2020 WATER QUALITY MONITORING BELTZVILLE RESERVOIR LEHIGHTON, PENNSYLVANIA

U.S. Army Corps of Engineers
Philadelphia District
Environmental Resources Branch

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2020 Water Quality Monitoring
Beltzville Reservoir
Lehighton, Pennsylvania

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1.0 INTRODUCTION

1.1 PURPOSE OF THE MONITORING PROGRAM

The U.S. Army Corps of Engineers (USACE) operates Beltzville Reservoir located in east-central Pennsylvania within the Delaware River Basin. Beltzville Reservoir provides flood control and a dependable water supply to downstream communities along the Pohopoco Creek and Lehigh River. Additionally, the reservoir provides important habitat for fish, waterfowl, and other wildlife, and recreational opportunities through fishing, boating, and swimming. Due to the broad range of uses and demands that Beltzville Reservoir serves, the USACE monitors water quality to compare with state water quality standards and to diagnose other problems that commonly effect reservoir health such as nutrient enrichment and toxic loadings. This report summarizes the results of water quality monitoring at Beltzville Reservoir from 21 May to 03 September 2020.

1.2 DESCRIPTION OF BELTZVILLE RESERVOIR

Beltzville Reservoir was designed to provide flood control, water supply, and enhanced water quality to downstream communities along the Lehigh River. The damming of Pohopoco Creek approximately three miles upstream of its confluence with the Lehigh River formed the reservoir. The reservoir is located in Carbon County, 3 miles northeast of Lehighton and about 20 miles northwest of Allentown, Pennsylvania. The reservoir dams a drainage area of 96.3 square miles and can impound up to 13 billion gallons of water. The primary water source feeding into the lake is Pohopoco Creek as it flows southwest to the Lehigh River. Secondary water sources include Pine Run and Wild Creek, both entering the reservoir from the north. The reservoir is approximately 7 miles long and, when full, covers an area of 947 acres. The maximum depth of the lake is 140 feet near the face of the dam.

1.3 ELEMENTS OF THE STUDY

The USACE, Philadelphia District, has been monitoring the water quality of Beltzville Reservoir since 1975. Over this time, the yearly monitoring designs have evolved to address new concerns such as the health of public drinking water and contamination of reservoir bottom sediments. The 2020 monitoring program included the following major elements:

- Monthly water quality and bacteria surface water monitoring of reservoir and upstream sources to evaluate compliance with Pennsylvania state water quality standards and to evaluate the health of the reservoir ecosystem starting on 21 May and ending on 03 September 2020.

- Monthly profile samples for temperature, dissolved oxygen, chlorophyll a, pH, turbidity, and conductivity at all stations in the reservoir and watershed starting on 21 May and ending on 03 September 2020.

2.0 METHODS

2.1 STRATIFICATION MONITORING

Physical stratification monitoring of the water column was conducted five times at Beltzville Reservoir between 21 May and 03 September 2020 (Table 2-1). Physical stratification parameters included depth, temperature, dissolved oxygen (DO), pH, turbidity, chlorophyll a, and conductivity. Physical stratification was monitored at seven fixed stations throughout the reservoir watershed (Fig. 2-1). Three stations were located within the reservoir body (BZ-3, BZ-6, and BZ-7) for which water quality was measured from the surface to the bottom in 5-foot increments. Surface water quality was measured at four stations, located in upstream source waters (BZ-2S on Pine Run, BZ-4S on Wild Creek, and BZ-5S on Pohopoco Creek) and BZ-1S downstream of the reservoir on Pohopoco Creek. The physical water quality parameters were measured with a calibrated YSI 6600 V2-4 water quality probe.

In this report, when applicable, water quality data recorded from monitoring was compared to water quality standards mandated by the Pennsylvania Department of Environmental Protection (PADEP Chapter 93). The standard for DO is a minimum concentration of 5 mg/L, and that for pH is an acceptable range from 6 to 9. Temperatures criteria are based on seasonal guidelines. All the water quality data collected during physical stratification monitoring is summarized in Appendix A.

2.2 WATER COLUMN CHEMISTRY MONITORING

Water column chemistry monitoring was conducted five times (once a month) at Beltzville Reservoir between 21 May and 03 September 2020 (Table 2-1). Water samples were collected at the seven fixed stations in the reservoir watershed (Fig. 2-1). Surface water samples were collected in release waters downstream of the reservoir (BZ-1S) and on upstream tributary sources Pine Run (BZ-2S), Wild Creek (BZ-4S), and Pohopoco Creek (BZ-5S). Surface, middle, and bottom water samples were collected at three reservoir stations (BZ-3, BZ-6, and BZ-7). Surface water samples were collected by opening sample containers approximately 1 foot below the water's surface. Middle and bottom water samples were collected with a Van Dorn design horizontal water bottle. Laboratory water sample analysis was conducted by M.J. Reider Associates, Inc Environmental Testing Laboratory located in Reading, Pennsylvania (U.S. EPA/PA DEP #06-00003).

Water samples from all depths were analyzed for ammonia, nitrite, nitrate, total Kjeldahl nitrogen, total phosphorus, soluble phosphorus, total dissolved solids, total suspended solids, biochemical oxygen demand, alkalinity, and total organic carbon. Table 2-2 summarizes the laboratory method detection limits, laboratory/Corps required reporting limits, state regulatory criteria, and allowable maximum hold times for each water quality parameter monitored.

Table 2-1. Beltzville Reservoir water quality monitoring schedule for 2020

Date of Sample Collection	Physical Stratification Monitoring (All Stations)	Water Column Chemistry Monitoring (All Stations)	BTEX Monitoring[1] (BZ-3 and -6)	Trophic State Assessment (BZ-6)	Coliform Bacteria Monitoring (All Surface Stations)	Drinking Water Monitoring[2]
21 May	X	X	-	X	X	-
18 June	X	X	-	X	X	-
09 July	X	X	-	X	X	-
13 August	X	X	-	X	X	-
03 September	X	X	-	X	X	-

(1) BTEX sampling was not conducted in 2020 based on historically low and non-detectable levels of these parameters.

(2) Drinking water samples are sampled quarterly by personnel at each reservoir. This data has not been included within the reservoir water quality sampling report.

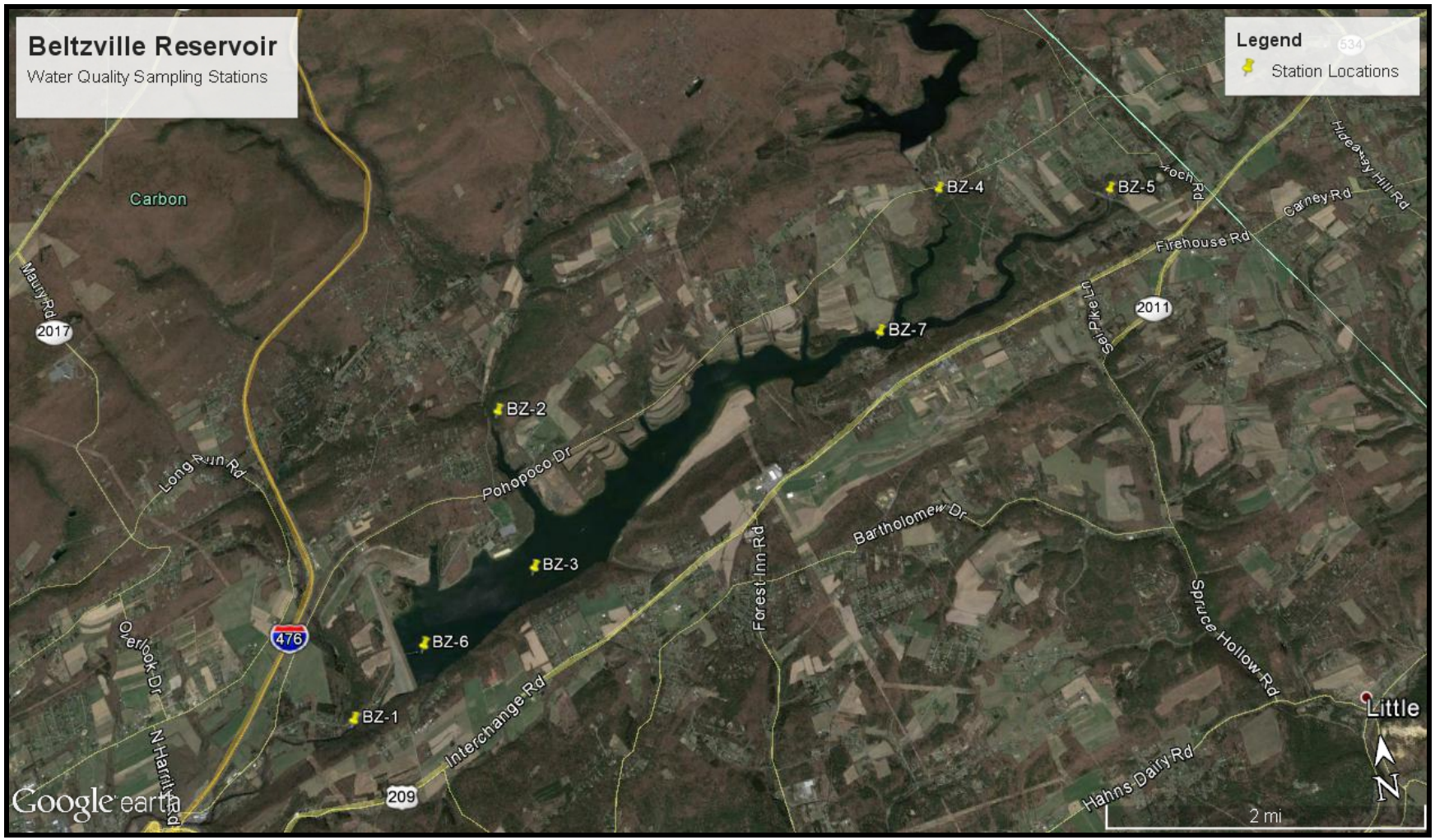

Figure 2-1. Water quality monitoring stations in 2020 at the U.S. Army Corps of Engineers Beltzville Reservoir located in Lehighton, Pennsylvania.

Table 2-2. Water quality test methods, detection limits, state regulatory criteria, and sample holding times for water quality parameters monitored at Beltzville Reservoir in 2020

Parameter	(2) Method	Laboratory Limit of Reporting	PADEP Surface Water Quality Criteria	Allowable Hold Times (Days)
Total Alkalinity	SM20 2320 B	2.0 mg/L	Min. 20 mg/L $CaCO_3$	14
Biochemical Oxygen Demand (BOD)	SM5210 B	2.0 mg/L	None	2
Total Phosphorus	SM4500-P E	0.01 mg/L	None	28
Diss./Ortho-Phosphate	NA	NA	None	28
Soluble Phosphorus	SM4500-P F	0.05 mg/L	None	28
Total Organic Carbon (TOC)	SM5310 C	0.5 mg/L	None	28
Total Inorganic Carbon (TIC) *	NA	NA	None	28
Total Carbon (TOC + TIC) *	NA	NA	None	28
(1) Chlorophyll *a*	YSI Probe	----	None	In Situ
Total Kjeldahl Nitrogen	EPA 351.2	0.50 mg/L	None	28
Ammonia	ASTM D6919-03	0.10 mg/L	Temp. and pH dependent	28
Nitrate	EPA 300.0 Rev 2.1	1.0 mg/L	Maximum 10 mg/L (nitrate + nitrite)	28
Nitrite	EPA 300.0 Rev 2.1	0.10 mg/L		28
Total Dissolved Solids	SM2540 C	5.0 mg/L	Maximum 750 mg/L	7
Total Suspended Solids	SM2540 D	1.0 mg/L	None	7

(1) Chlorophyll *a* samples were recorded using a YSI 6600 with a chlorophyll sensor.
(2) Laboratory Methods Reference:
EPA- "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983 and subsequent revisions.
SM- "Standard Methods for the Examination of Water and Wastewater", 22nd Edition, 2012.
ASTM International- Formerly American Society for Testing and Materials
* Total Inorganic Carbon and Total Carbon were not sampled for in 2020

2.3 TROPHIC STATE DETERMINATION

The trophic state of Beltzville Reservoir was determined by methods outlined by Carlson (1977). In general, this method calculated trophic state indices (TSIs) independently for measures of total phosphorus, chlorophyll *a*, and secchi disk depth. Surface water measures of total phosphorus and chlorophyll *a* from chemistry monitoring were used independently in the determination of monthly trophic state (Table 2-1). Secchi disk depth was measured monthly at reservoir-body station BZ-6. Trophic state determinations were made using criteria defined by Carlson and EPA (1983) and calculated for the deepest portion of the reservoir (Station BZ-6).

2.4 RESERVOIR BACTERIA MONITORING

Monitoring for coliform bacteria contaminants was conducted five times at Beltzville Reservoir between 21 May and 03 September 2020 (Table 2-1). Surface water samples were collected at all seven stations and analyzed for total coliform and escherichia coliform contamination as indicators of risk. The samples were collected in the same manner as the chemistry samples or approximately 1-foot below the surface of the water. Table 2-3 presents the test methods, detection limits, United States Environmental Protection Agency (EPA) and Pennsylvania Department of Environmental Protection (PADEP) standards, and sample holding times for the bacteria parameters monitored at Beltzville Reservoir in 2020. The bacteria analytical method was based on a membrane filtration technique. All the samples were analyzed within their maximum allowable hold times. Laboratory analysis was conducted by M.J. Reider Associates, Inc Environmental Testing Laboratory located in Reading, Pennsylvania (U.S. EPA/PA DEP #06-00003).

Table 2-3. Water quality test methods, detection limits, PADEP standards, and sample holding times for bacteria parameters monitored at Beltzville Reservoir in 2020.

Parameter	Total Coliform	Escherichia Coliform
Test method	SM 9223 B	SM 9223 B
Limit of Quantification	1 clns/100-mls	1 clns/100-mls
PADEP/EPA standard	None	Geometric mean < 126 clns/100-mls or a single sample reading of < 235 clns/100-mls
Max. allowable holding time	30 hours	30 hours
Holding time	< 30 hours	< 30 hours

Monthly bacteria counts were compared to the EPA primary recreation water quality single sample standard for Escherichia coli bacteria. Application of this standard

applies to Beltzville Reservoir because swimming and other primary and secondary human/water contact recreation is permitted in the reservoir. Beltzville State Park maintains a bathing beach at Beltzville Reservoir and conducts bacteria sampling of that area. Given logistical limitations (all monthly sampling conducted on one day) and because water contact recreation is permitted within the reservoir, the coliform data collected by the Corps is compared to the single sample standard as a method of evaluating background coliform data on the main body of the reservoir. Although our sampling design does not fully meet PADEP guidelines for bathing beach monitoring, we feel that this interpretation of the coliform data meets the intent of the PADEP water quality standard for evaluating Beltzville Reservoir bacteria levels within the main reservoir body.

