatment Parameters 2011

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
EFFLUENT BOD, mg/L												
Max	3.3	4.6	8.7	6.1	7.5	9.5	9.2	5.9	7.3	6.2	6.6	8.1
Mean	2.8	3.7	6.6	4.4	6	5.7	5.6	4.3	6.5	5.7	5.5	5.8
Average lbs/day	43	52	156	68	56	49	49	36	50	51	55	48
INFLUENT BOD, mg/L												
Max	431	485	316	358	473	429	323	378	403	363	349	410
Mean	400	347	241	262	410	346	285	344	373	334	320	359
Average lbs/day	3903	3762	4583	3081	3043	2424	1878	2180	2271	2256	2482	2335

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
INFLUENT TSS, mg/L												
Max	951	533	263	331	393	367	287	298	395	444	426	393
Mean	630	397	200	290	263	303	228	261	354	376	326	315
Average lbs/day	6147	4304	3803	3410	1952	2123	1502	1654	2155	2540	2529	2049
EFFLUENT TSS, mg/L												
Max	14.7	3.3	11.9	6	4.9	8.7	18.6	6.4	6.9	7.3	7.4	8
Mean	5.9	2.7	7.2	4.1	4.2	4.5	12.1	4.4	6.3	4.8	4.8	6
Average lbs/day	92	38	171	63	39	39	106	36	48	43	48	50
INFLUENT FLOW, MGD												
Max	2.03	2.49	3.29	2.35.	1.15	1.02	0.92	0.85	0.9	1.18	1.96	0.99
Mean	1.17	1.3	2.28	1.41	0.89	0.84	0.79	0.76	0.73	0.81	0.93	0.78
TOTAL	35.21	36.28	68.45	42.37	26.66	25.1	23.85	22.9	22.04	24.19	27.8	24.16
EFFLUENT FLOW, MGD												
Max	3.92	2.86	4.61	2.98	1.46	1.23	1.72	1.18	1.08	2.22	1.97	1.28
Mean	1.86	1.67	2.84	1.84	1.12	1.04	1.05	0.99	0.92	1.08	1.2	0.99
TOTAL	55.89	46.67	85.14	55.33	33.49	31.32	31.6	29.66	27.73	32.3	36.00	30.64
SETTLEABLE SOLIDS, ml/L												
Max	<0.1	NO TEST	<0.1	NO TEST	NO TEST	NO TEST	NO TEST	NO TEST	NO TEST	NO TEST	NO TEST	NO TEST
Mean	<0.1	NO TEST	<0.1	NO TEST	NO TEST	NO TEST	NO TEST	NO TEST	NO TEST	NO TEST	NO TEST	NO TEST
COLIFORM, MPN												
Max	1600	80	30	11	11	300	11	80	80	50	13	220
Median	2	8	4	3*	5*	13	2*	2	11	20*	6	110

*LESS THAN

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Max pH	7	6.9	6.9	6.8	7.2	7.4	6.9	6.9	7.1	6.9	7.2	7.1
Min pH	6.7	6.7.	6.7	6.7.	6.8	6.8	6.5.	6.5	6.9	6.6	6.9	6.9
BASIN CHLORINE RESIDUAL, mg/L												
Max	5	5.6	4.3	6	7.4	12.6	16.9	13.7	7.2	5.6	7	15.5
Mean	2.5	2.5	2	3	3.5	2.9	6.1	3.7	2.6	2.7	2.8	5
Mixed Liqour Concentration, mg/L												
Max	3530	2130	2120	3060	4180	2590	2540	2750	2580	2420	3900	4210
Mean	2340	1700	1670	2100	3330	2010	1860	2110	1810	1890	2730	3450
Sludge Wasted, LBS												
Max	2265	1342	1624	1858	1584	3106	2066	1599	1160	4239	1398	3613
Mean	821	828	1141	639	596	664	876	772	686	919	452	670
TOTAL	23802	24827	34221	19172	16094	19924	26294	23152	20566	27584	13100	20100
Primary Sludge Digested, LBS	28553	25926	38033	34086	50721	28305	43305	35832	45036	38698	28805	
Digester % solid	2.3	2.7	2.6	2.6	2.5	1.6	1.8	1.9	2.1	2.1	2.6	2.7
Cogeneration, kwh	1916	5399	4172	4334	3989	0	567	2612	3098	5042	4475	3126
Mean Primary Effluent BOD, mg/L	451	376	325	445	720	267	261	293	289	213	217	292

g. *Solids Handling*

The anaerobic digestion process reduces sludge volume and stabilizes the solids to form biosolids. In 2011, an average of 1088 lb/day of raw sludge from primary treatment was pumped to the anaerobic digester for treatment. Average total solids (TS) concentration of raw sludge was 3.2% and total volatile solids content was 85% of TS. Waste activated sludge (WAS) was diverted from the mixed liquor recycling line to eliminate fluctuations in digester feed rates due to variations in RAS concentrations and pumped to the anaerobic digester after processing through the gravity belt thickener. In 2011, approximately 755 lb/day of WAS was thickened and sent to the digester. The average thickened waste activated sludge (TWAS) total solids concentration was 5.3%.The average hydraulic retention time of sludge in the anaerobic digester was 79 days.

In 2011, approximately 148 dry metric tons of biosolids were produced and composted to approximately 1100 cubic yards of Class A Exceptional Quality compost.

Additionally, the WWTP continued offering compost to the public free of charge, and gave away all but 30 cubic yards of 2010's compost by April 30th, 2011.

Overall, public reception of the compost facility has been outstanding. The process utilizes green waste from City curbside pickup as well as green material from the local solid waste facility and diverts approximately 2000 cubic yards of waste from the solid waste stream annually. Green waste can be utilized repeatedly for the composting process and the facility has stockpiled a substantial supply for next year. Biosolids are composted for 15 days at temperatures in excess of 140 degrees to destroy pathogens and are tested quarterly for metals content to ensure Exceptional Quality status and safety of the finished material. Results of tests performed in 2011 are presented in Table 6.

Table 6: Biosolids Quality Monitoring 2011

Dewatered sludge 2011, mg/kg

	2011
Chromium (Cr)	42
Nickel (Ni)	47
Copper (Cu)	620
Zinc (Zn)	950
Arsenic (As)	ND
Selenium (Se)	8.3
Molybdenum (Mo)	ND
Cadmium (Cd)	ND
Mercury (Hg)	ND
Lead (Pb)	54

Compost Given To Public in 2011, mg/kg

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Chromium (Cr)	47	42	40	42
Nickel (Ni)	44	40	42	41
Copper (Cu)	360	430	390	360
Zinc (Zn)	640	690	660	620
Arsenic (As)	7.3	7.1	7.4	6.9
Selenium (Se)	4.6	4.7	4.7	4.6
Molybdenum (Mo)	4.5	4.8	4.7	5.1
Cadmium (Cd)	2.2	2.5	2.5	2.2
Mercury (Hg)	0.54	0.61	0.56	0.62
Lead (Pb)	65	61	62	65

Compost Given To Public in 2011

	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
Salmonella, MPN/ 1 g TS	<0.5	<0.4	<0.5	<0.4
Fecal Coliform, MPN/ 1 g TS	57	<0.3	<0.3	0.3

(Manure Typically has >2,400 MPN/g TS Fecal Coliforms)

4. MAINTENANCE

a. Maintenance Summary

The WWTP 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 WWTP 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 emergency and predictive maintenance was completed in 2011:

- Inspected and installed new blower air filters
- Installed new wearing shoes on grit flights
- Removed, inspected and changed oil in influent pumps
- Cleaned and changed oil in all 5 circular clarifiers
- Installed new valves in primary sludge pump room
- Installed new belts on return sludge pumps
- Installed new mechanical seal in return sludge pump
- Lubricated stair screen and washer press
- Painted #1 primary clarifier
- Changed oil and filters in auxiliary generator
- Changed drive bearings on belt filter press
- Changed wearing bars in grit system
- Re-plumbed recycle line
- Changed drive bearings on #2 primary clarifier
- Rebuilt scum beach for #2 primary clarifier
- Repaired sweep arm and skimmer on #4 secondary clarifier
- Replaced effluent flow meter
- Installed anoxic zone air mixing system in aeration basins #2 & 3
- Installed flow equalization weirs in aeration basin inlets

- Installed new ammonia feed system
- Cleaned and inspected #4 & 5 secondary clarifiers

b. Flow Meter Calibration Record

Flow to the plant is measured at the headworks and chlorine contact basin effluent weir. The annual calibration of flow meter equipment was completed on July 7th, 2011 and found to be within design parameters. Meters are checked monthly for accuracy and functionality.