3.0 RESULTS AND DISCUSSION

3.1 STRATIFICATION MONITORING

The following sections summarize the water quality monitoring results of the physical and chemical parameters: temperature, dissolved oxygen, and pH. Seasonal and spatial patterns of surface water quality measured throughout the reservoir watershed, and seasonal and depth related patterns of the stratified lake water column based on measures from the deepest portion of the reservoir (station BZ-6 or the "Tower") are described. The discussion of stratification is focused on this station as water quality problems related to depth are generally most severe in deeper water habitats. Corps personnel collected the physical and chemical water quality data discussed herein over the monitoring period from May to September 2020. All the parameters were measured with a calibrated YSI 6600 V2-4 water quality probe and are presented in Appendix A.

3.1.1 Temperature

Temperature is the primary influencing factor on water density, affects the solubility of many chemical compounds, and can therefore influence the effect of pollutants on aquatic life. Increased temperatures elevate the metabolic oxygen demand, in conjunction with reduced oxygen solubility, and can impact many species. Vertical temperature stratification patterns naturally occurring in lakes affect the distribution of dissolved and suspended compounds.

Temperatures of the tributary and downstream release surface waters generally followed a similar seasonal pattern throughout the watershed of Beltzville Reservoir during 2020 with maximum surface water temperatures seen in late August (Fig. 3-1). The maximum upstream tributary temperature of 25.82 °C was seen at station BZ-4S on 13 August. The maximum downstream release (BZ-1S) surface water temperature was 16.49 °C on 09 July. Upstream and downstream waters have a variety of environmental and anthropogenic factors potentially influencing surface water temperature. Station BZ-1S is directly influenced by Beltzville Reservoir releases that are pulled from various locations in the water column and is dictated by reservoir release operations. Downstream release temperatures are managed to meet Chapter 93 Pennsylvania State High-Quality Cold-Water Fishery standards. Station BZ-2S is a small well vegetated cold-water tributary. Station BZ-4S is influenced by Wild Creek Reservoir releases upstream of Beltzville Reservoir and has consistently maintained the yearly highest average tributary surface water temperatures throughout the sampling seasons. Station BZ-5S is located in an open water area were Pohopoco Creek enters Beltzville Reservoir. These factors, amongst others, result in the temperature variations in surface water temperatures at each tributary station shown in Figure 3.1.

Beltzville Reservoir was stratified with respect to temperature in 2020 (Fig. 3-2). The reservoir surface waters are warmed by the sun and account for warmer surface water temperatures recorded at lake stations (BZ-3, BZ-7, and BZ-6). In May, the onset of stratification was apparent at Station BZ-6 with lake surface temperatures (14.68°C) approximately 6.28°C warmer than the lower water column (8.40°C). A strong

stratification pattern was evident from June into August. In September, cooling surface temperatures and erosion of the epilimnion marked the onset of fall turnover and destratification within the reservoir.

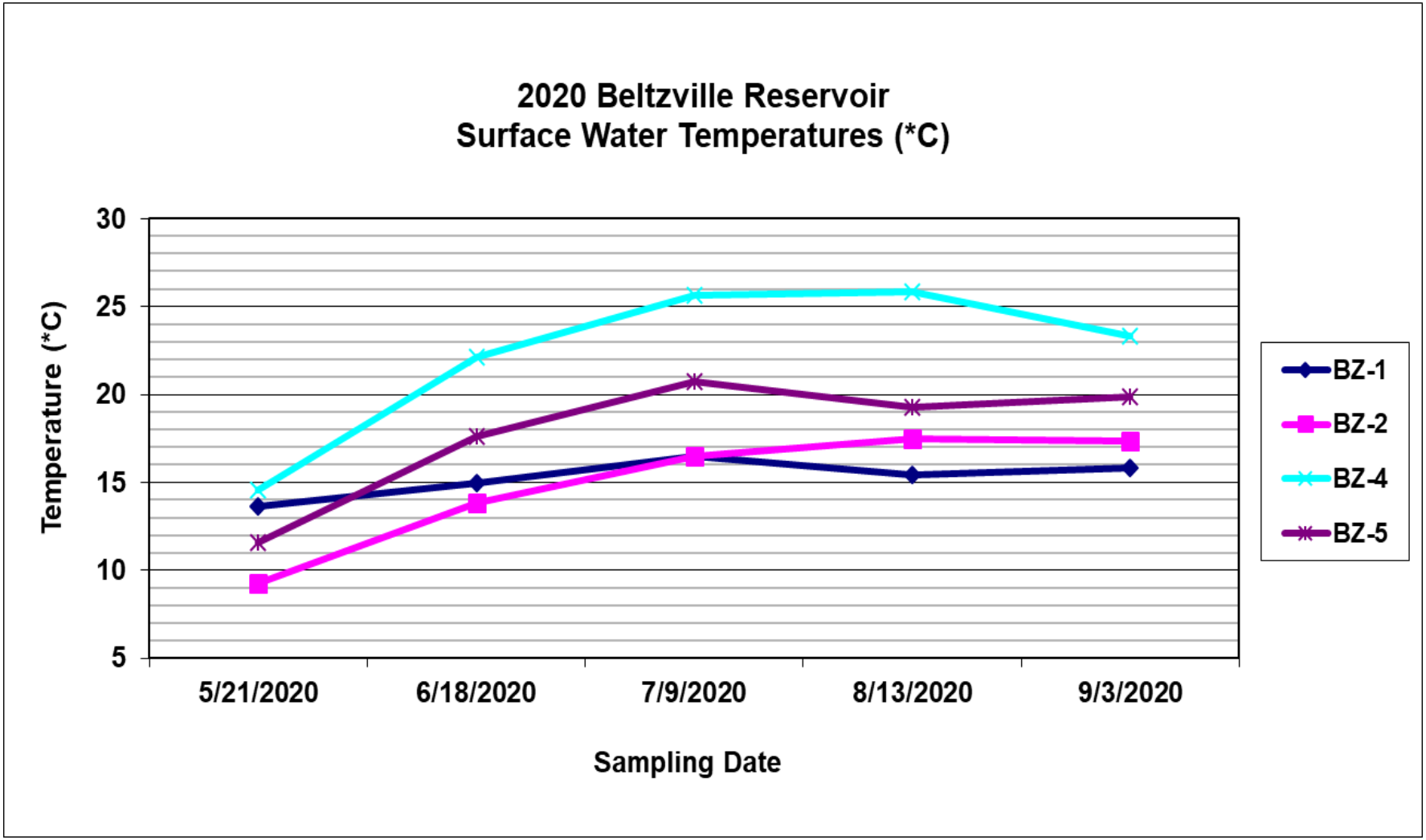

Figure 3-1. Tributary and downstream surface water temperature (°C) measured at Beltzville Reservoir in 2020. See Appendix A for Summary of plotted values. Station BZ-1 reflects releases surface water temperatures downstream of Beltzville Reservoir.

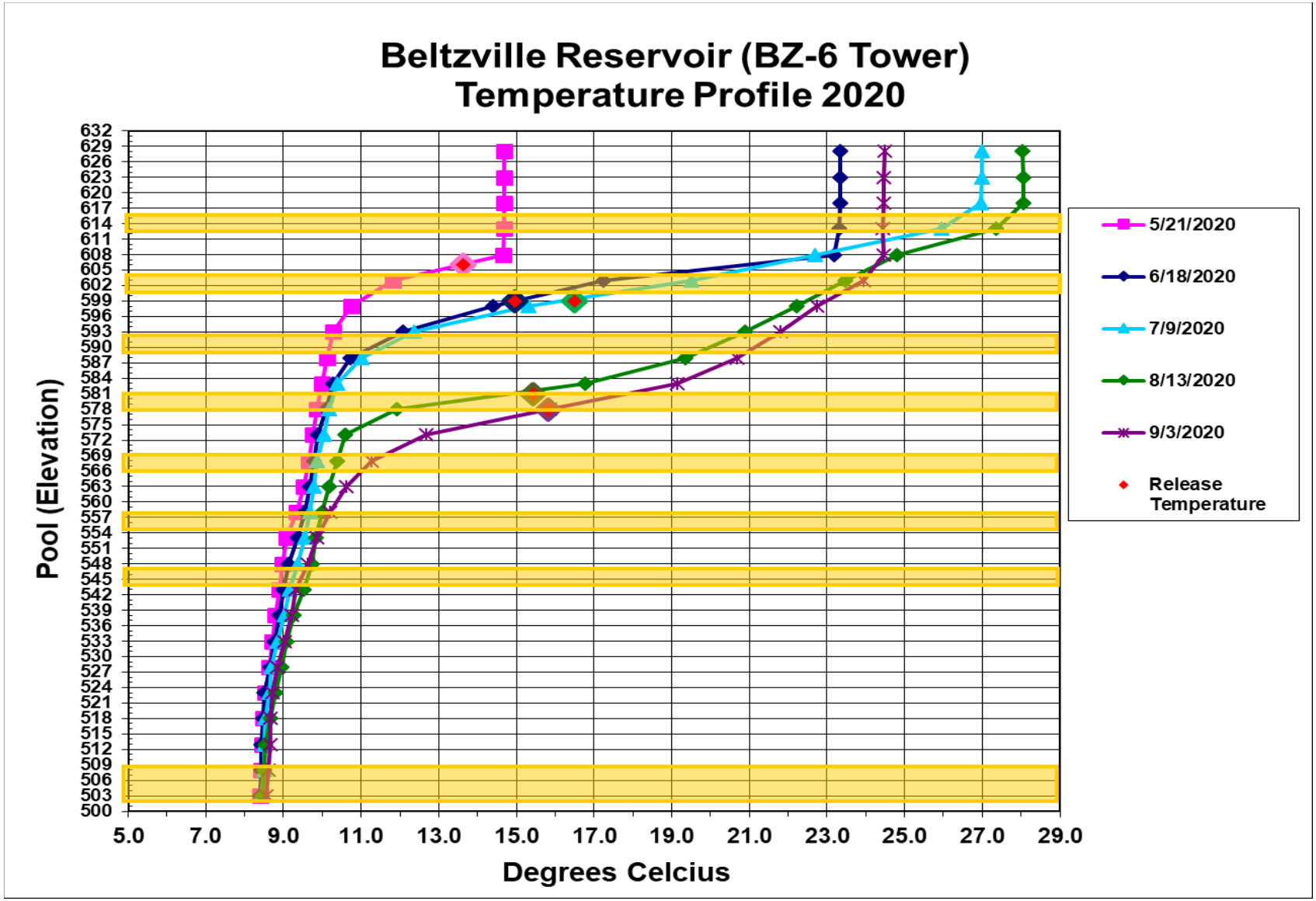

Figure 3-2. Lake temperature profile at station BZ-6 of Beltzville Reservoir in 2020. See Appendix A for summary of plotted values. The yellow bars represent the locations of water control gates in the Beltzville Reservoir control tower. Corresponding downstream release water temperatures at Station BZ-1S on each sampling date is also presented.

3.1.2 Dissolved Oxygen

Dissolved oxygen (DO) is the measure of the amount of DO in water. Typically, DO concentrations in surface waters are less than 10 mg/L. Dissolved Oxygen concentrations are subject to diurnal and seasonal fluctuations that can be influenced, in part, by air and water temperature, river discharge, and photosynthetic activity. Dissolved Oxygen is essential to the respiratory metabolism of most aquatic organisms. It affects the availability and solubility of nutrients and subsequently the productivity of aquatic ecosystems. Low levels of dissolved oxygen can facilitate the release of nutrients from bottom sediments.

Dissolved oxygen (DO) in the tributary and release surface waters remained within an 7.5-11.5 mg/L value range and followed a similar seasonal pattern throughout the watershed of Beltzville Reservoir during 2020 (Fig. 3-3). Dissolved oxygen concentrations downstream of the reservoir (BZ-1S) averaged 9.58 mg/L for the sampling season. The upstream tributary stations (BZ-2S, -4S, -5S) ranged in values from 7.83 mg/L to 11.47 mg/L for the sampling season. The maximum DO reading of 11.47 mg/L occurred at BZ-2S on 21 May and a minimum reading of 7.83 mg/L occurred at BZ-4S on 13 August.

Dissolved Oxygen in the water column at station BZ-6 of Beltzville Reservoir from July through September, exhibited a metalimnetic oxygen minimum (negative heterograde curve) with concentrations decreasing, increasing and decreasing rapidly as measurements were taken from the surface to the lake bottom (Fig. 3-4). The most sever occurrence of these conditions was seen in August and September. This general pattern has been observed at station BZ-6 in previous years and may be due to a lens of low oxygenated water passing through the reservoir from upstream sources, a result of portal operations at the reservoir tower, temperature related water density changes, respiratory oxygen consumption, lake topography or some other factor or combination of factors. No visible impacts on the in-lake fishery occurred because of the low oxygen conditions.

DO concentrations in the water column of Beltzville Reservoir followed PADEP water quality standards during 2020. The state water quality standard for DO is a minimum concentration of 5-mg/L in the epilimnion of stratified lakes. As shown in Figure 3-4, concentrations falling below the standard were not encountered in the epilimnion in 2020 but did occur at greater depths. DO concentrations measured in all surface waters of the reservoir followed the standard.

The health of aquatic ecosystems is impaired by low DO concentrations in the water column. Hypoxia, or conditions of DO less than 2 mg/L, is generally accepted as the threshold at which the most severe effects on biota occur. Bottom waters that are not mixed during stratification are depleted of oxygen primarily through biological respiration. In 2020, these conditions were seen in the water column at station BZ-6 in August and September (Appendix A).

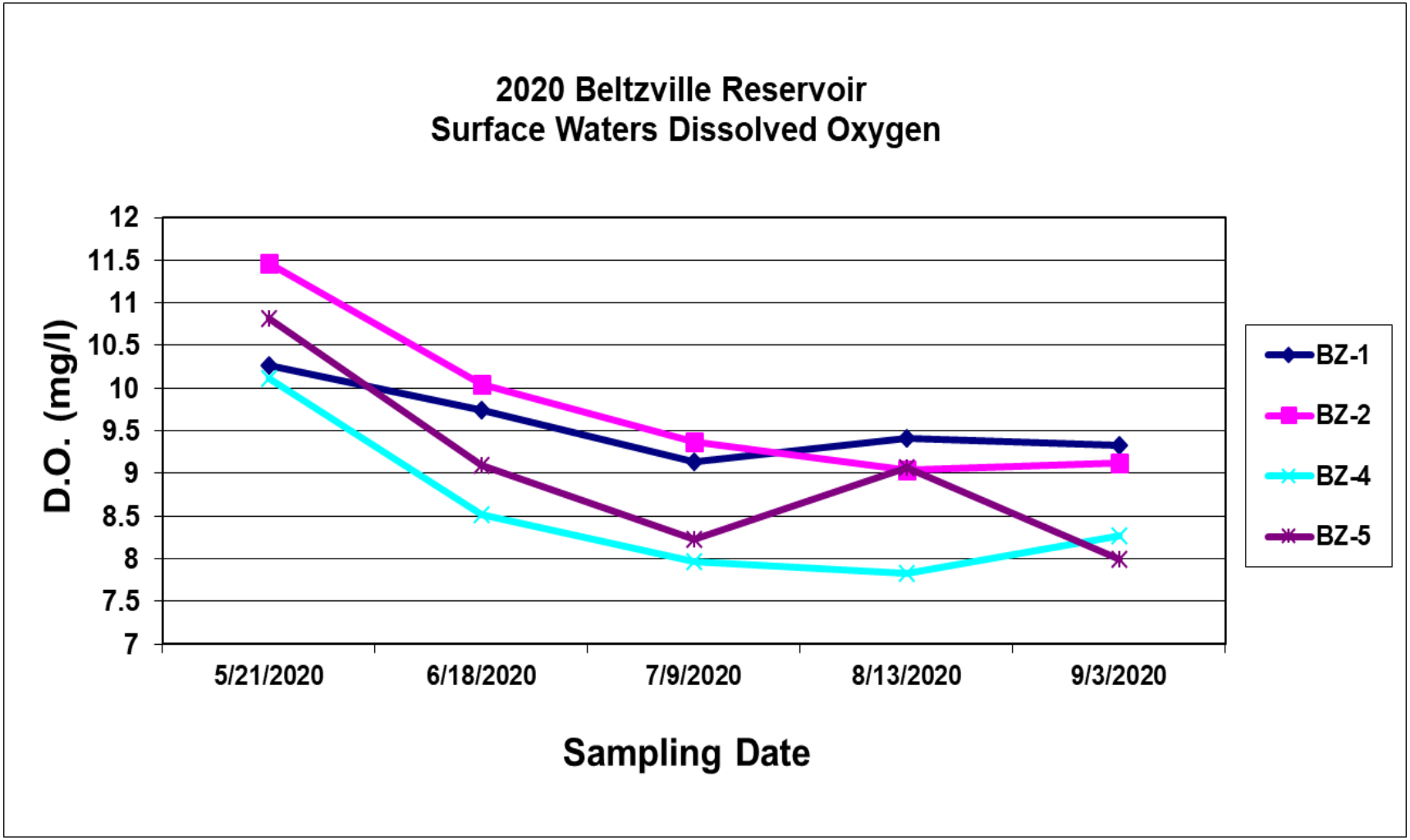

Figure 3-3. Dissolved oxygen concentrations measured in tributary and downstream surface waters at Beltzville Reservoir in 2020. (The PADEP water quality standard for dissolved oxygen is a minimum concentration of 5 mg/L.) See Appendix A for summary of plotted values. Station BZ-1S reflects reservoir release surface waters downstream of Beltzville Reservoir.

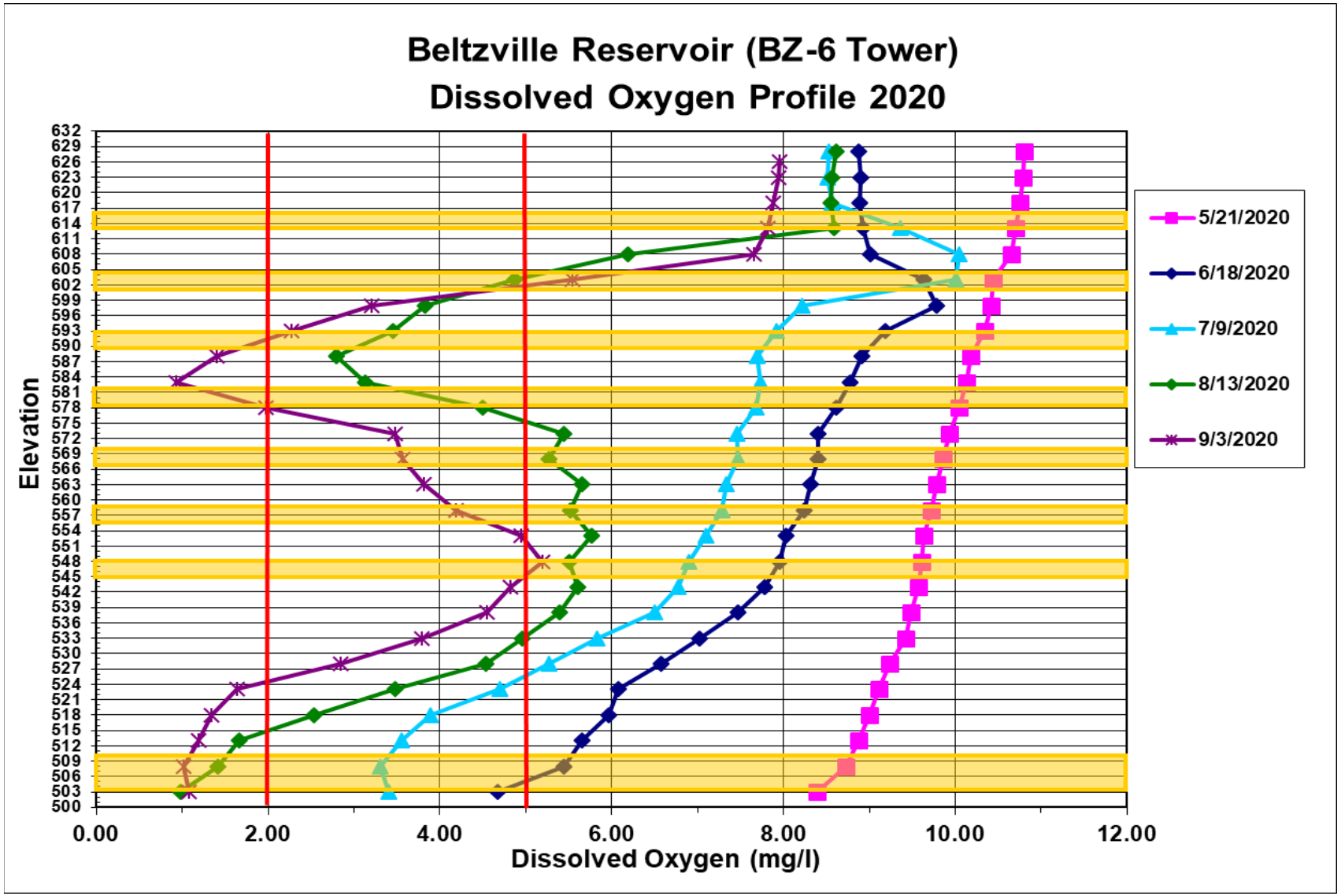

Figure 3-4. Dissolved oxygen profile at station BZ-6 of Beltzville Reservoir in 2020. The PADEP water quality standard for DO is a minimum concentration of 5 mg/L in epilimnion. Start of hypoxia is shown as 2 mg/L. See Appendix A for summary of plotted values.

3.1.3 pH

PH is the measure of the hydrogen –ion concentration in the water. The pH scale is 0-14. A pH below 7 is considered acidic and a pH above 7 is basic. High pH values tend to facilitate solubilization of ammonia, salts, and heavy metals. Low pH levels tend to increase carbonic acid and carbon dioxide concentrations. Lethal effects of pH on aquatic life typically occur below pH 4.5 and above pH 9.5.

Measures of pH at upstream tributary (BZ-2S, BZ-4S and BZ-5S) and release (BZ-1S) surface water stations throughout the sampling season stayed within an acceptable range of values (6.28-7.96) and followed a similar seasonal pattern across all surface water stations at Beltzville Reservoir during 2020 (Fig. 3-5).

In all months sampled in 2020, pH values in the lake water column were slightly higher near the water surface, declined rapidly, and remained relatively constant throughout most of the remaining water column (Fig. 3-6). The higher pH readings near the surface can be attributed to algal productivity in the trophic zone of the lake. In August a spike in pH readings was witnessed near the surface waters of the lake. This spike may be attributed to an algal bloom occurring at that time and depth. A slight variation in pH in bottom waters occurred in the portions of the water column experiencing anoxic or low oxygen conditions. This localized change in pH may be attributed to anaerobic oxidation processes in the bottom waters of the lake. During the 2020 sampling season the pH measures in the bottom waters of the lake stations at Beltzville Reservoir were not in compliance with PADEP pH criteria. The standard for pH is a range of acceptable measures between 6 and 9. Lake bottom waters violated this standard in September in the lower 30 feet of the water column.

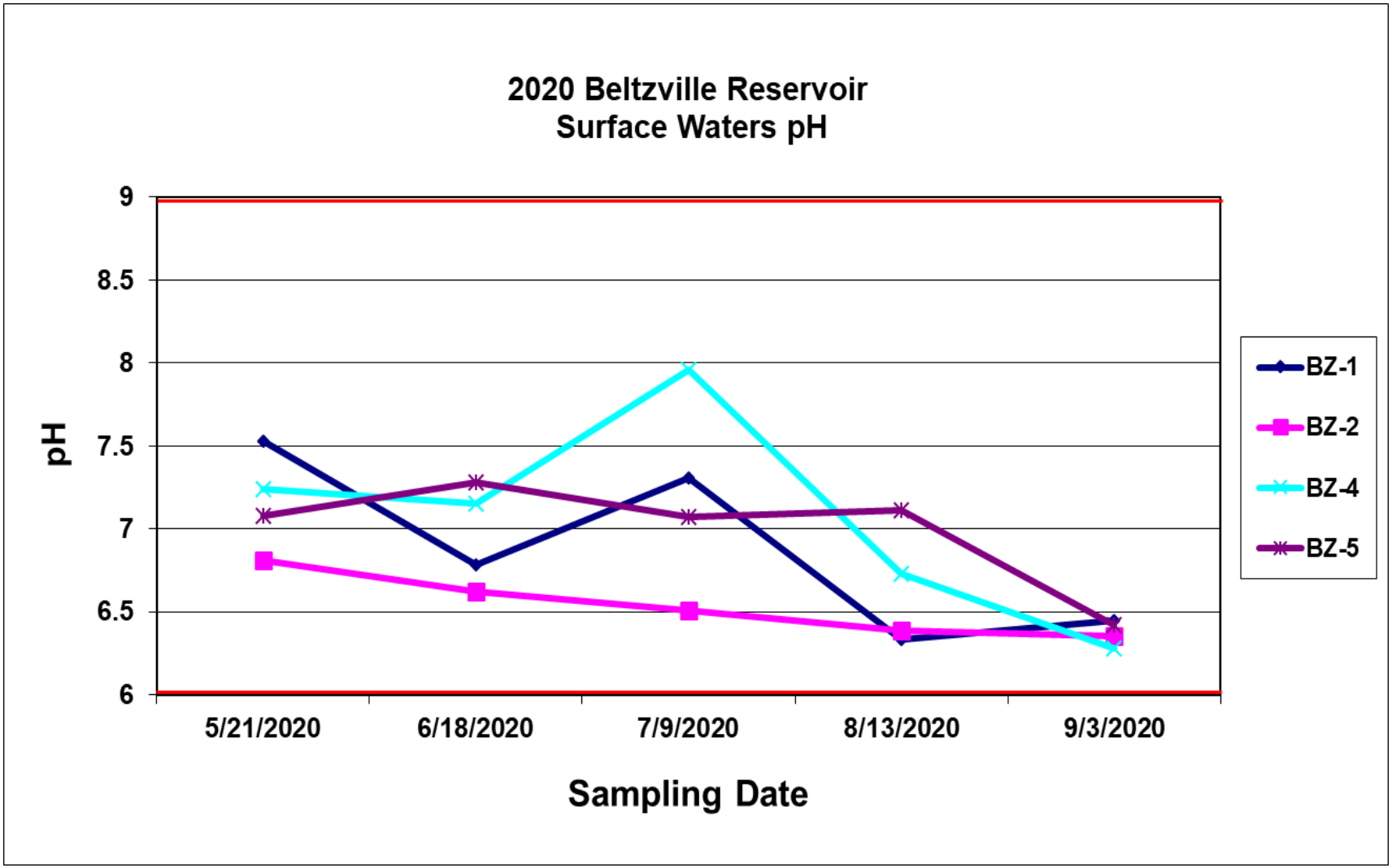

Figure 3-5. pH concentrations measured in tributary and downstream surface waters at Beltzville Reservoir in 2020. (The PADEP water quality standard for pH is between 6 and 9). See Appendix A for summary of plotted values.