5. CHEMICALS AND UTILITIES

a. Chemicals

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

- Sodium Hydroxide (Nutrient Removal, pH adjustment)
- Chlorine gas (Disinfection)
- Sulfur Dioxide gas (Dechlorination)
- Ammonia Hydroxide

i. Sodium Hydroxide for Nutrient Removal and pH Adjustment

Sodium Hydroxide consumption to provide for the increased demand for alkalinity associated with nitrification for nutrient removal (i.e. ammonia) during 2011 was approximately 38 tons, dry weight. Sodium Hydroxide was applied to the mixing box upstream of the aeration basins and, if necessary, prior to discharge to Strongs Creek.

ii. Chlorine for Disinfection

Chlorine is used for disinfection of the final effluent. In 2011, approximately 16 tons were consumed for this purpose. The decrease of nearly 7 tons from last year is due to the improved chloramination process and decreased demand for chlorine due to reduction in effluent ammonia and solids concentrations.

iii. Sulfur Dioxide for Dechlorination

Sulfur Dioxide is used for dechlorination of the final effluent prior to discharge to Strong's Creek. In 2011, approximately 11 tons was consumed for this purpose. The increase in usage is due to the necessity to treat all plant effluent as if it were discharged to surface water, in consideration of the locale of the facility's percolation ponds.

iv. Ammonia Hydroxide

Ammonia Hydroxide is used to eliminate free, uncombined chlorine and limit Disinfection Byproduct formation. The process was begun in November of 2010, and approximately 3.5 drytons of ammonia hydroxide were used during 2011.

b. Utilities

Several utilities are used for operation of the plant. Major utilities are:

- Potable water
- Electricity
- Natural gas
- Reclaimed water
- Cogeneration power

i. Water

The WWTP has two potable water lines with backflow protection devices. The overall metered water usage cost in 2011 was approximately $27,000.

ii. Electricity

The overall electricity cost in 2011 was approximately $138,900.

iii. Natural Gas

The overall natural gas cost in 2011 was approximately $17,000.

iv. Reclaimed Water

The total amount of water reclaimed from the treated effluent for use in the treatment plant averaged 55,000 gallons per day for an estimated reclaimed water usage of 20 million gallons in 2011.

v. Cogeneration

During the year, we operated the cogeneration unit for 440 hours at 81 kilowatts (kw). Approximately 45 of those hours were during Peak Day Pricing events.

6. HUMAN RESOURCES

a. Staffing

In 2011, the treatment plant had 9 employees. Plant staffing for 2011 is shown in Table 7.

Table 7: Plant Staffing

Chief Plant Operator	1
Shift Supervisor	2
WWTP Operator	4
Plant Maintenance Mechanic	1
Lab Director	1

b. Staff Training & Development

In addition to weekly safety meetings, the WWTP has developed a comprehensive Operator Training Program that expands the abilities of the operational staff, resulting in better service to the public, and better, more efficient operation of the facility. Accreditation has been received to conduct in-house trainings meeting Continuing Education requirements, and these training opportunities have been offered to other municipalities and agencies, free of charge, to assist other local treatment facilities in improving their operational knowledge and to provide local training and staff development opportunities to help minimize the cost of training on facility budgets strained by the current economic landscape. WWTP operating staff conducted and/or attended the following trainings:

- CPR
- Chlorine Safety
- First Aid
- Forklift Operation
- Lockout/Tagout
- Confined Space
- Loader Operation
- Electrical Controls
- Air Stripping
- Skid Steer loader operation
- Water Quality Laboratory
- Loader operation & safety
- Coagulation and Flocculation
- Suspended Growth Treatment Systems
- Pumps and Motors
- Distribution and Collections System Operation

c. Operator Certification

The WWTP has incorporated two full time Shift Supervisor positions into the organizational structure of the water and wastewater treatment facilities. This allows for operational and process changes to be made when needed, including during weekends, in accordance with SWRCB Office of Operator Certification guidelines, and provides the required two operators on duty at all times. While this demonstrates compliance with the regulations of the Office of Operator Certification, it also provides sufficient levels of staffing and improves staff safety during Holidays and weekend shifts.

Table 8 summarizes the status of operator certification held by WWTP operators at the facility during 2011.

Table 8: Wastewater Treatment Certifications

Grade IV	1
Grade III	2
Grade II	0
O.I.T.	5

In addition, senior City staff members hold additional two Grade III wastewater certifications. Additional certifications held by WWTP staff include Laboratory Analyst, Water Treatment, Maintenance Technologist, and Biosolids Management certifications. Five staff members are qualified to perform Energized Electrical Work, as well.

7. 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.

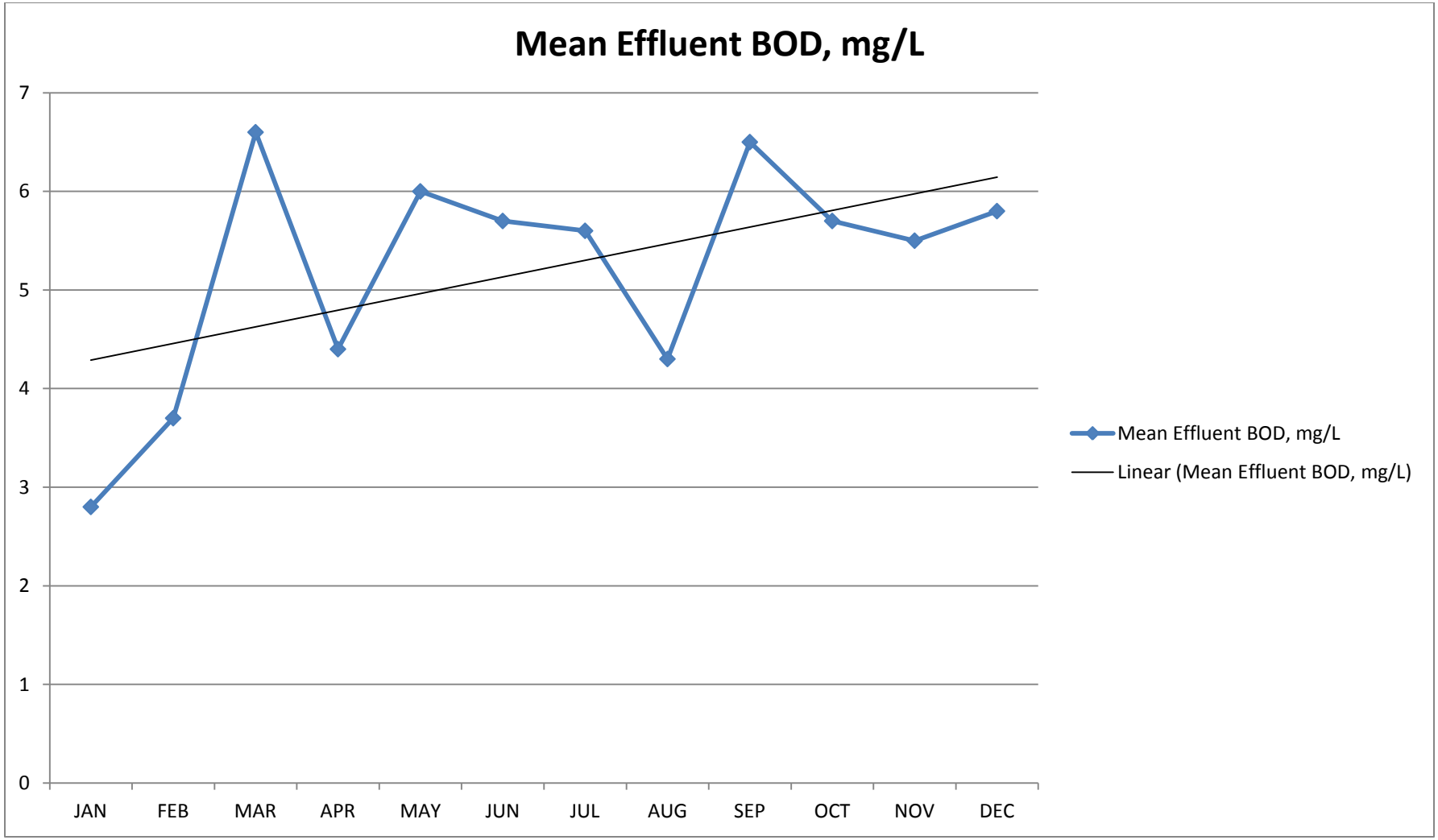
If you have any questions or need additional information, please feel free to contact me at hbrenard@ci.fortuna.ca.us or (707)725-1476.