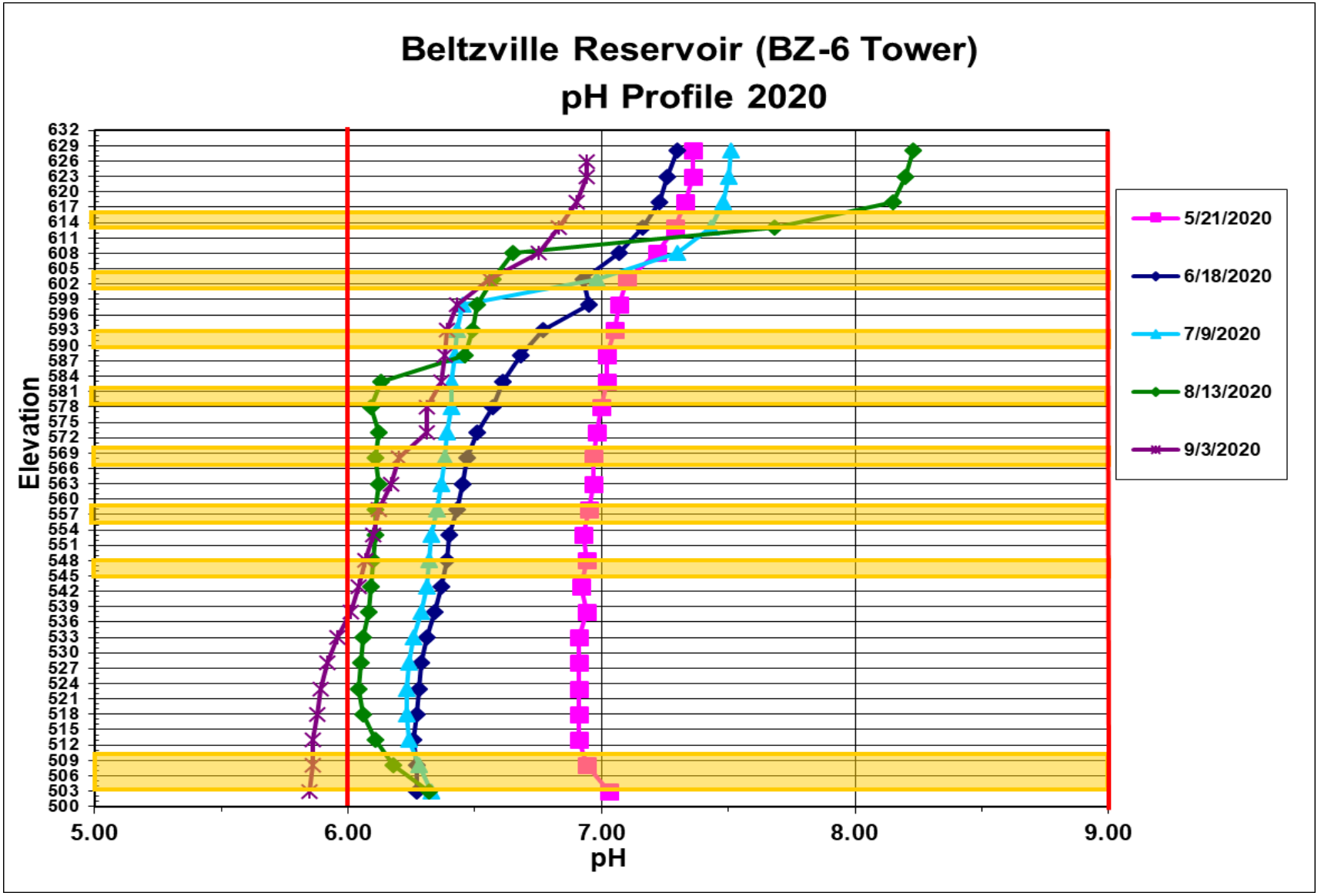

Figure 3-6. pH profile at station BZ-6 of Beltzville Reservoir in 2020. (The PADEP water quality standard for pH is between 6 and 9) See Appendix A for summary of plotted value

3.2 WATER COLUMN CHEMISTRY MONITORING

The following sections describe temporal, spatial, and patterns relating to depth for the water quality parameters measured in surface, middle, and bottom waters of Beltzville Reservoir during 2020 (Table 3-2).

3.2.1 Ammonia

Total Ammonia (NH3) is a measure of the most reduced inorganic form of nitrogen in water and includes dissolved ammonia and the ammonium ion. Ammonia is a small component of the nitrogen cycle but as an essential plant nutrient, it contributes to the trophic status of a water body. Elevated ammonia in the lower water column of deep, stratified lakes and reservoirs usually results in those that are affected by eutrophication and can result in excessive algal growths and impacts on recreation and drinking water supplies. In high concentrations, ammonia is toxic to aquatic life.

EPA guidance for ambient water quality criteria for Ammonia in freshwater are dependent on temperature and pH (EPA, 2013). This water quality criteria is adopted by the State of Pennsylvania. Table 3.1 shows the acute and chronic criteria that are expected to protect freshwater aquatic life. The EPA (2013) also provides tables with the temperature and pH-dependent values of the acute criterion magnitude and the temperature and pH-dependent values of the chronic criterion magnitude. These tables provide an expected ammonia criterion over a wide range of pH and temperature values and can be utilized to evaluate field collected samples.

Ammonia concentrations were low in Beltzville Reservoir during 2020. Ammonia concentrations among all stations and depths ranged from <0.01 mg/L to 0.17 mg/L. Ammonia measured at Beltzville Reservoir followed the EPA freshwater criteria during 2020.

Table 3.1 Environmental Protection Agency Ammonia Freshwater Criteria (2013)

2013 Final Aquatic Life Criteria for Ammonia (Magnitude, Frequency, and Duration) (mg TAN/L) pH 7.0, T=20°C	
Acute (1-hour average)	17
Chronic (30-day rolling average)	1.9*

*Not to exceed 2.5 times the CCC as a 4-day average within the 30-days, i.e. 4.8 mg TAN/L at pH 7 and 20°C, more than once in three years on average.
Criteria frequency: Not to be exceeded more than once in three years on average.

Table 3.2. Summary of surface, middle, and bottom water quality monitoring data for Beltzville Reservoir in 2020

Station	Date	ALK	BOD5	DISS-P	NH3	NO2	NO3	NO3-NO2	TDS	TKN	TOC	TP	TSS
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
BZ-1S	5/21/2020	12	<2.0	<0.05	<0.01	<0.01	0.92	0.93	99	<0.37	1.7	<0.01	3
	6/18/2020	12	<2.0	<0.05	<0.01	<0.01	0.89	0.9	52	<0.37	2	<0.01	<1
	7/9/2020	12	<2.0	<0.05	<0.01	<0.01	0.85	0.86	77	<0.47	1.8	0.04	2
	8/13/2020	13	2.7	<0.05	0.05	<0.01	0.91	0.92	57	<0.47	2	0.1	2
	9/2/2020	14	<2.0	<0.05	<0.01	<0.01	0.92	0.93	71	<0.47	2	<0.01	1
	Mean	13	2.1	0.05	0.018	0.009	0.90	0.91	71	0.43	1.9	0.03	2
	Stdev	1	0.3	0.00	0.018	0.001	0.03	0.03	19	0.05	0.1	0.04	1
	Max	14	2.7	0.05	0.05	0.01	0.92	0.93	99	0.47	2	0.1	3
	Min	12	2	0.05	0.01	0.007	0.85	0.86	52	0.37	1.7	0.01	1
	No. of Det.	5	1	0	1	0	5	5	5	0	5	2	4
BZ-2S	5/21/2020	8	<2.0	<0.05	<0.01	<0.01	0.4	0.41	68	<0.37	0.6	<0.01	1
	6/18/2020	8	<2.0	0.06	<0.01	<0.01	0.42	0.43	34	<0.37	0.7	<0.01	3
	7/9/2020	10	<2.0	0.06	<0.01	<0.01	0.47	0.48	55	<0.47	1.1	<0.01	3
	8/13/2020	10	<2.0	0.06	<0.01	<0.01	0.6	0.61	70	<0.47	1	0.07	6
	9/2/2020	14	<2.0	0.05	<0.01	<0.01	0.57	0.58	56	<0.47	3.5	0.02	2
	Mean	10	2	0.06	0.01	0.009	0.49	0.50	57	0.43	1.4	0.02	3
	Stdev	2	0	0.01	0	0.001	0.09	0.09	14	0.055	1.2	0.03	2
	Max	14	2	0.06	0.01	0.01	0.6	0.61	70	0.47	3.5	0.07	6
	Min	8	2	0.05	0.01	0.007	0.4	0.407	34	0.37	0.6	0.01	1
	No. of Det.	5	0	4	0	0	5	5	5	0	5	2	5

Table 3.2 Continued. Summary of surface, middle, and bottom water quality monitoring data for Beltzville Reservoir in 2020

Station	Date	ALK mg/L	BOD5 mg/L	DISS-P mg/L	NH3 mg/L	NO2 mg/L	NO3 mg/L	NO3-NO2 mg/L	TDS mg/L	TKN mg/L	TOC mg/L	TP mg/L	TSS mg/L
BZ-3S	5/21/2020	12	<2.0	<0.05	<0.01	<0.01	0.91	0.92	74	<0.37	2	<0.01	2
	6/18/2020	11	<2.0	<0.05	<0.01	<0.01	0.76	0.77	53	<0.37	1.7	<0.01	3
	7/9/2020	11	<2.0	<0.05	<0.01	<0.01	0.68	0.69	44	<0.47	1.8	<0.01	4
	8/13/2020	11	<2.0	0.05	<0.01	<0.01	0.52	0.53	66	<0.47	1.9	0.07	1
	9/2/2020	11	<2.0	<0.05	<0.01	<0.01	0.54	0.55	57	<0.47	1.7	<0.01	1
	Mean	11	2	0.05	0.01	0.009	0.68	0.69	59	0.43	1.8	0.02	2
	Stdev	0	0	0.00	0	0.001	0.16	0.16	12	0.05	0.1	0.03	1
	Max	12	2	0.05	0.01	0.01	0.91	0.92	74	0.47	2	0.07	4
	Min	11	2	0.05	0.01	0.007	0.52	0.53	44	0.37	1.7	0.01	1
	No. of Det.	5	0	1	0	0	5	5	5	0	5	1	5
BZ-3M	5/21/2020	12	<2.0	<0.05	<0.01	<0.01	0.96	0.97	67	<0.37	1.3	<0.01	3
	6/18/2020	12	<2.0	<0.05	0.02	<0.01	0.92	0.93	44	<0.37	1.2	<0.01	<1
	7/9/2020	12	<2.0	<0.05	<0.01	0.03	0.93	0.96	73	<0.47	1.3	<0.01	1
	8/13/2020	12	2.5	0.05	<0.01	<0.01	0.95	0.96	75	<0.47	1.2	0.04	1
	9/2/2020	13	<2.0	<0.05	<0.01	<0.01	0.91	0.92	55	0.54	1.3	<0.01	2
	Mean	12	2.1	0.05	0.012	0.013	0.93	0.95	63	0.444	1.3	0.02	2
	Stdev	0	0.2	0.00	0.004	0.009	0.02	0.02	13	0.073	0.1	0.01	1
	Max	13	2.5	0.05	0.02	0.03	0.96	0.967	75	0.54	1.3	0.04	3
	Min	12	2	0.05	0.01	0.007	0.91	0.92	44	0.37	1.2	0.01	1
	No. of Det.	5	1	1	1	1	5	5	5	1	5	1	4

Table 3.2 Continued. Summary of surface, middle, and bottom water quality monitoring data for Beltzville Reservoir in 2020

Station	Date	ALK mg/L	BOD5 mg/L	DISS-P mg/L	NH3 mg/L	NO2 mg/L	NO3 mg/L	NO3-NO2 mg/L	TDS mg/L	TKN mg/L	TOC mg/L	TP mg/L	TSS mg/L
BZ-3D	5/21/2020	12	<2.0	0.06	<0.01	<0.01	0.97	0.98	85	<0.37	1.2	0.01	1
	6/18/2020	13	<2.0	0.05	0.17	0.02	0.88	0.90	47	<0.37	1.3	<0.01	3
	7/9/2020	13	<2.0	<0.05	<0.01	<0.01	0.92	0.93	71	<0.47	1.3	<0.01	4
	8/13/2020	14	<2.0	0.07	<0.01	<0.01	0.81	0.82	82	<0.47	1.4	0.05	8
	9/2/2020	13	<2.0	<0.05	0.01	<0.01	0.86	0.87	56	0.58	1.2	<0.01	6
	Mean	13	2	0.06	0.042	0.011	0.89	0.90	68	0.45	1.3	0.02	4
	Stdev	1	0	0.01	0.072	0.005	0.06	0.06	16	0.09	0.1	0.02	3
	Max	14	2	0.07	0.17	0.02	0.97	0.98	85	0.58	1.4	0.05	8
	Min	12	2	0.05	0.01	0.007	0.81	0.82	47	0.37	1.2	0.01	1
	No. of Det.	5	0	3	2	1	5	5	5	1	5	2	5
BZ-4S	5/21/2020	6	<2.0	<0.05	<0.01	<0.01	0.26	0.27	54	<0.37	1.4	<0.01	1
	6/18/2020	7	<2.0	<0.05	<0.01	<0.01	0.23	0.24	36	<0.37	1.5	<0.01	1
	7/9/2020	7	<2.0	<0.05	<0.01	<0.01	0.24	0.25	24	<0.47	1.5	0.02	2
	8/13/2020	7	<2.0	0.06	<0.01	<0.01	0.29	0.3	43	<0.47	1.4	0.06	1
	9/2/2020	7	<2.0	<0.05	<0.01	<0.01	0.26	0.27	22	<0.47	1.4	<0.01	2
	Mean	7	2	0.05	0.01	0.009	0.26	0.27	36	0.43	1.4	0.02	1
	Stdev	0	0	0.00	0	0.001	0.02	0.02	13	0.05	0.1	0.02	1
	Max	7	2	0.06	0.01	0.01	0.29	0.3	54	0.47	1.5	0.06	2
	Min	6	2	0.05	0.01	0.007	0.23	0.24	22	0.37	1.4	0.01	1
	No. of Det.	5	0	1	0	0	5	5	5	0	5	2	5

Table 3.2 Continued. Summary of surface, middle, and bottom water quality monitoring data for Beltzville Reservoir in 2020

Station	Date	ALK mg/L	BOD5 mg/L	DISS-P mg/L	NH3 mg/L	NO2 mg/L	NO3 mg/L	NO3-NO2 mg/L	TDS mg/L	TKN mg/L	TOC mg/L	TP mg/L	TSS mg/L
BZ-5S	5/21/2020	14	<2.0	<0.05	<0.01	<0.01	1.23	1.24	107	0.41	1.2	0.03	37
	6/18/2020	14	<2.0	0.05	0.04	<0.01	1.29	1.3	66	<0.37	1.4	0.03	6
	7/9/2020	16	<2.0	0.08	<0.01	<0.01	1.08	1.09	82	<0.47	2.9	0.05	8
	8/13/2020	18	2.7	0.07	<0.01	<0.01	1.49	1.5	105	0.62	1.4	0.01	3
	9/2/2020	15	2.2	0.07	<0.01	<0.01	0.72	0.73	57	1.45	8	0.09	22
	Mean	15	2	0.06	0.016	0.009	1.16	1.17	83	0.66	3.0	0.04	15
	Stdev	2	0	0.01	0.013	0.001	0.29	0.29	23	0.45	2.9	0.03	14
	Max	18	2.7	0.08	0.04	0.01	1.49	1.5	107	1.45	8	0.09	37
	Min	14	2	0.05	0.01	0.007	0.72	0.73	57	0.37	1.2	0.01	3
	No. of Det.	5	2	4	1	0	5	5	5	3	5	5	5
BZ-6S	5/21/2020	12	<2.0	<0.05	<0.01	<0.01	0.92	0.93	59	0.37	3.4	0.02	2
	6/18/2020	11	<2.0	<0.05	<0.01	<0.01	0.76	0.77	55	<0.37	2.4	0.02	2
	7/9/2020	10	<2.0	0.05	<0.01	<0.01	0.67	0.68	53	<0.47	2.1	<0.01	6
	8/13/2020	11	4.3	0.06	<0.01	<0.01	0.53	0.54	74	<0.47	1.8	0.07	1
	9/2/2020	11	<2.0	<0.05	<0.01	<0.01	0.54	0.55	45	0.51	1.8	<0.01	1
	Mean	11	2.5	0.05	0.01	0.009	0.68	0.69	57	0.44	2.3	0.03	2
	Stdev	1	1.0	0.00	0	0.001	0.16	0.16	11	0.06	0.7	0.03	2
	Max	12	4.3	0.06	0.01	0.01	0.92	0.93	74	0.51	3.4	0.07	6
	Min	10	2	0.05	0.01	0.007	0.53	0.54	45	0.37	1.8	0.01	1
	No. of Det.	5	1	2	0	0	5	5	5	2	5	3	5