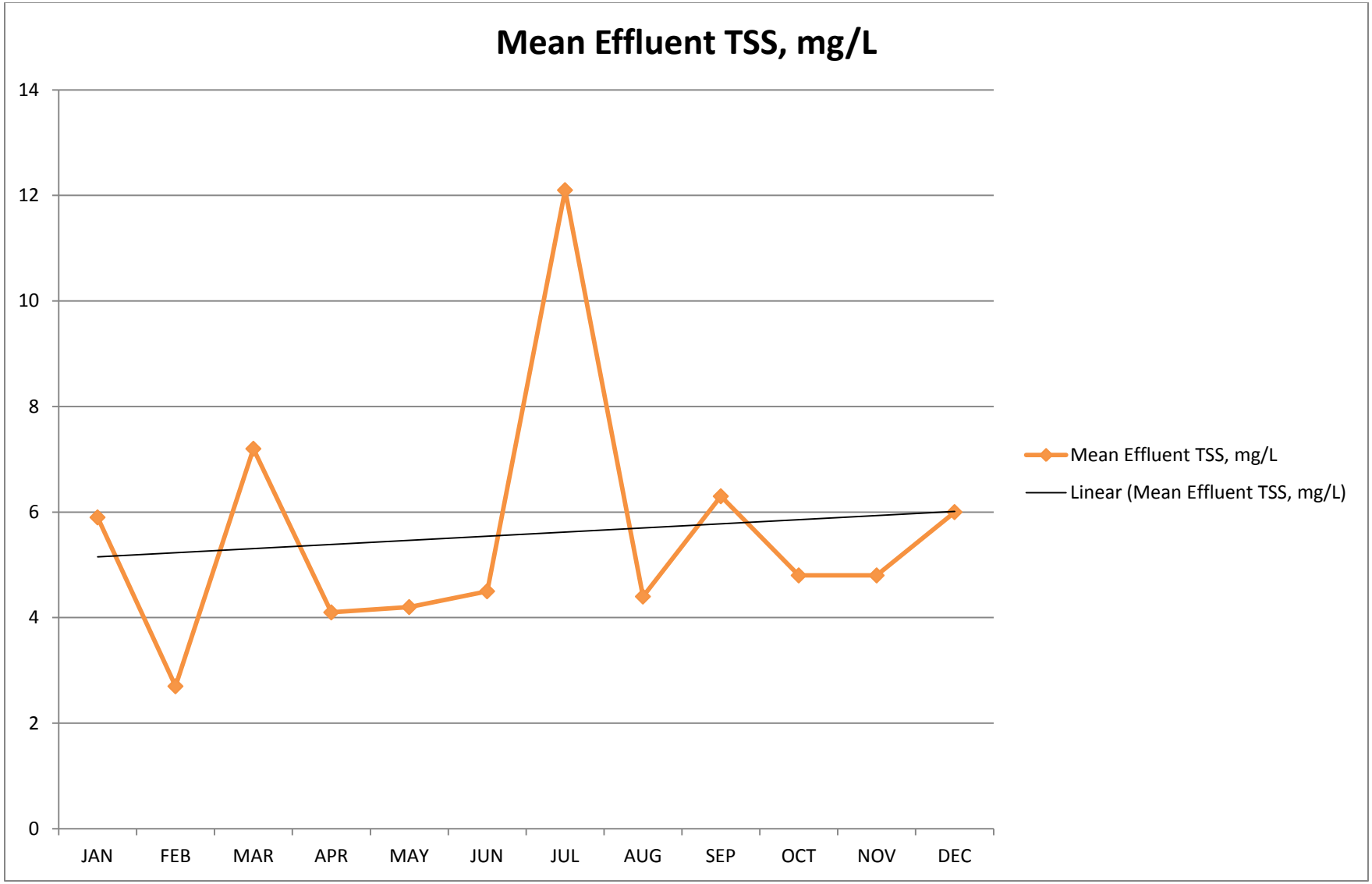
Sincerely,

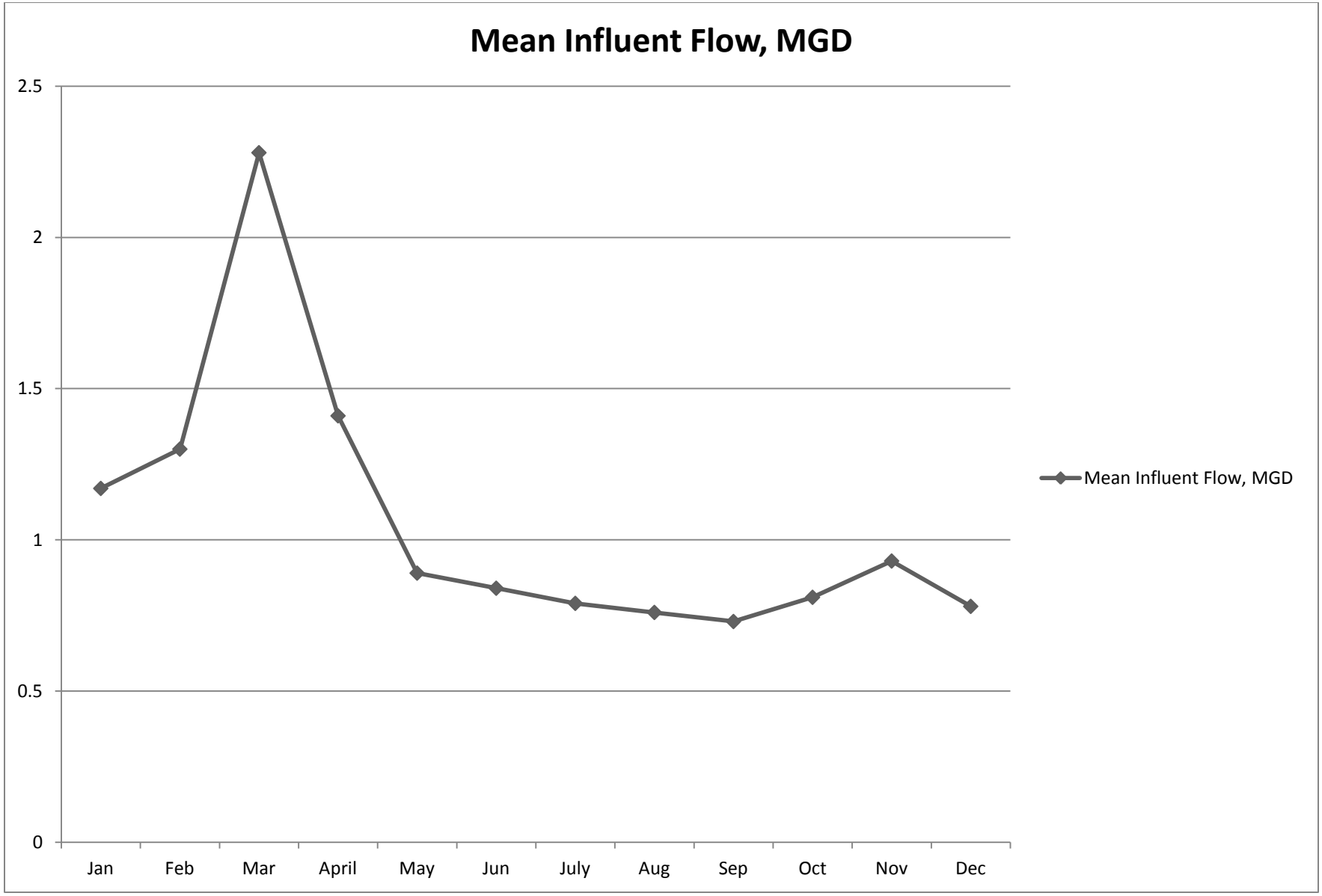
Hank Brenard, WWTPO IV-28479
Chief Plant Operator
Tom Cooke Memorial WWTP
City of Fortuna