Table 3.2 Continued. Summary of surface, middle, and bottom water quality monitoring data for Beltzville Reservoir in 2020

Station	Date	ALK mg/L	BOD5 mg/L	DISS-P mg/L	NH3 mg/L	NO2 mg/L	NO3 mg/L	NO3-NO2 mg/L	TDS mg/L	TKN mg/L	TOC mg/L	TP mg/L	TSS mg/L
BZ-6M	5/21/2020	12	<2.0	<0.05	<0.01	<0.01	0.99	0.997	70	<0.37	1.3	0.07	3
	6/18/2020	12	<2.0	<0.05	0.04	<0.01	0.93	0.94	58	<0.37	1.7	<0.01	<1
	7/9/2020	12	<2.0	<0.05	<0.01	0.02	0.91	0.93	32	<0.47	1.3	<0.01	1
	8/13/2020	13	2.5	0.06	<0.01	<0.01	0.95	0.96	73	<0.47	1.2	0.09	1
	9/2/2020	7	<2.0	0.06	<0.01	<0.01	0.92	0.93	57	0.71	1.2	0.08	1
	Mean	11	2.1	0.05	0.016	0.011	0.94	0.95	58	0.478	1.3	0.05	1
	Stdev	2	0.2	0.01	0.013	0.005	0.03	0.03	16	0.139	0.2	0.04	1
	Max	13	2.5	0.06	0.04	0.02	0.99	0.997	73	0.71	1.7	0.09	3
	Min	7	2	0.05	0.01	0.007	0.91	0.93	32	0.37	1.2	0.01	1
	No. of Det.	5	1	2	1	1	5	5	5	1	5	3	4
BZ-6D	5/21/2020	12	<2.0	<0.05	<0.01	<0.01	0.96	0.97	70	<0.37	1.3	0.02	1
	6/18/2020	15	<2.0	<0.05	0.09	0.02	0.82	0.84	46	<0.37	2.8	0.13	14
	7/9/2020	14	<2.0	<0.05	<0.01	<0.01	0.88	0.89	50	<0.47	1.5	0.02	4
	8/13/2020	13	2.8	<0.05	<0.01	<0.01	0.92	0.93	84	<0.47	1.3	0.02	5
	9/2/2020	15	<2.0	<0.05	0.02	<0.01	0.69	0.7	73	0.74	1.6	<0.01	2
	Mean	14	2.2	0.05	0.028	0.011	0.85	0.87	65	0.48	1.7	0.04	5
	Stdev	1	0.4	0.00	0.035	0.005	0.11	0.10	16	0.15	0.6	0.05	5
	Max	15	2.8	0.05	0.09	0.02	0.96	0.97	84	0.74	2.8	0.13	14
	Min	12	2	0.05	0.01	0.007	0.69	0.7	46	0.37	1.3	0.01	1
	No. of Det.	5	1	0	2	1	5	5	5	1	5	4	5

Table 3.2 Continued. Summary of surface, middle, and bottom water quality monitoring data for Beltzville Reservoir in 2020

Station	Date	ALK mg/L	BOD5 mg/L	DISS-P mg/L	NH3 mg/L	NO2 mg/L	NO3 mg/L	NO3-NO2 mg/L	TDS mg/L	TKN mg/L	TOC mg/L	TP mg/L	TSS mg/L
BZ-7S	5/21/2020	12	<2.0	<0.05	<0.01	<0.01	0.93	0.94	67	<0.37	1.8	0.07	1
	6/18/2020	11	<2.0	<0.05	<0.01	<0.01	0.71	0.72	28	<0.37	1.9	<0.01	1
	7/9/2020	10	<2.0	<0.05	<0.01	<0.01	0.61	0.62	28	<0.47	1.6	0.04	3
	8/13/2020	10	4.9	0.06	<0.01	<0.01	0.51	0.52	67	<0.47	2.2	<0.01	1
	9/2/2020	11	<2.0	<0.05	<0.01	<0.01	0.51	0.52	50	<0.47	1.7	<0.01	1
	Mean	11	2.6	0.05	0.01	0.009	0.65	0.66	48	0.43	1.8	0.03	1
	Stdev	1	1.3	0.00	0	0.001	0.18	0.17	20	0.05	0.2	0.03	1
	Max	12	4.9	0.06	0.01	0.01	0.93	0.937	67	0.47	2.2	0.07	3
	Min	10	2	0.05	0.01	0.007	0.51	0.52	28	0.37	1.6	0.01	1
	No. of Det.	5	1	1	0	0	5	5	5	0	5	2	5
BZ-7M	5/21/2020	12	<2.0	<0.05	<0.01	<0.01	0.95	0.96	73	<0.37	1.3	0.05	<1
	6/18/2020	13	<2.0	<0.05	0.05	<0.01	0.89	0.9	46	<0.37	1.3	<0.01	<1
	7/9/2020	13	<2.0	<0.05	<0.01	<0.01	0.94	0.95	45	<0.47	1.3	<0.01	2
	8/13/2020	14	2.4	0.06	0.04	<0.01	1.01	1.02	84	<0.47	2.4	0.08	2
	9/2/2020	11	<2.0	<0.05	<0.01	<0.01	0.59	0.6	60	0.5	1.7	<0.01	3
	Mean	13	2.1	0.05	0.024	0.009	0.88	0.89	62	0.44	1.6	0.03	2
	Stdev	1	0.2	0.00	0.019	0.001	0.17	0.17	17	0.06	0.5	0.03	1
	Max	14	2.4	0.06	0.05	0.01	1.01	1.02	84	0.5	2.4	0.08	3
	Min	11	2	0.05	0.01	0.007	0.59	0.6	45	0.37	1.3	0.01	1
	No. of Det.	5	1	1	2	0	5	5	5	1	5	2	3

Table 3.2 Continued. Summary of surface, middle, and bottom water quality monitoring data for Beltzville Reservoir in 2020

Station	Date	ALK mg/L	BOD5 mg/L	DISS-P mg/L	NH3 mg/L	NO2 mg/L	NO3 mg/L	NO3-NO2 mg/L	TDS mg/L	TKN mg/L	TOC mg/L	TP mg/L	TSS mg/L
BZ-7D	5/21/2020	12	<2.0	<0.05	<0.01	<0.01	0.96	0.97	69	<0.37	1.4	0.02	3
	6/18/2020	13	<2.0	<0.05	0.04	<0.01	0.88	0.89	65	<0.37	1.5	0.03	10
	7/9/2020	13	<2.0	<0.05	<0.01	<0.01	0.91	0.92	57	<0.47	1.6	<0.01	3
	8/13/2020	15	3.2	0.06	0.02	<0.01	0.83	0.84	52	<0.47	1.4	0.02	20
	9/2/2020	15	<2.0	<0.05	<0.01	<0.01	0.92	0.93	81	0.66	1.6	<0.01	4
	Mean	14	2.2	0.05	0.018	0.009	0.90	0.91	65	0.47	1.5	0.02	8
	Stdev	1	0.5	0.00	0.013	0.001	0.05	0.05	11	0.12	0.1	0.01	7
	Max	15	3.2	0.06	0.04	0.01	0.96	0.967	81	0.66	1.6	0.03	20
	Min	12	2	0.05	0.01	0.007	0.83	0.84	52	0.37	1.4	0.01	3
	No. of Det.	5	1	1	2	0	5	5	5	1	5	3	5

< Laboratory analysis result was less than the limit of quantification or limit of detection.
NS- Not Sampled

3.2.2 Nitrite and Nitrate

Nitrite (NO2) is a measure of a form of nitrogen that occurs as an intermediate in the nitrogen cycle. It is unstable and can rapidly be oxidized to nitrate or reduced to nitrogen gas. Nitrite is a source of nutrients for plants and can be toxic to aquatic life in relatively low concentrations. Except for four samples, concentrations measured at all other stations and depths were less than the laboratory reporting limit of 0.01 mg/L during the entire 2020 sampling season. The maximum recorded single sample of 0.03 mg/L was collected from station BZ-3M on 09 July.

Nitrate (NO3) is the measure of the most oxidized and stable form of nitrogen. It is the principal form of combined nitrogen in natural waters. Nitrate is the primary form of nitrogen used by plants as a nutrient to stimulate plant growth. Nitrate was distributed uniformly in the water column of Beltzville Reservoir during 2020 with sample results ranging from 0.23 mg/L to 1.49 mg/L (Table 3-2). The highest recorded single nitrate measure of 1.49 mg/L was measured on 13 August at station BZ-5S. Station BZ-5S maintained the highest seasonal mean concentration (1.16 mg/L) of all stations. Elevated readings at this tributary station can be attributed to watershed inputs.

Beltzville Reservoir followed the PADEP water quality standard for nitrite and nitrate during 2020. The standard is a summed concentration of nitrite and nitrate of less than 10 mg/L. Throughout the monitoring period, a maximum summed concentration across all stations and depths of 1.50 mg/L was measured at station BZ-5S on 13 August.

3.2.3 Total Kjeldahl Nitrogen

Total Kjeldahl nitrogen (TKN) is a measure of organic nitrogen that includes ammonia. Organic nitrogen is not immediately available for biological activity and is therefore not available for plant growth until decomposition to inorganic form occurs. Total kjeldahl nitrogen (TKN) was low in the water column of Beltzville Reservoir during 2020 with single sample concentrations ranging from less than the 0.37 mg/L laboratory reporting limit to 1.45 mg/L (Table 3-2). The highest concentration of 1.45 mg/L was recorded at station BZ-5S on 2 September.

3.2.4 Total Phosphorus

Total phosphorus (TP) is a measure of both organic and inorganic forms of phosphorus. It is an essential plant nutrient and is often the most limiting nutrient to plant growth in freshwater systems. Inputs of phosphorus are the prime contributing factors to eutrophication in most freshwater systems. Phosphorus bound to bottom sediments in lakes can be released when oxygen levels are depleted in bottom waters. This phosphorus then becomes available for plant growth.

EPA guidance for nutrient criteria in lakes and reservoirs suggests a maximum concentration for total phosphorus of 0.01-mg/L (EPA 2000). Lakes and reservoirs exceeding this concentration are more likely to experience algal bloom problems during the growing season. In 2020, 45 of the 65 samples measured for total phosphorus were less than or slightly exceeding (0.02 mg/L) the EPA suggested maximum concentration and laboratory reporting limit of 0.01 mg/L (Table 3-2). The remaining 20 elevated concentration samples ranged from 0.03 mg/L to 0.13 mg/L with higher concentrations seen during the August sampling across all stations. Higher concentrations were predominantly collected at deep water bottom stations and BZ-5S. Elevated TP readings in deep reservoir waters are typically associated with phosphorus release from bottom sediments during low oxygen conditions. Beltzville Reservoir experienced these conditions in 2020. Upstream tributary station BZ-5S (Pohopoco Creek) exceeded the EPA 0.01 mg/L suggested concentration through much of the sampling season. Land use or other watershed factors contribute to nutrient loading in this tributary.

3.2.5 Dissolved Phosphorus

During the 2020 sampling season, fifteen samples measured at all stations and depths were greater than the laboratory reporting limit of 0.05 mg/L (Table 3-2). Results greater than the laboratory reporting limit were most often seem in the month of August. Upstream tributary station BZ-5S (Pohopoco Creek) exceeded the laboratory reporting limit on 3 of 5 sampling events and averaged 0.06 mg/L for all samples collected. Land use or other watershed factors contribute to nutrient loading in this tributary.

3.2.6 Total Dissolved Solids

Total dissolved solids (TDS) is a measure of the amount of non-filterable dissolved material in the water. Dissolved salts such as sulfate, magnesium, chloride, and sodium contribute to elevated levels. Concentrations of TDS in the water column of Beltzville Reservoir were consistently low during 2020 (Table 3-2). Concentrations among all stations and depths ranged from 22 to 107 mg/L. Total dissolved solids measured at Beltzville Reservoir in 2020 followed PADEP water quality standards. The state water quality standard for TDS is a maximum concentration of 500 mg/L.

3.2.7 Total Suspended Solids

Total suspended solids (TSS) are a measure of the amount of filterable particulate matter that is suspended within the water column. High concentrations increase the turbidity of the water and can hinder photosynthetic activity, result in damage to fish gills, and cause impairment to spawning habitat (smothering). Total suspended solids concentrations in the waters of Beltzville Reservoir were low during 2020 (Table 3-2). Concentrations measured at all stations and depths ranged from less than the laboratory reporting limit of 1.0 mg/L to a maximum of 37.0 mg/L collected at Station BZ-5S in May. High measures of TSS can be the result of sample collection error associated with

capturing disturbed fine sediments in the lake bottom or stream sample during field sampling. This sampling error may apply to elevated or unexplained high TSS water samples collected at those locations.

3.2.8 Biochemical Oxygen Demand

Five-day biochemical oxygen demand (BOD5) is a measure of the oxygen-depleting burden imposed by organic material present in water. It measures the rate of oxygen uptake by organisms in the water sample over a set laboratory method time. It is an indicator of the quality of a water body and the degree of pollution by biodegradable organic matter can therefore be inferred. The five-day biochemical oxygen demand and commonly accepted water quality inferences are as follows:

- 1-2 mg/L is associated with very clean water and little biodegradable wastes;
- 3-5 mg/L is associated with moderately clean water with some biodegradable wastes;
- 6-9 mg/L is associated with fairly polluted water, many bacteria, and much biodegradable wastes; and
- 10+ mg/L is associated with very polluted water and large amounts of biodegradable wastes.

Biochemical oxygen demand concentrations in the waters of Beltzville Reservoir were consistently low in all months and stations sampled (Table 3-2). Ten samples throughout the sampling season were greater than the laboratory reporting limits of 2.0 mg/L with the greatest concentration of 4.9 mg/L measured in the surface waters at station BZ-7S. Based on the seasonal sampling results, it is inferred that in 2020, Beltzville Reservoir and its associated tributaries had predominantly very clean water with little biodegradable organic wastes.

3.2.9 Alkalinity

Alkalinity (ALK) is a measure of the acid-neutralizing capacity of water. Waters that have high alkalinity values are considered undesirable because of excessive hardness and high concentrations of sodium salts. Water with low alkalinity has little capacity to buffer acidic inputs and is susceptible to acidification (low pH). The PADEP standard is a minimum concentration of 20-mg/L $CaCO_3$ except where natural conditions are less.

For all sampling stations and depths, alkalinity measures during 2020 ranged from 18.0 mg/L to 6.0 mg/L (Table 3-2). All reservoir and tributary samples measured were below the state minimum criteria (20 mg/L) during the sampling season. The natural alkalinity of water is largely dependent on the underlying geology and soils within the surrounding watershed. The typically low alkalinity measured at Beltzville Reservoir results from the regional geology, which is primarily sandstone and shale. Based on this,

the reservoir waters and surrounding tributaries follow the PADEP alkalinity criteria, due to the regional natural conditions.

3.2.10 Total Organic Carbon

Total organic carbon (TOC) is a measurement of the amount of dissolved and particulate carbon that is bound in organic compounds. TOC can be derived from decaying vegetation, bacterial growth, and metabolic activities of living organisms. The bulk of organic carbon in water is composed of humic substances and partly degraded animal and plant materials. Other sources of TOC can include agricultural chemicals such as herbicides and insecticides and wastewater treatment plant discharges. The amount of carbon in a freshwater stream is an indicator of the organic character of the stream or water body. High organic content can increase the growth of microorganisms which contribute to the depletion of oxygen. Total organic carbon concentrations in the water column and tributaries of Beltzville Reservoir were low during 2020 (Table 3-2). Concentrations of TOC at all stations and depths ranged from 0.6 mg/L to 8.0 mg/L.

3.2.11 Chlorophyll *a*

Chlorophyll a is the measure of the plant chlorophyll a primary pigment which helps plants get energy from light. It is found in most plants, algae, and cyanobacteria. Chlorophyll a concentration increases in relation to algal densities in a water body. Chlorophyll *a* in the surface waters (0-10 feet) of Beltzville Reservoir were low during 2020 (Appendix A). Concentrations measured in surface waters at all lake body stations ranged between 2.2 ug/L and 5.3 ug/L with an average seasonal concentration across all lake stations of 3.38 ug/L.

3.3 TROPHIC STATE DETERMINATION

Carlson's (1977) trophic state index (TSI) is a method of quantitatively expressing the magnitude of eutrophication for a lake. The trophic state analysis calculates separate indices for eutrophication based on measures of total phosphorus, chlorophyll *a*, and secchi disk. Index values for each parameter range on the same scale from 0 (least enriched) to 100 (most enriched). The resulting indices can also be compared to qualitative threshold values that correspond to levels of eutrophication. Classification of Beltzville Reservoir was based on a single sample each month during the 2020 sampling season collected at station BZ-6 (Figure 3-7).

TSIs calculated for measures of total phosphorus classified Beltzville Reservoir as eutrophic in August (65.41), mesotrophic in May (47.35) and June (47.35) and oligotrophic in July (37.35) and September (37.35). TSIs calculated for measures of secchi disk depth classified Beltzville Reservoir as mesotrophic in May (44.66), June (43.70) and August (41.54), and oligotrophic in July (39.15) and September (39.32). TSIs calculated for

measures of chlorophyll *a* classified Beltzville Reservoir as oligotrophic in June (39.19) and mesotrophic in May (44.91), July (40.70), August (44.68) and September (42.01).

Carlson (1977) warned against averaging TSI values estimated for different parameters, and instead suggested giving priority to chlorophyll *a* in the summer and to phosphorus in the spring, fall, and winter. Considering this and historic sampling results, the trophic state of the reservoir, based on TSI's, was mesotrophic throughout the 2020 sampling season.

The EPA (1983) also provides criteria for defining the trophic conditions of lakes of the north-temperate zone based on concentrations of total phosphorus, chlorophyll *a*, and secchi depth (Table 3-3). Considering the general agreement between the EPA classifications with that of the Carlson TSI's, the trophic condition of Beltzville Reservoir was oligotrophic/mesotrophic in 2020.

Table 3-3. EPA trophic classification criteria and average monthly measures for Beltzville Reservoir in 2020.

Water Quality Variable	Oligo-trophic	Meso-trophic	Eutrophic	21 May	18 June	09 July	13 August	03 September
Total phosphorus (ppb)	<10	10-20	>20	20	20	<10	70	<10
Chlorophyll a (ppb)	<4	4-10	>10	4.3	2.4	2.8	4.2	3.2
Secchi disk depth (meters)	>4	2-4	<2	2.90	3.10	4.25	3.60	4.20

3.4 RESERVOIR BACTERIA MONITORING

Total coliform bacteria include *escherica coliform* (*E. coli*) and related bacteria that are associated with fecal discharges. Fecal coliform bacteria are a subgroup of the total coliform and are normally associated with waste derived from human and other warm-blooded animals and indicate the presence of fecal contamination but not the associated risk. With respect to EPA and PADEP water quality standards, fecal coliform bacteria standards have been replaced with a recommended E. coli criterion. Bacteria contamination was monitored in the tributary and lake surface waters at Beltzville Reservoir once monthly (May-September) during 2020 (Table 3-4). Beltzville surface water samples were not analyzed for fecal coliform bacteria in 2020.

Escherichia coli is the most reliable indicator of fecal bacterial contamination of surface waters in the United States according to water quality standards set by the EPA (2000). The EPA recommendation for recreational water quality standards for E. coli is based on two criteria: a geometric mean of 126 organisms/100 ml (geometric mean of five samples collected over not more than a 30 consecutive day period) threshold and 235 organisms/100 ml (single water sample) threshold.

Total coliform values for all stations ranged from <1 colonies/100-ml to greater than the detection limit of >2420 colonies/100-ml. Bacteria in natural waters are common and their presence in the sample is not necessarily a human health concern. Given that Corps regular monitoring was completed utilizing single day grab samples, single sample results were compared to the EPA E. coli single sample criteria in 2020. The E. coli samples collected at Beltzville Reservoir did exceed the 235 organisms/100 ml single water sample threshold on three occasions in upstream tributary stations. Upstream tributary Station BZ-5S consistently maintained the highest bacteria readings and may be a result of upstream watershed activities or land use. Water contact recreation is permitted at Beltzville Reservoir. The recreational swimming beach is monitored for bacteria and managed independently by the Commonwealth of Pennsylvania. No long-term elevated bacteria counts were recorded in the main reservoir body where public water recreation is also permitted.

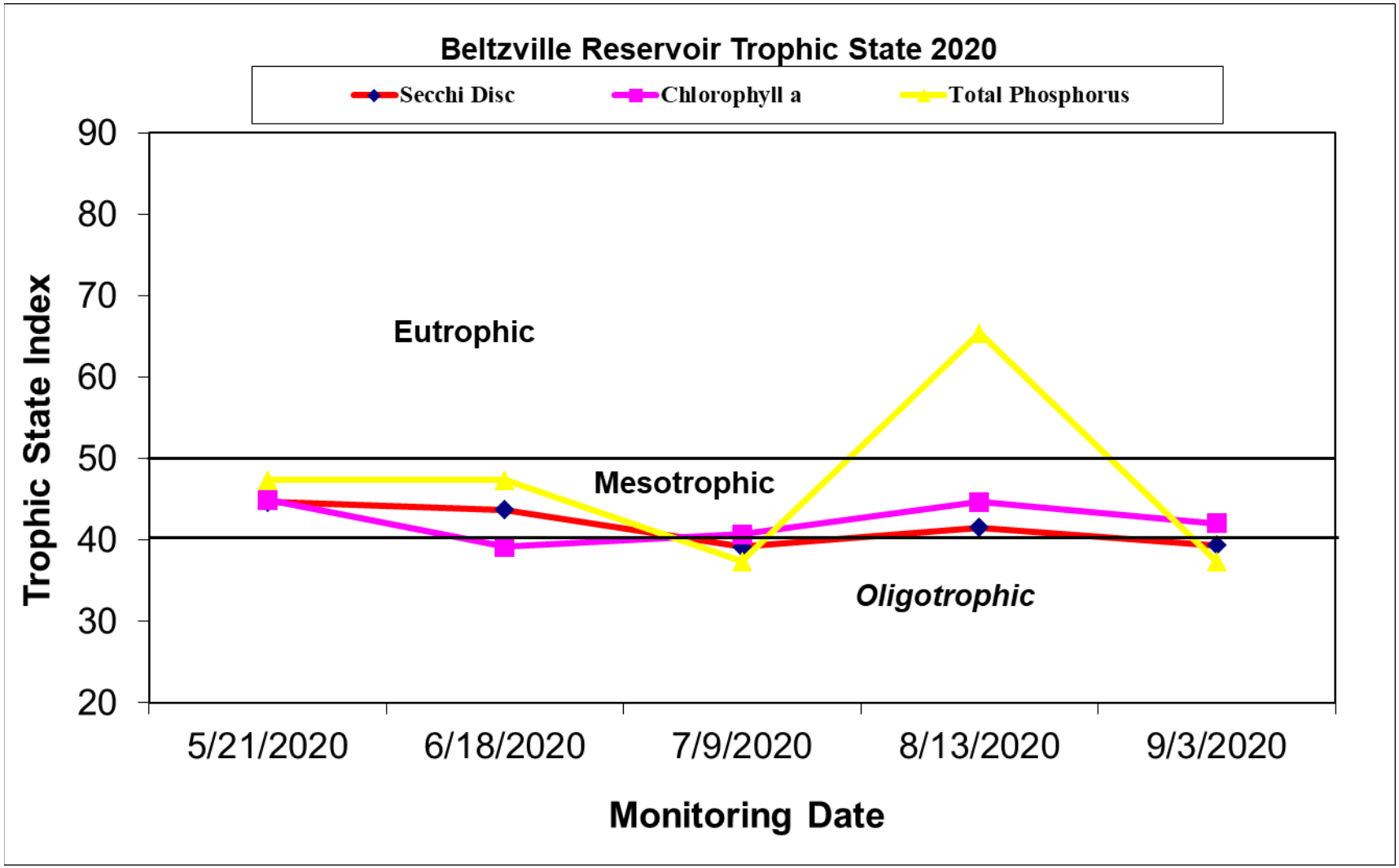

Figure 3-7. Trophic state indices calculated from secchi disk depth and concentrations of total phosphorus and chlorophyll *a* at reservoir Station BZ-6 for Beltzville Reservoir in 2020.

Table 3-4 Bacteria counts (colonies/100ml) at Beltzville Reservoir and tributaries during 2020.

STATION	DATE	Total Coliform (TC)		Fecal Coliform (FC)		Escherichia coli	
BZ-1S	5/21/2020		194		NS		1
	6/18/2020		488		NS		6
	7/9/2020		613		NS		16
	8/13/2020	>	2420		NS		21
	9/3/2020	>	2420		NS		66
BZ-2S	5/21/2020		435		NS		6
	6/18/2020		727		NS		65
	7/9/2020		1550		NS		71
	8/13/2020		1410		NS		35
	9/3/2020	>	2420		NS		980
BZ-3S	5/21/2020		9		NS	<	1
	6/18/2020		64		NS	<	1
	7/9/2020		119		NS		2
	8/13/2020		70		NS		2
	9/3/2020		121		NS	<	1
BZ-4S	5/21/2020		261		NS		3
	6/18/2020		1990		NS		26
	7/9/2020		2420		NS		28
	8/13/2020		1990		NS		16
	9/3/2020	>	2420		NS		62
BZ-5S	5/21/2020		816		NS		32
	6/18/2020	>	2420		NS		135
	7/9/2020	>	2420		NS		1730
	8/13/2020	>	2420		NS		166
	9/3/2020	>	2420		NS	>	2420
BZ-6S	5/21/2020		40		NS	<	1
	6/18/2020		228		NS		7
	7/9/2020		272		NS		1
	8/13/2020		32		NS		1
	9/3/2020		102		NS		1
BZ-7S	5/21/2020		22		NS	<	1
	6/18/2020		141		NS		1
	7/9/2020		326		NS		5
	8/13/2020		192		NS		1
	9/3/2020		326		NS		1

-Highlighted counts exceed single sample EPA contact recreation criteria (235 Escherichia Coliform colonies/100ml).
-NS = Not Sampled in 2020

4.0 REFERENCES

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APPENDIX A

STRATIFICATION DATA TABLES

2020 Beltzville Reservoir Water Column Profile

Station	Date	Time	Depth	Temp	DO	DO	pH	pHmV	ORP	Turbidity	Chloro.	SpCond
	M/D/Y	hh:mm:ss	ft	C	%	mg/L		mV	mV	NTU	ug/L	mS/cm
BZ-1S Outfall Pohopoco	5/21/2020	ERROR	0.5	13.62	98.7	10.26	7.53	-54.1	174.5	37.2	5.8	0.073
	6/18/2020	6:39:44	0.5	14.97	96.5	9.74	6.78	-11.4	207.7	47.9	4.6	0.075
	7/9/2020	6:25:30	0.5	16.49	93.5	9.14	7.31	-41.9	122.5	44.5	7	0.079
	8/13/2020	6:32:26	0.5	15.43	94.2	9.41	6.33	14.2	194.4	37.4	2.9	0.078
	9/3/2020	6:48:33	0.5	15.82	94.2	9.33	6.45	7.5	193.2	31.4	2.5	0.079
BZ-2S Pine Run Trib.	5/21/2020	ERROR	0.5	9.27	99.9	11.47	6.81	-13.2	181.2	58.7	1.3	0.045
	6/18/2020	10:41:24	0.5	13.82	97	10.04	6.62	-2.2	190.9	51.8	2.2	0.054
	7/9/2020	10:23:13	0.467	16.49	95.9	9.37	6.51	4	188.9	31.7	1.3	0.059
	8/13/2020	11:09:46	0.5	17.48	94.5	9.04	6.39	11	192.3	36.6	1.1	0.067
	9/3/2020	11:12:53	0.5	17.33	95	9.12	6.35	13.2	184.8	44.5	3.2	0.065
BZ-3 Bouy/Beach	5/21/2020	ERROR	0.5	14.57	107	10.89	7.38	-45.9	144.2	32.1	3.6	0.074
		ERROR	5	14.56	106	10.83	7.34	-43.6	144.6	32.5	4.3	0.074
		ERROR	10	14.5	106	10.79	7.3	-41.3	145.6	32.5	6	0.074
		ERROR	15	14.43	105	10.76	7.25	-38.1	146.9	32.7	6.7	0.074
		ERROR	20	13.98	103	10.66	7.16	-33.4	149.6	32.4	5.1	0.073
		ERROR	25	12.34	98.5	10.53	7.08	-28.5	153.4	32.4	4.2	0.071
		ERROR	30	10.77	93.5	10.37	7.05	-26.7	154.8	31.7	3.4	0.068
		ERROR	35	10.3	91.4	10.24	7.02	-25.1	155.9	31.8	2.2	0.067
		ERROR	40	10.12	90.4	10.17	7.01	-24.7	155.9	31.9	2.7	0.067
		ERROR	45	9.99	89.4	10.1	7.01	-24.4	155.6	31.6	2.7	0.067
		ERROR	50	9.76	87.4	9.92	6.98	-23	156.2	31.3	2.6	0.067
		ERROR	55	9.65	86.6	9.85	6.97	-22.4	156.4	31.3	1.8	0.067
		ERROR	60	9.45	85.6	9.79	6.97	-22.1	156.2	31.4	1.2	0.067
		ERROR	65	9.39	84.9	9.72	6.94	-20.7	157.2	31.6	1.9	0.067
		ERROR	70	9.28	84.4	9.69	6.94	-20.8	156.7	31.4	1.3	0.067
		ERROR	75	9.08	83.6	9.64	6.92	-19.5	157.6	31.2	2.2	0.067
		ERROR	80	8.99	82.7	9.56	6.91	-19	157.5	31.3	1.7	0.067
		ERROR	85	8.94	82.1	9.51	6.89	-18.1	157.5	31.3	1.8	0.067
		ERROR	90	8.85	80.7	9.36	6.84	-15.2	159.5	31.3	1.5	0.067
		ERROR	95	8.69	79	9.19	6.85	-15.5	158.1	31.7	1.7	0.067
		ERROR	100	8.6	77.9	9.08	6.85	-15.9	156.1	31.1	1.4	0.067
		ERROR	105	8.59	77.6	9.06	6.89	-17.6	151.9	31.6	1.4	0.067