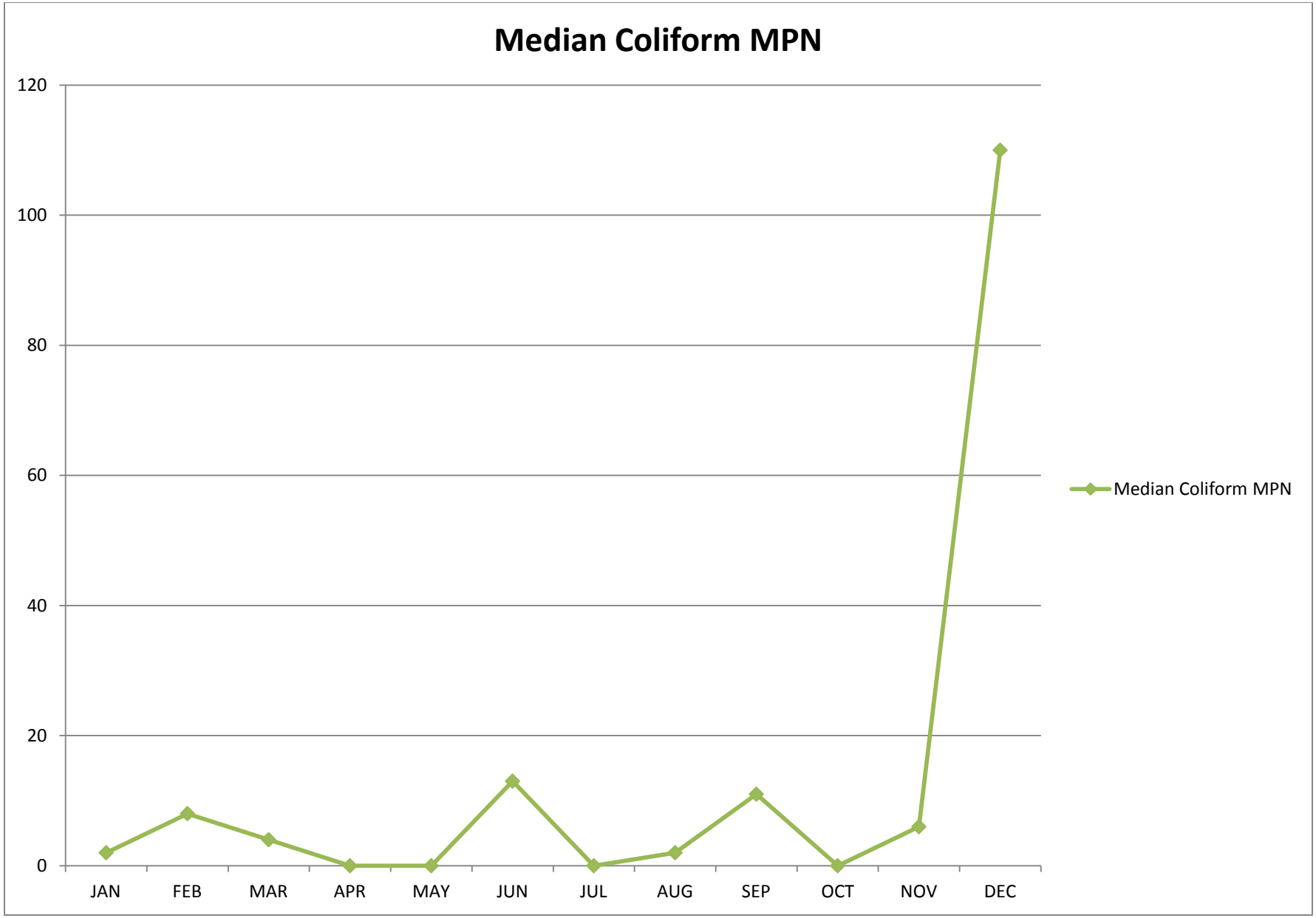
Appendix A

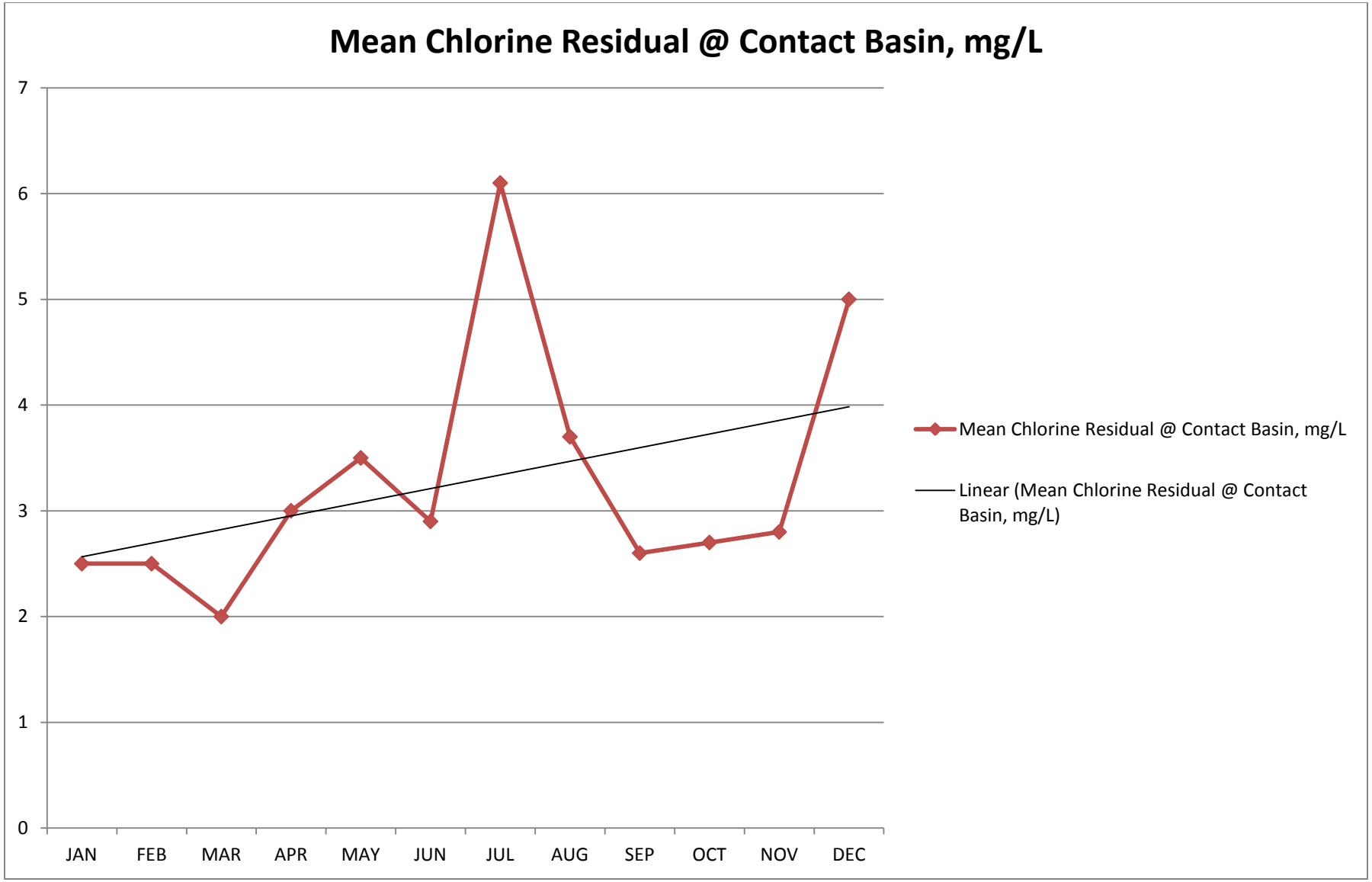
Performance Charts

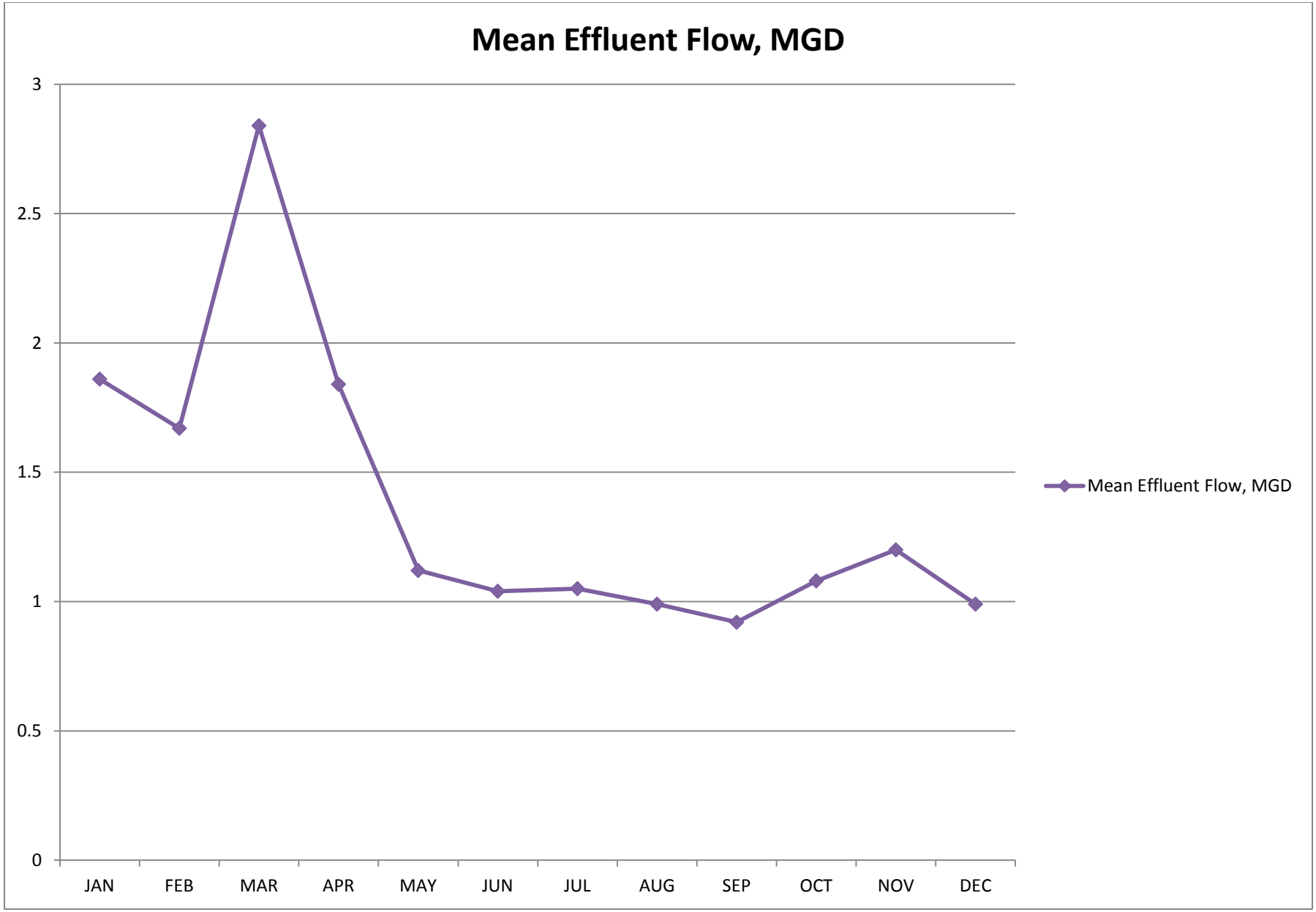

Mean Effluent BOD, mg/L
7
6
5
4
3
2
1
0
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
Mean Effluent BOD, mg/L
Linear (Mean Effluent BOD, mg/L)

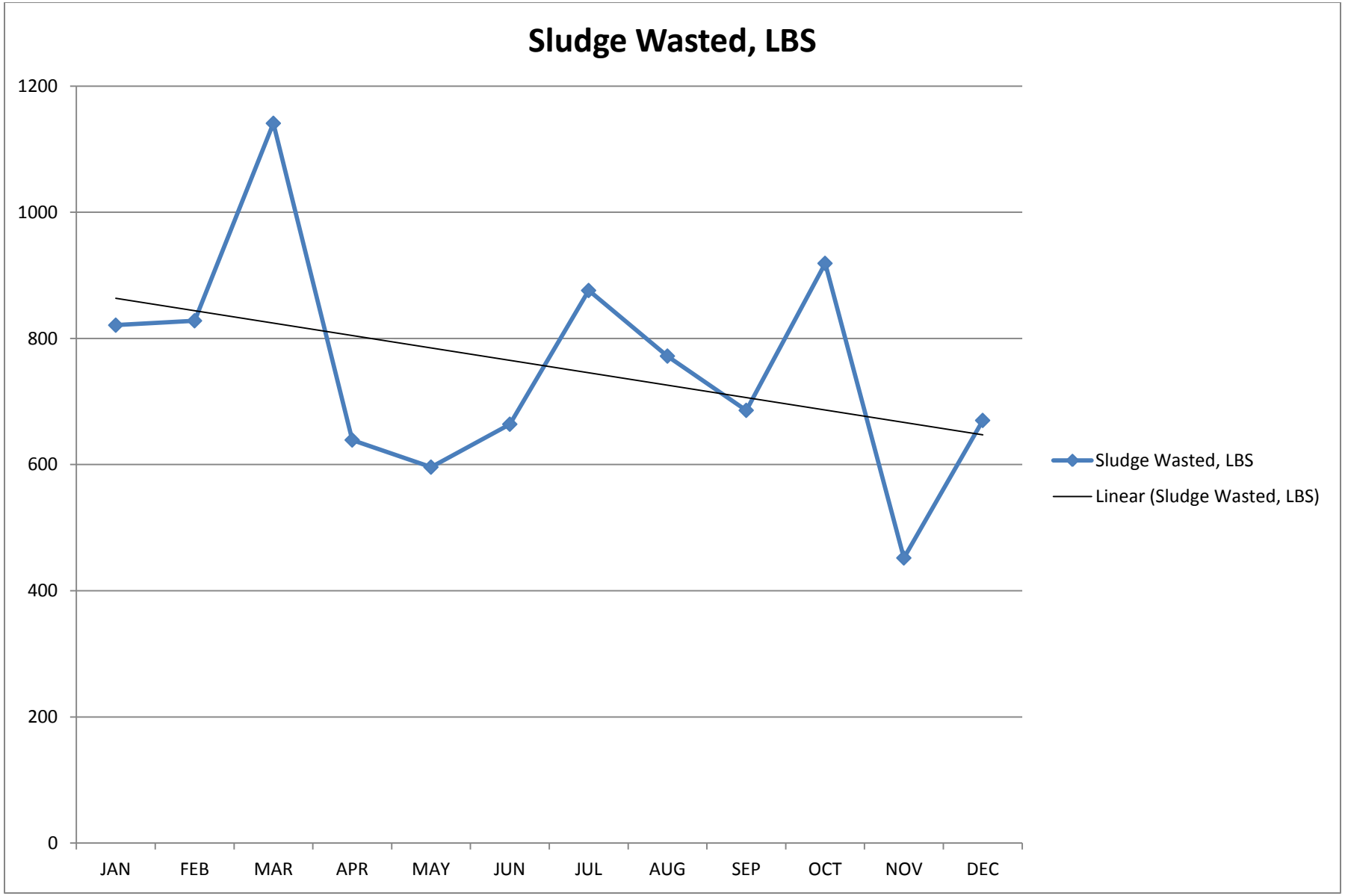