2020 Beltzville Reservoir Water Column Profile

Station	Date	Time	Depth	Temp	DO	DO	pH	pHmV	ORP	Turbidity	Chloro.	SpCond
	M/D/Y	hh:mm:ss	ft	C	%	mg/L		mV	mV	NTU	ug/L	mS/cm
BZ-3 Bouy/Beach	6/18/2020	8:33:58	0.5	23.06	105	9.03	7.41	-47.9	181	36.2	2.5	0.087
		8:33:33	5.0	23.06	106	9.04	7.36	-45.4	182.5	37.3	2.6	0.087
		8:32:53	10.0	23.04	105	9.02	7.31	-42.1	182.7	38.0	2.5	0.087
		8:32:02	15.0	22.95	106	9.12	7.23	-37.7	184	38.5	3.2	0.087
		8:31:11	20.0	19	108	10.03	7.11	-30.6	189	37.9	5	0.083
		8:30:27	25.0	16.5	103	10.01	7	-24.1	194.1	36.8	4.7	0.079
		8:29:12	30.0	13.5	87.5	9.12	6.54	2	217.9	36.5	3.2	0.073
		8:28:30	35.0	11.86	80.5	8.7	6.49	4.9	220.9	36.5	4	0.070
		8:27:40	40.0	10.74	78.5	8.71	6.48	5.4	221.7	36.2	3	0.069
		8:26:52	45.0	10.33	78.4	8.78	6.46	6	222.5	36.0	2.2	0.068
		8:26:06	50.0	10.1	77.1	8.67	6.45	7	223.4	35.6	2.6	0.068
		8:25:26	55.0	9.92	76.7	8.67	6.44	7.6	224.1	35.4	1.6	0.068
		8:24:40	60.0	9.8	75.8	8.6	6.42	8.3	224.8	36.0	1.3	0.068
		8:23:06	65.0	9.67	75.6	8.61	6.4	9.6	226	35.5	1.4	0.067
		8:22:19	70.0	9.53	73.4	8.38	6.39	10.3	226.5	35.7	1.7	0.067
		8:21:46	75.0	9.47	73	8.34	6.38	10.6	226.9	35.6	1.4	0.067
		8:20:26	80.0	9.35	71.3	8.17	6.38	10.7	227	35.6	1.9	0.067
		8:19:25	85.0	9.09	70.4	8.12	6.39	10.1	226.8	35.5	1.2	0.067
		8:18:08	90.0	8.94	68.1	7.88	6.42	8.5	225.8	35.1	1.8	0.067
		8:16:52	95.0	8.87	65.2	7.56	6.47	5.6	223.3	35.1	1.4	0.067
		8:15:46	100.0	8.63	58.4	6.8	6.53	1.9	220	34.9	1.6	0.068
		8:14:15	105.0	8.79	60.4	7.01	6.81	-13.3	226.6	60.9	4.2	0.068
BZ-3 Bouy/Beach	7/9/2020	08:20:35	0.5	27.18	107	8.48	7.47	-52	137.9	32.2	1.8	0.091
		8:19:55	5	27.15	107	8.5	7.43	-49.9	138.4	32.9	3.0	0.091
		8:18:51	10	27.11	109	8.63	7.39	-47.1	138.4	32.9	3.1	0.091
		8:18:04	15	25.56	117	9.53	7.34	-44	138.9	33.0	3.9	0.090
		8:17:10	20	22.93	115	9.89	7.19	-35.4	143.6	33.3	4.0	0.089
		8:15:48	25	19.48	93.9	8.63	6.46	7.2	181.2	33.5	10.2	0.086
		8:14:41	30	15.33	81.6	8.17	6.39	10.9	184.2	33.0	5.5	0.077
		8:13:32	35	12.37	71.1	7.6	6.36	11.9	184.9	32.8	3.2	0.072
		8:12:17	40	10.9	67.3	7.43	6.36	11.8	184.3	32.1	1.6	0.070
		8:11:26	45	10.4	68.5	7.66	6.37	11.3	183.5	32.1	2.5	0.069
		8:10:24	50	10.16	66.8	7.52	6.37	11.2	182.8	31.9	2.2	0.068
		8:09:39	55	10.03	66.5	7.5	6.38	10.9	182.2	32.1	1.7	0.068
		8:08:48	60	9.88	68.2	7.71	6.39	10.4	181.1	31.9	2.0	0.068
		8:08:00	65	9.75	68.2	7.75	6.39	10.3	180.3	32.0	1.6	0.067
		8:06:17	70	9.61	65.9	7.5	6.38	10.8	179	31.7	1.3	0.067
		8:05:07	75	9.46	60.6	6.93	6.37	11.5	178.2	31.6	1.0	0.067
		8:04:25	80	9.31	59	6.77	6.38	10.5	176.5	31.4	0.9	0.067
		8:03:26	85	9.11	57.6	6.64	6.41	8.9	173.9	31.6	1.5	0.067
		8:02:34	90	8.97	56.2	6.5	6.45	6.5	170.4	31.4	1.2	0.067
		8:01:07	95	8.86	46.8	5.42	6.47	5.5	167.1	31.5	1.3	0.068
		7:59:36	100	8.77	42.6	4.95	6.48	4.8	163.2	31.1	1.1	0.068
		7:58:57	102	8.76	43.2	5.02	6.64	-3.7	152.2	30.8	1.4	0.069

2020 Beltzville Reservoir Water Column Profile

Station	Date	Time	Depth	Temp	DO	DO	pH	pHmV	ORP	Turbidity	Chloro.	SpCond
	M/D/Y	hh:mm:ss	ft	C	%	mg/L		mV	mV	NTU	ug/L	mS/cm
BZ-3 Bouy/Beach	8/13/2020	9:01:04	0.5	27.86	113	8.87	8.5	-113.3	134.4	29.3	3.1	0.09
		9:00:14	5	27.88	112	8.81	8.37	-105.6	134.6	29.6	3.8	0.09
		8:59:19	10	27.86	111	8.74	8.05	-86.7	136	29.5	3.8	0.09
		8:58:16	15	26.85	105	8.4	7.28	-40.5	143.5	30.0	3.5	0.088
		8:57:04	20	24.89	75.4	6.24	6.66	-4.2	159.7	29.9	5.1	0.09
		8:55:20	25	23.32	53.7	4.57	6.54	3.1	163.8	30.1	4.2	0.093
		8:54:09	30	22.16	46.7	4.07	6.51	4.8	164.3	31.4	3.8	0.084
		8:52:39	35	21.09	41.8	3.72	6.47	7.2	166.7	31.6	3.1	0.086
		8:51:15	40	19.81	42.8	3.91	6.02	32.6	191.8	32.2	2.6	0.086
		8:50:39	45	16.33	29.3	2.87	6.02	32	191.7	30.8	1.7	0.083
		8:46:21	50	12.29	33.8	3.62	6.04	30.1	190	30.4	1.9	0.073
		9:19:32	55	10.7	22.3	2.48	6.62	-2.8	214	29.9	0.8	0.072
		8:44:29	60	10.32	34.9	3.91	6.08	27.6	188.8	30.1	1.1	0.07
		8:42:20	65	10.06	45.9	5.17	6.14	24.3	186.9	29.8	0.7	0.069
		8:41:01	70	9.86	50.7	5.74	6.17	22.6	185.6	29.8	1.0	0.068
		8:39:54	75	9.76	50.5	5.73	6.18	21.8	184.9	29.7	1.6	0.068
		8:38:41	80	9.62	49.8	5.67	6.2	21.1	184.1	29.7	1.2	0.068
		8:37:06	85	9.44	46.6	5.33	6.21	20.1	183.2	29.8	1.0	0.068
		8:34:06	90	9.28	40.1	4.61	6.27	17	180.7	29.6	1.8	0.068
		8:32:35	95	9.12	35.6	4.1	6.3	14.9	179.6	29.5	0.6	0.068
		8:30:54	100	9.04	30.6	3.54	6.37	11	177.1	30.1	1.1	0.068
		8:27:57	102	9	29.2	3.37	6.49	4.2	172.8	31.9	1.7	0.068
BZ-3 Bouy/Beach	9/3/2020	9:09:06	0.5	24.62	97.2	8.09	6.96	-21.4	147	28.4	2.7	0.084
		9:08:24	5	24.55	96.8	8.07	6.91	-18.8	148.4	28.6	3.9	0.084
		9:07:27	10	24.53	96.4	8.03	6.89	-17.5	147.4	29.4	3.8	0.084
		9:06:07	15	24.5	95.1	7.93	6.84	-14.9	146.9	28.7	2.9	0.084
		9:04:36	20	24.5	92.4	7.7	6.72	-7.8	149.4	29.2	3.1	0.084
		9:03:04	25	23.68	51.5	4.36	6.44	9.2	157.8	29.4	3.2	0.091
		9:02:10	30	22.55	48.8	4.22	6.4	11.1	159.3	30.0	1.8	0.099
		9:01:08	35	21.78	39.7	3.49	6.35	14.1	160.4	29.5	1.9	0.096
		8:59:29	40	20.78	33.8	3.02	5.93	38.6	183.4	29.5	1.7	0.093
		8:58:00	45	19.07	19.9	1.84	5.82	44.2	185.6	30.7	2.2	0.086
		8:56:53	50	16.14	21.2	2.09	5.83	43	183.1	30.2	0.5	0.081
		8:55:37	55	12.99	25.2	2.66	5.86	40.3	179.6	30.0	1.8	0.075
		8:54:32	60	11.53	24.5	2.67	5.89	38.5	176.9	29.3	0.8	0.073
		8:53:08	65	10.7	28.6	3.17	5.93	36.4	173.6	29.6	0.8	0.071
		8:51:29	70	10.28	36.8	4.13	5.98	33	168.8	29.3	1.0	0.07
		8:50:43	75	10.02	39.8	4.49	6.01	31.5	166.4	29.2	1.5	0.069
		8:49:32	80	9.72	39.8	4.53	6.04	30	163	30.7	0.9	0.068
		8:48:04	85	9.5	37.7	4.31	6.02	30.6	159.9	29.0	0.8	0.068
		8:45:49	90	9.48	17	1.94	5.94	35.6	158.8	332.8	6.4	0.068

2020 Beltzville Reservoir Water Column Profile

Station	Date	Time	Depth	Temp	DO	DO	pH	pHmV	ORP	Turbidity	Chloro.	SpCond
	M/D/Y	hh:mm:ss	ft	C	%	mg/L		mV	mV	NTU	ug/L	mS/cm
BZ-4S Wild Creek Upstream	5/21/2020	ERROR	0.5	14.57	99.3	10.11	7.24	-37.5	146	55.4	3.7	0.031
	6/18/2020	10:26:35	0.5	22.12	97.7	8.52	7.15	-32.6	164.4	47.9	1	0.036
	7/9/2020	10:07:40	0.5	25.67	97.5	7.96	6.7	-6	168.7	36.0	1.3	0.039
	8/13/2020	10:53:15	0.5	25.82	96.1	7.83	6.73	-7.8	176	36.2	0.7	0.04
	9/3/2020	10:56:01	0.5	23.32	97	8.27	6.28	18	182	40.5	2.5	0.04
BZ-5S Pohopoco Upstream	5/21/2020	ERROR	0.5	11.56	99.4	10.82	7.08	-28.7	148.8	56.6	0.8	0.087
	6/18/2020	10:10:20	0.5	17.64	95.5	9.1	7.28	-40.2	162.5	44.6	1.7	0.103
	7/9/2020	9:54:45	0.5	20.75	91.9	8.23	7.07	-28.3	147.3	39.8	2.3	0.107
	8/13/2020	10:38:14	0.5	19.26	98.4	9.07	7.11	-30.6	174.5	53.1	1.8	0.118
	9/3/2020	10:42:10	0.5	19.86	87.7	8	6.42	9.9	163.9	80.3	7.2	0.072
BZ-6 In-Lake Tower **Secchi 2.90 M**	5/21/2020	ERROR	0.5	14.68	106	10.8	7.36	-44.8	121	32.1	2.9	0.075
		ERROR	5	14.68	106	10.79	7.36	-44.3	120.2	32.3	4.7	0.075
		ERROR	10	14.68	106	10.75	7.33	-42.9	120.4	32.3	5.3	0.075
		ERROR	15	14.68	105	10.7	7.29	-40.6	121.1	32.6	6.1	0.075
		ERROR	20	14.65	105	10.65	7.22	-36.3	123	32.8	5.5	0.074
		ERROR	25	11.83	96.5	10.44	7.1	-29.7	128.1	32.2	4.4	0.07
		ERROR	30	10.76	94	10.42	7.07	-28	128.7	31.7	3	0.068
		ERROR	35	10.27	92.2	10.34	7.05	-26.6	128.2	31.8	2	0.068
		ERROR	40	10.12	90.5	10.18	7.02	-25.2	127.8	31.6	1.7	0.067
		ERROR	45	9.98	89.7	10.13	7.02	-24.9	126.9	31.4	2.1	0.067
		ERROR	50	9.87	88.7	10.05	7	-24	126.6	31.6	2.6	0.067
		ERROR	55	9.76	87.5	9.93	6.98	-23	125.9	31.7	1.9	0.067
		ERROR	60	9.65	86.6	9.86	6.97	-22.4	125.4	31.7	2.2	0.067
		ERROR	65	9.53	85.7	9.78	6.97	-22.4	124.2	31.3	1.3	0.067
		ERROR	70	9.33	84.7	9.72	6.95	-21.4	123.7	31.3	1.6	0.067
		ERROR	75	9.09	83.5	9.63	6.93	-20.1	122.5	31.1	1.3	0.067
		ERROR	80	8.97	83	9.61	6.94	-20.5	121.1	31.1	1.6	0.067
		ERROR	85	8.89	82.5	9.57	6.92	-19.6	120.4	31.1	1.2	0.067
		ERROR	90	8.8	81.7	9.49	6.94	-20.4	117.5	31.4	1.5	0.067
		ERROR	95	8.72	81	9.42	6.91	-19.3	117.1	31.5	1.2	0.067
		ERROR	100	8.63	79.1	9.23	6.91	-19.2	114.3	31.2	1.3	0.067
		ERROR	105	8.52	77.9	9.11	6.91	-18.8	112.7	31.5	2	0.067
		ERROR	110	8.47	76.9	9	6.91	-18.9	108.9	31.3	3.1	0.067
		ERROR	115	8.45	75.7	8.87	6.91	-18.9	104.7	31.6	1.6	0.067
		ERROR	120	8.42	74.5	8.73	6.94	-20.6	96.6	31.8	2.2	0.067
		ERROR	125	8.4	71.6	8.39	7.03	-25.7	78.6	45.9	2.8	0.067