Mean Effluent TSS, mg/L
14
12
10
8
6
4
2
0
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
Mean Effluent TSS, mg/L
Linear (Mean Effluent TSS, mg/L)

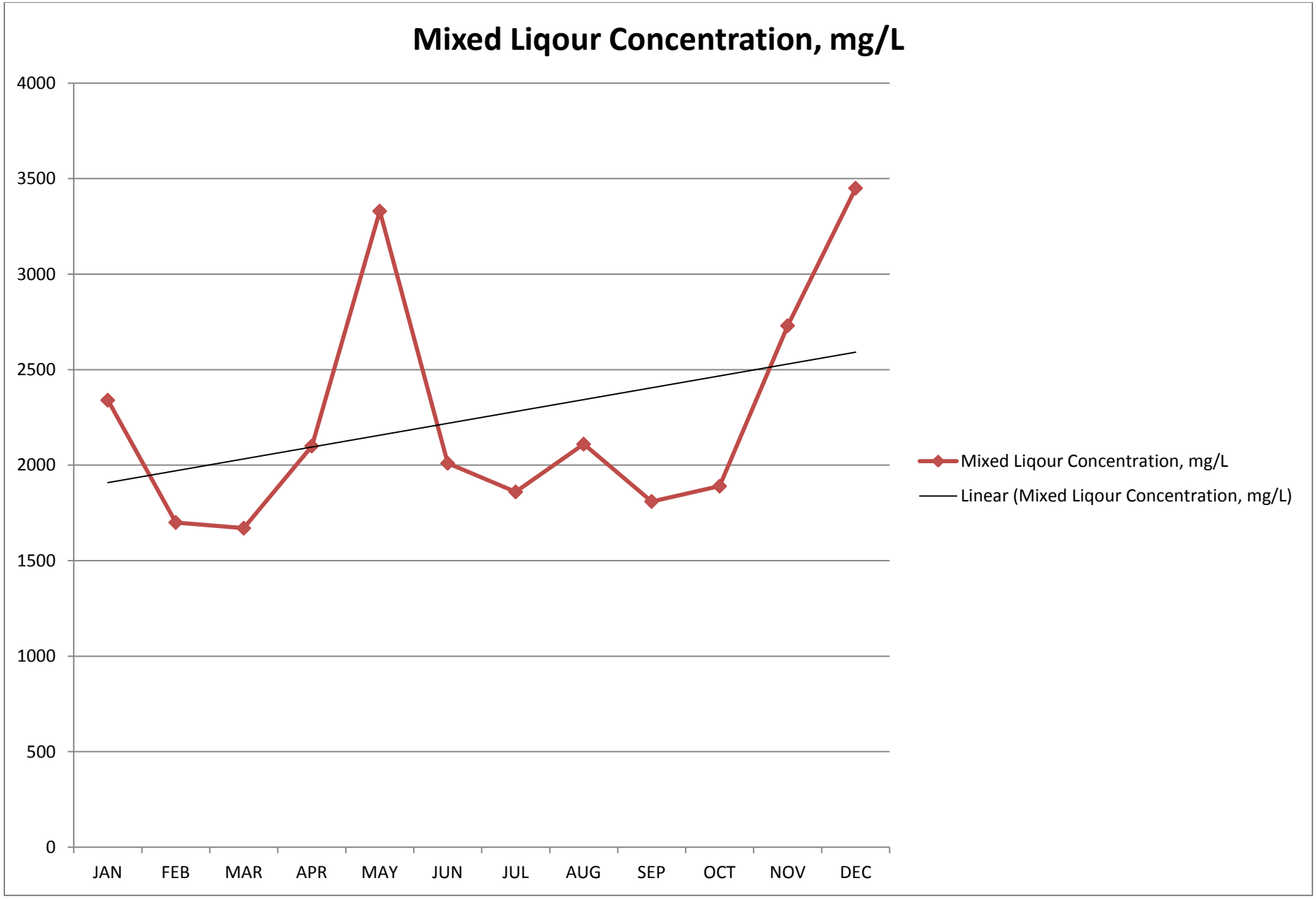

Mean Influent Flow, MGD
2.5
2
1.5
1
0.5
0
Jan
Feb
Mar
April
May
Jun
July
Aug
Sep
Oct
Nov
Dec
Mean Influent Flow, MGD

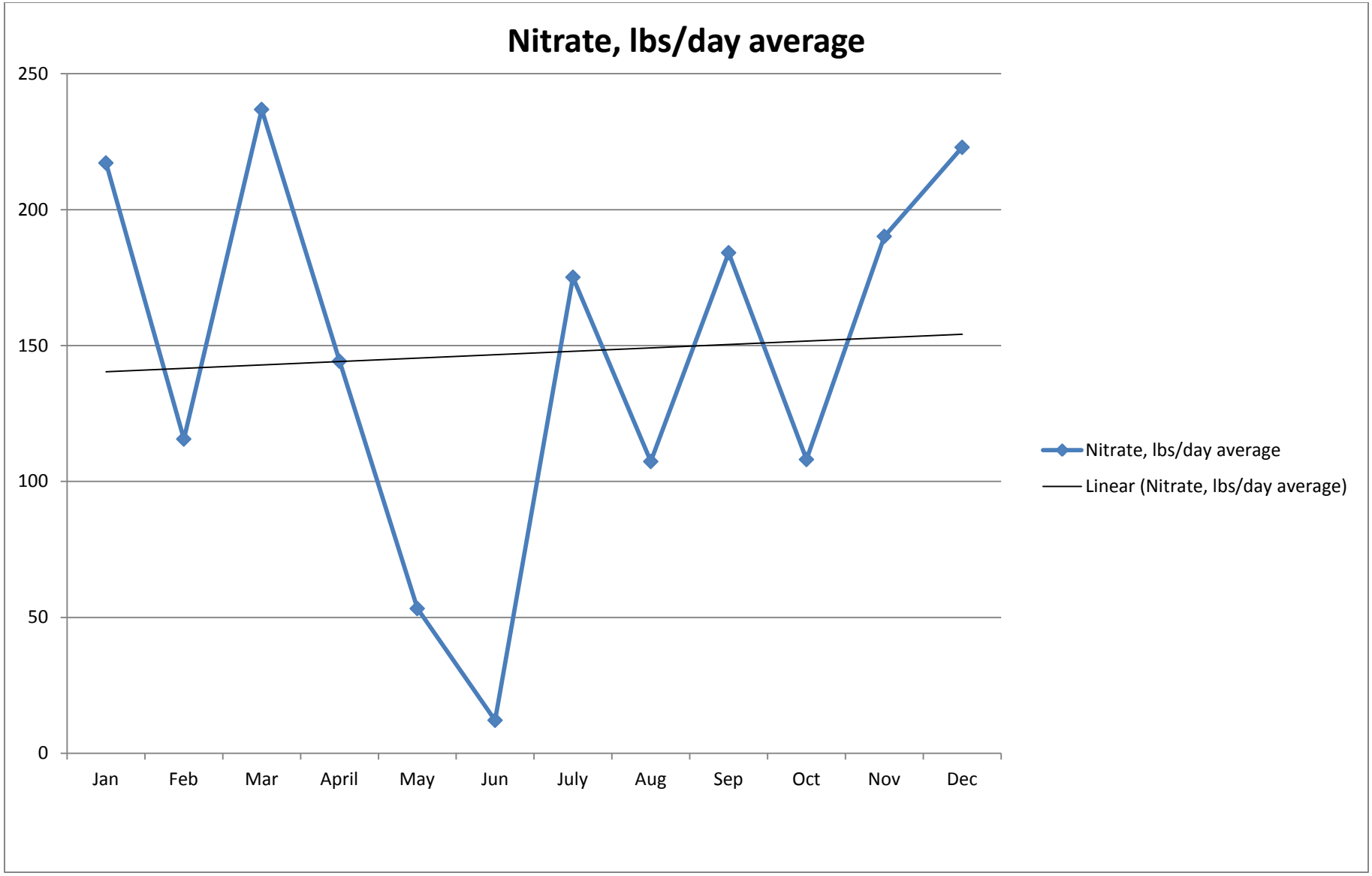

Median Coliform MPN
120
100
80
60
40
20
0
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
Median Coliform MPN

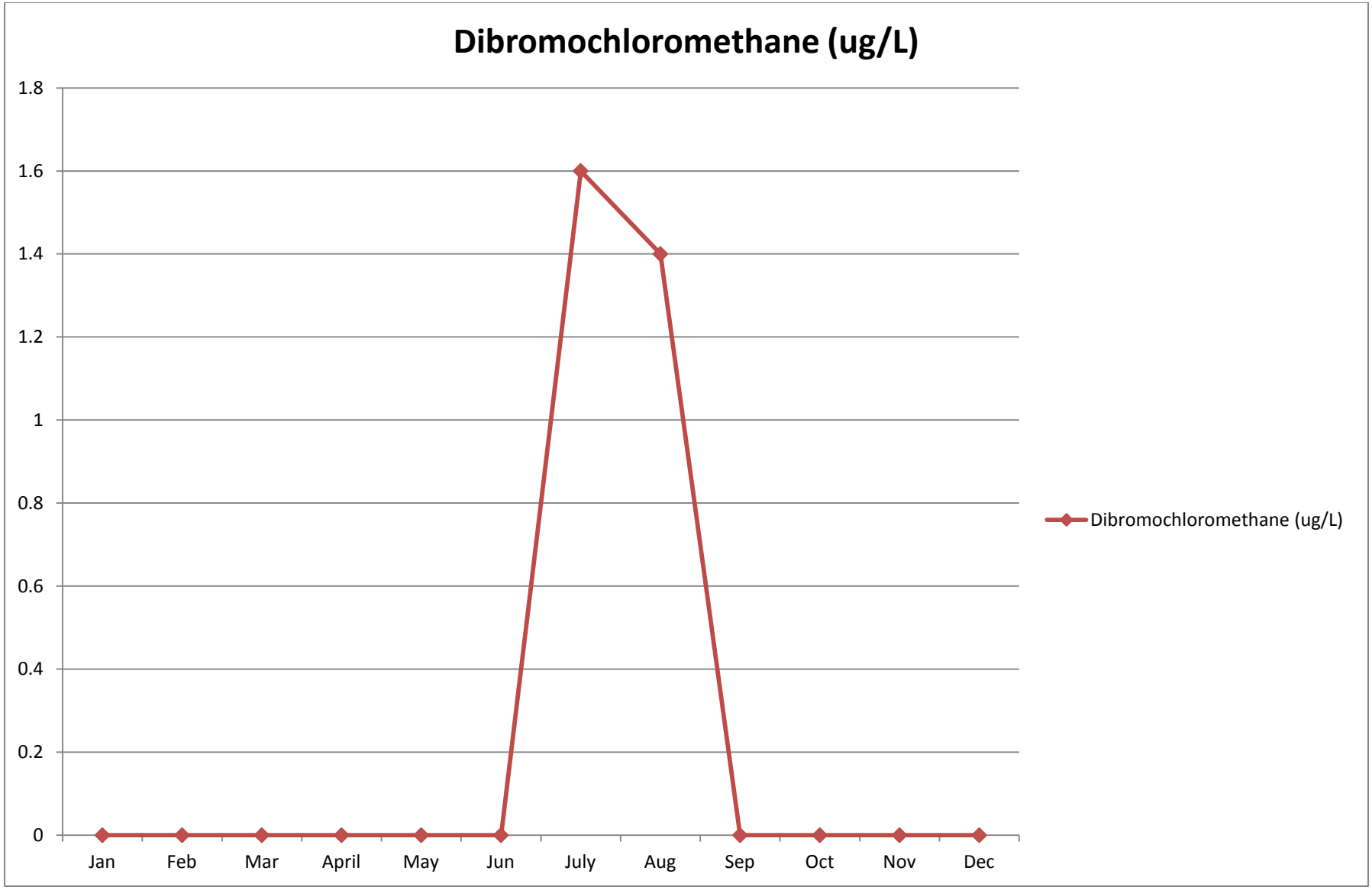

Mean Chlorine Residual @ Contact Basin, mg/L
7
6
5
4
3
2
1
0
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
Mean Chlorine Residual @ Contact Basin, mg/L
Linear (Mean Chlorine Residual @ Contact Basin, mg/L)

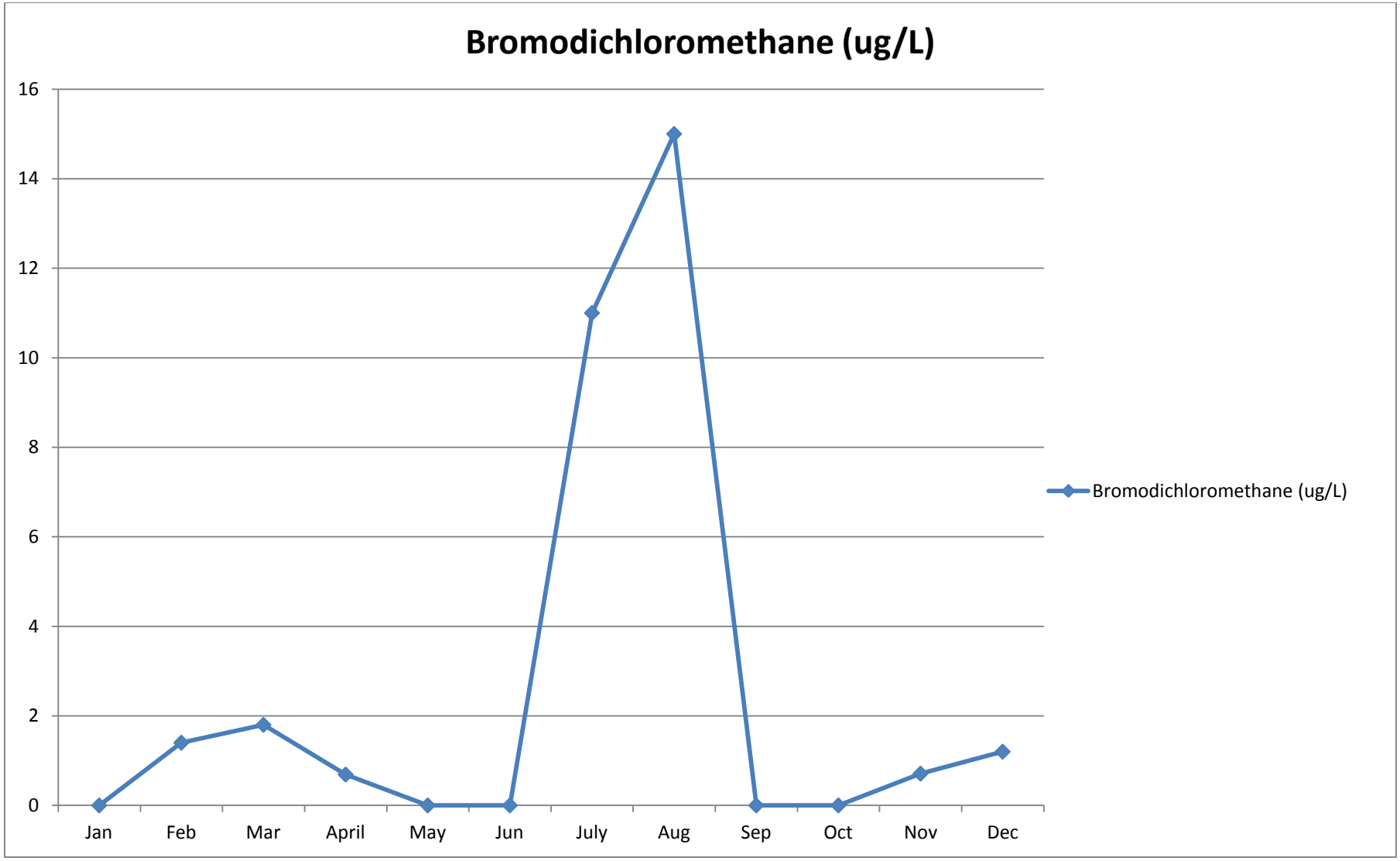

Mean Effluent Flow, MGD
3
2.5
2
1.5
1
0.5
0
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
Mean Effluent Flow, MGD

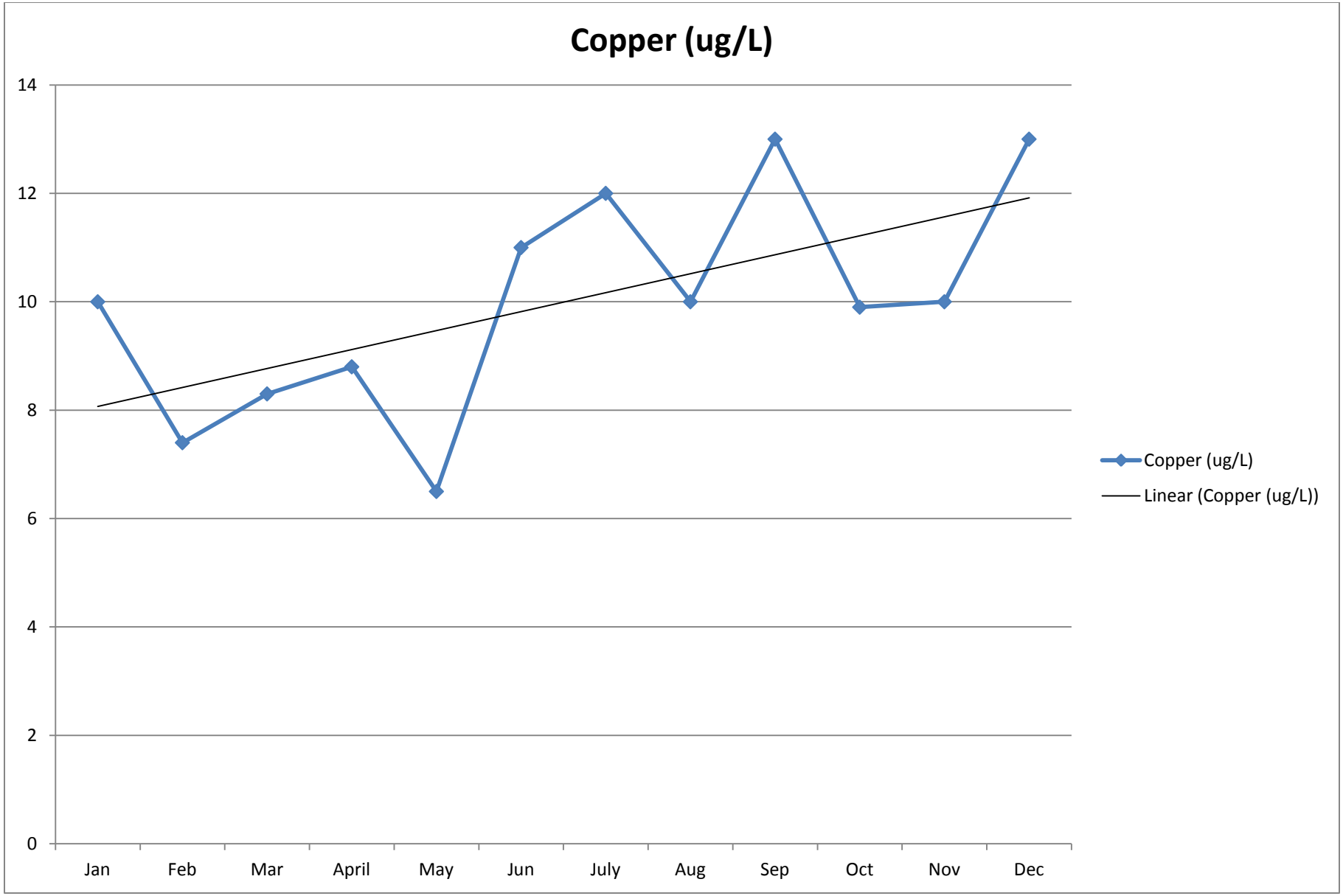

Sludge Wasted, LBS
1200
1000
800
600
400
200
0
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
Sludge Wasted, LBS
Linear (Sludge Wasted, LBS)

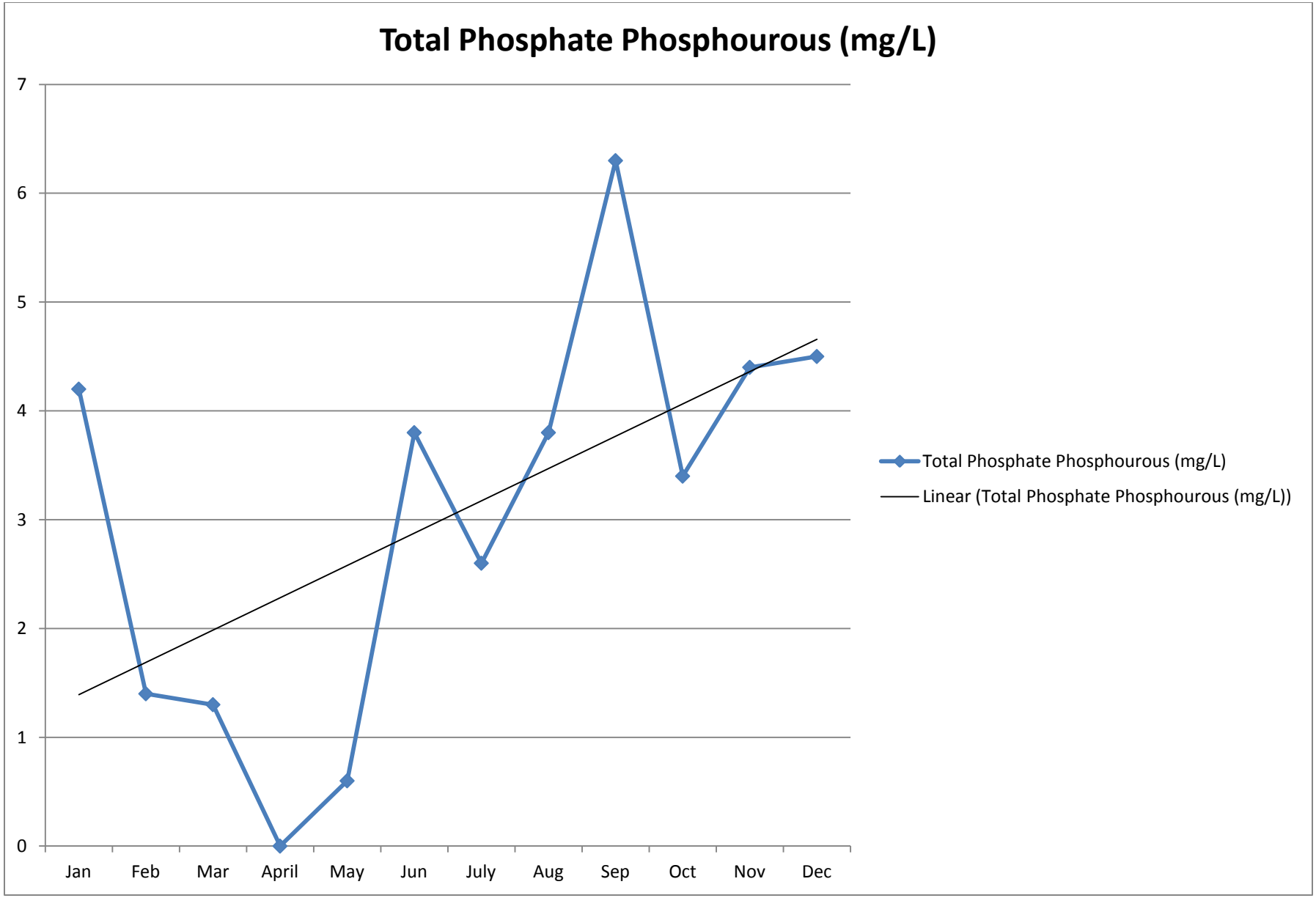

Mixed Liqour Concentration, mg/L
4000
3500
3000
2500
2000
1500
1000
500
0
JAN
FEB
MAR
APR
MAY
JUN
JUL
AUG
SEP
OCT
NOV
DEC
Mixed Liqour Concentration, mg/L
Linear (Mixed Liqour Concentration, mg/L)

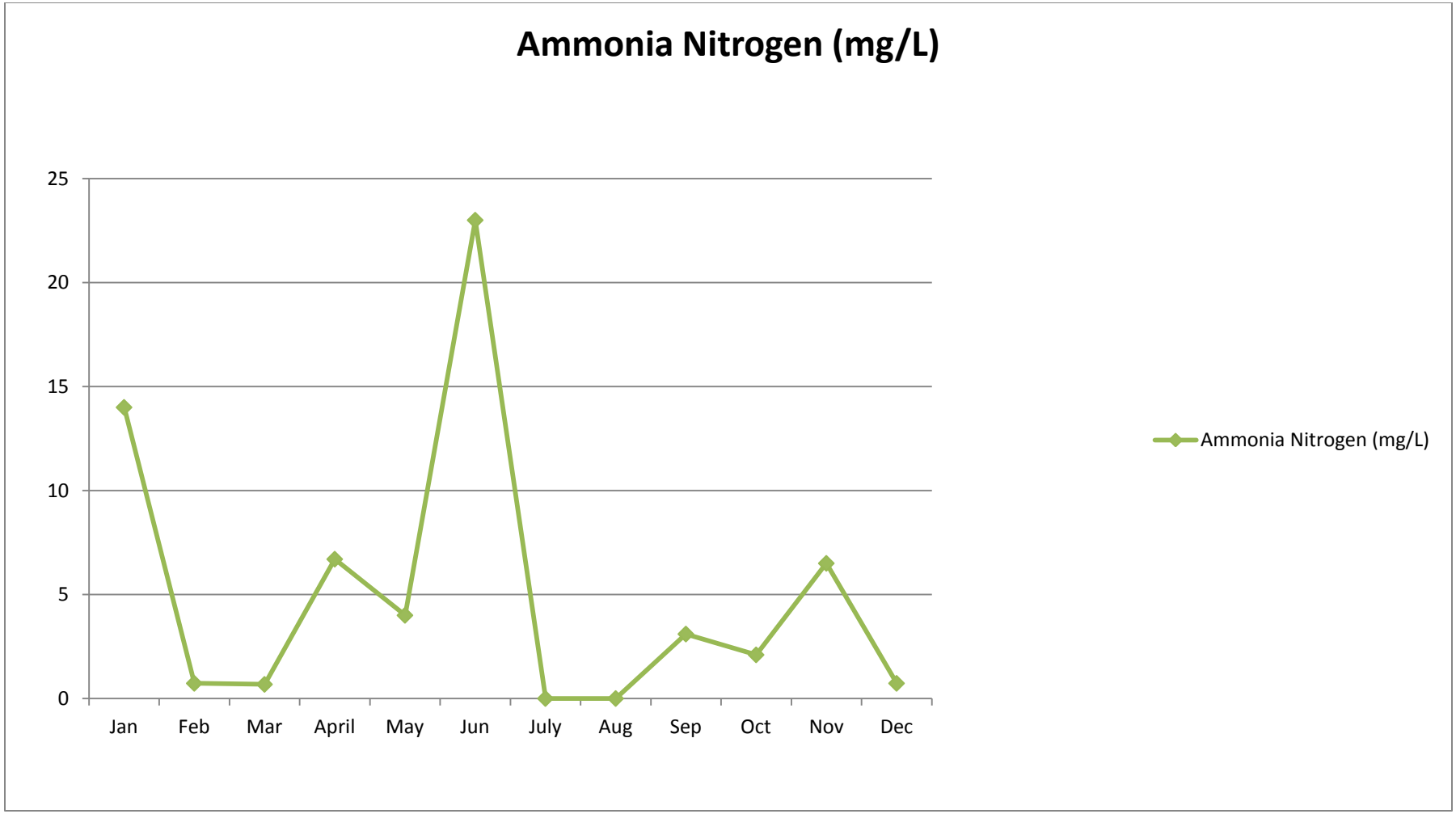

Nitrate, lbs/day average
250
200
150
100
50
0
Jan
Feb
Mar
April
May
Jun
July
Aug
Sep
Oct
Nov
Dec
Nitrate, lbs/day average
Linear (Nitrate, lbs/day average)


Dibromochloromethane (ug/L)
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
Jan
Feb
Mar
April
May
Jun
July
Aug
Sep
Oct
Nov
Dec
Dibromochloromethane (ug/L)


Bromodichloromethane (ug/L)
16
14
12
10
8
6
4
2
0
Jan
Feb
Mar
April
May
Jun
July
Aug
Sep
Oct
Nov
Dec
Bromodichloromethane (ug/L)


Copper (ug/L)
14
12
10
8
6
4
2
0
Jan
Feb
Mar
April
May
Jun
July
Aug
Sep
Oct
Nov
Dec
Copper (ug/L)
Linear (Copper (ug/L))


Total Phosphate Phosphourous (mg/L)
7
6
5
4
3
2
1
0
Jan
Feb
Mar
April
May
Jun
July
Aug
Sep
Oct
Nov
Dec
Total Phosphate Phosphourous (mg/L)
Linear (Total Phosphate Phosphourous (mg/L))


Ammonia Nitrogen (mg/L)
25
20
15
10
5
0
Jan
Feb
Mar
April
May
Jun
July
Aug
Sep
Oct
Nov
Dec
Ammonia Nitrogen (mg/L)