2020 Beltzville Reservoir Water Column Profile

Station	Date	Time	Depth	Temp	DO	DO	pH	pHmV	ORP	Turbidity	Chloro.	SpCond
	M/D/Y	hh:mm:ss	ft	C	%	mg/L		mV	mV	NTU	ug/L	mS/cm
BZ-6 In-Lake Tower Secchi 3.10 M	6/18/2020	7:55:03	0.5	23.35	104	8.88	7.3	-41.9	162.2	38.9	2.2	0.088
		7:54:13	5	23.34	104	8.9	7.26	-39.2	162.2	34.6	2.7	0.088
		7:53:48	10	23.33	104	8.89	7.23	-37.3	162.3	35.4	2.4	0.088
		7:53:15	15	23.31	105	8.92	7.16	-33.3	163	35.6	2.4	0.088
		7:52:51	20	23.18	105	9.01	7.07	-28.2	164.9	35.9	3.4	0.087
		7:52:06	25	17.23	100	9.64	6.93	-20.1	171.4	34.2	5.1	0.08
		7:51:30	30	14.4	95.8	9.78	6.95	-21	170.3	33.9	5	0.074
		7:50:19	35	12.07	85.4	9.19	6.77	-11.3	177.8	33.0	4.2	0.07
		7:49:18	40	10.71	80.3	8.91	6.68	-6.1	181.6	33.0	3.4	0.068
		7:48:30	45	10.28	78.4	8.78	6.61	-2.1	184.5	32.5	2.1	0.068
		7:47:59	50	10.09	76.5	8.62	6.57	0.3	186.1	32.6	2.3	0.068
		7:47:21	55	9.89	74.2	8.4	6.51	3.6	188.5	32.7	2.1	0.067
		7:46:51	60	9.78	74	8.4	6.47	5.9	190.1	32.9	1.8	0.067
		7:46:21	65	9.68	73.1	8.32	6.45	6.9	190.4	32.9	1.5	0.067
		7:45:42	70	9.55	72.2	8.24	6.43	8	190.5	32.7	1.3	0.067
		7:44:31	75	9.37	70.1	8.03	6.4	9.7	190.2	32.5	1.8	0.067
		7:43:56	80	9.14	69	7.95	6.39	10.3	189.8	33.0	1.8	0.067
		7:43:14	85	9.01	67.3	7.78	6.37	11.3	189.6	32.8	1.5	0.067
		7:42:11	90	8.9	64.5	7.47	6.34	12.9	188.9	32.6	1	0.067
		7:41:09	95	8.77	60.4	7.02	6.31	14.3	188.1	32.6	1.6	0.067
		7:40:20	100	8.67	56.5	6.58	6.29	15.4	187.4	32.8	1.4	0.067
		7:39:23	105	8.51	52	6.08	6.28	16.4	186.2	33.2	0.6	0.068
		7:38:33	110	8.49	51	5.97	6.27	16.7	184.6	32.8	1.4	0.068
		7:37:09	115	8.44	48.2	5.65	6.26	17.2	180.9	33.2	1.4	0.068
		7:36:10	120	8.43	46.4	5.44	6.27	16.8	176.1	32.8	1.9	0.068
		7:34:33	125	8.39	39.8	4.67	6.27	16.5	165.5	36.7	4.4	0.069
BZ-6 In-Lake Tower Secchi 4.25 M	7/9/2020	7:46:46	0.5	26.98	107	8.53	7.51	-54.2	144.3	31.7	2.6	0.091
		7:45:49	5.0	26.98	107	8.51	7.5	-53.6	144.2	32.4	2.9	0.091
		7:44:58	10	26.97	107	8.56	7.48	-52.4	144.5	32.4	2.9	0.091
		7:43:48	15	25.94	115	9.36	7.43	-49.7	145.6	32.4	2.9	0.090
		7:42:18	20	22.68	116	10.05	7.3	-41.4	148.5	32.3	4.8	0.088
		7:40:20	25	19.5	109	10.01	6.98	-23.1	161.5	33.1	11.6	0.085
		7:38:14	30	15.32	82.1	8.22	6.45	7.2	188.8	32.6	7.7	0.077
		7:36:35	35	12.36	74.1	7.92	6.43	8.1	189.5	32.4	2.8	0.071
		7:34:56	40	11.01	69.8	7.7	6.42	8.7	189.7	32.0	3.3	0.069
		7:33:47	45	10.39	69.1	7.73	6.41	8.9	189.5	32.3	2.1	0.068
		7:32:55	50	10.18	68.4	7.68	6.41	9.4	189.6	32.1	2.4	0.068
		7:31:31	55	10.05	66.1	7.46	6.39	10.4	189.8	32.3	2.0	0.068
		7:30:40	60	9.85	65.9	7.47	6.38	10.8	189.8	31.2	1.4	0.068
		7:29:55	65	9.78	64.6	7.33	6.37	11.4	189.8	32.1	1.7	0.068
		7:28:26	70	9.68	64.1	7.29	6.35	12.4	189.9	31.8	1.5	0.067
		7:27:17	75	9.56	62.3	7.1	6.33	13.3	189.9	32.0	1.8	0.067
		7:26:09	80	9.36	60.3	6.9	6.32	14.1	190	32.0	1.0	0.067
		7:25:10	85	9.17	58.8	6.77	6.31	14.8	190.1	31.9	1.1	0.067
		7:23:49	90	9.03	56.3	6.5	6.29	15.7	190.1	31.7	1.3	0.067
		7:21:30	95	8.84	50.2	5.83	6.26	17.3	190.3	31.8	1.3	0.068
		7:19:23	100	8.7	45.2	5.27	6.24	18.3	190.2	32.2	1.4	0.068
		7:17:40	105	8.64	40.3	4.7	6.23	18.9	190	32.1	1.0	0.068
		7:15:52	110	8.52	33.3	3.89	6.23	18.9	189.5	32.6	2.0	0.069
		7:14:28	115	8.51	30.4	3.55	6.24	18.3	188.9	32.9	1.3	0.069
		7:13:11	120	8.51	28.3	3.31	6.28	16.2	187.1	33.7	1.8	0.069
		7:11:45	125	8.43	29.1	3.41	6.33	13.4	185.4	33.3	0.6	0.069

2020 Beltzville Reservoir Water Column Profile

Station	Date	Time	Depth	Temp	DO	DO	pH	pHmV	ORP	Turbidity	Chloro.	SpCond
	M/D/Y	hh:mm:ss	ft	C	%	mg/L		mV	mV	NTU	ug/L	mS/cm
BZ-6 In-Lake Tower Secchi 3.6 M	8/13/2020	8:09:12	0.5	28.04	110	8.61	8.23	-97.5	133.4	28.6	3.9	0.09
		8:08:12	5	28.06	110	8.57	8.2	-95.8	132.3	28.8	4.7	0.09
		8:07:12	10	28.05	109	8.55	8.15	-92.5	133	28.6	4.0	0.09
		8:04:39	15	27.35	109	8.59	7.68	-64.3	132.1	28.8	4.4	0.089
		8:02:22	20	24.79	74.6	6.19	6.65	-3.5	151.7	30.3	4.5	0.092
		8:01:05	25	23.48	57.3	4.87	6.57	1.2	153.2	29.8	4.6	0.095
		7:59:42	30	22.21	43.9	3.83	6.51	4.4	153.5	30.0	3.2	0.089
		7:57:59	35	20.89	38.6	3.45	6.49	6	153.4	31.0	3.9	0.085
		7:55:53	40	19.34	30.4	2.8	6.46	7.3	153.7	31.2	3.2	0.085
		7:54:18	45	16.78	32.3	3.13	6.13	26.2	172.8	30.5	2.5	0.083
		7:51:40	50	11.91	41.7	4.5	6.09	27.6	174.4	29.8	2.0	0.072
		7:48:21	55	10.59	49	5.45	6.12	25.5	171.2	29.6	1.1	0.069
		7:46:32	60	10.38	47.1	5.27	6.11	25.9	170	29.5	1.0	0.069
		7:44:58	65	10.17	50.4	5.66	6.12	25.4	168.7	29.7	2.0	0.068
		7:43:21	70	9.99	48.9	5.52	6.11	25.9	167.6	29.5	1.5	0.068
		7:42:07	75	9.84	51	5.77	6.11	25.7	166.4	29.5	1.1	0.068
		7:40:49	80	9.72	48.5	5.51	6.1	26.5	165.5	29.4	1.2	0.068
		7:39:21	85	9.51	49	5.6	6.09	26.8	164.1	29.7	1.6	0.068
		7:37:51	90	9.25	47	5.39	6.08	27.5	162.7	29.7	1.2	0.068
		7:36:32	95	9.07	43	4.96	6.06	28.3	161.3	29.5	1.0	0.067
		7:34:39	100	8.96	39.2	4.53	6.05	29.1	159.1	28.9	1.6	0.067
		7:32:18	105	8.79	30	3.48	6.04	29.8	155.6	30.0	1.8	0.068
		7:30:17	110	8.65	21.7	2.53	6.06	28.7	151.1	30.4	1.3	0.068
		7:28:03	115	8.54	14.3	1.67	6.11	25.9	145	30.7	1.3	0.068
		7:26:12	120	8.5	12.1	1.42	6.18	21.5	138.4	30.5	1.1	0.068
		7:23:14	125	8.45	8.4	0.98	6.32	14.1	123	31.4	3.2	0.069
BZ-6 In-Lake Tower Secchi 4.2 M	9/3/2020	8:26:39	0.5	24.48	95.5	7.96	6.94	-20.7	164.7	28.5	2.8	0.084
		8:25:33	5	24.47	95.2	7.94	6.94	-20.3	164.7	28.3	3.2	0.084
		8:24:01	10	24.47	94.5	7.88	6.9	-18.1	164.9	28.9	3.5	0.084
		8:21:35	15	24.44	93.7	7.82	6.83	-13.7	166.1	28.2	2.4	0.084
		8:20:40	20	24.45	91.8	7.66	6.75	-9.4	167.8	28.9	3.4	0.084
		8:19:01	25	23.95	65.8	5.54	6.56	1.7	173	29.2	3.2	0.086
		8:16:54	30	22.73	37.2	3.21	6.43	9.5	178.5	28.7	3.1	0.094
		8:15:16	35	21.79	25.8	2.27	6.39	11.5	179.9	29.2	2.8	0.092
		8:13:17	40	20.67	15.7	1.4	6.38	12.2	179.9	29.9	2.2	0.088
		8:11:37	45	19.15	10.1	0.93	6.37	12.7	180.9	29.5	1.4	0.084
		8:07:19	50	15.87	19.9	1.97	6.31	15.7	186.4	30.2	1.9	0.081
		8:05:47	55	12.67	32.8	3.48	6.31	15	187.2	29.6	1.7	0.073
		8:04:16	60	11.28	32.6	3.57	6.2	21.1	193.8	30.0	1.3	0.071
		8:03:14	65	10.63	34.3	3.81	6.17	22.9	195.8	29.6	0.5	0.07
		8:01:35	70	10.21	37.3	4.19	6.12	25.2	198.5	29.4	1.4	0.069
		7:59:30	75	9.86	43.7	4.95	6.1	26.4	200	29.5	1.0	0.068
		7:58:07	80	9.62	45.5	5.19	6.07	28.3	201.7	29.5	1.0	0.068
		7:57:06	85	9.32	42	4.82	6.04	29.7	202.5	29.1	1.3	0.067
		7:56:02	90	9.2	39.6	4.55	6.01	31.2	203.5	29.3	1.1	0.067
		7:54:00	95	9.02	32.8	3.79	5.96	34	205	29.4	0.9	0.067
		7:51:59	100	8.84	24.5	2.84	5.92	36.1	206.2	29.7	1.3	0.067
		7:50:14	105	8.72	14.1	1.64	5.89	37.9	207.3	34.9	1.3	0.068
		7:48:46	110	8.66	11.5	1.34	5.88	38.8	208.1	31.3	1.7	0.068
		7:46:55	115	8.66	10.2	1.19	5.86	39.5	209.1	30.1	1.5	0.068
		7:44:39	120	8.6	8.7	1.02	5.86	39.7	209.7	33.8	0.8	0.068
		7:43:12	125	8.57	9.3	1.08	5.85	40.1	210.7	39.3	7.6	0.068

2020 Beltzville Reservoir Water Column Profile

Station	Date	Time	Depth	Temp	DO	DO	pH	pHmV	ORP	Turbidity	Chloro.	SpCond
	M/D/Y	hh:mm:ss	ft	C	%	mg/L		mV	mV	NTU	ug/L	mS/cm
BZ-7 Upper Lake No-Wake	5/21/2020	ERROR	0.5	13.56	103	10.73	7.22	-36.4	174.3	34.2	2.2	0.072
		ERROR	5	13.45	103	10.7	7.19	-35	176.5	34	1.9	0.072
		ERROR	10	13.41	102	10.67	7.18	-34.3	176.8	34.3	4.4	0.072
		ERROR	15	13.39	102	10.64	7.16	-32.9	177.4	34.4	4.2	0.072
		ERROR	20	13.28	100	10.51	7.11	-30.5	178.5	34.4	4.1	0.072
		ERROR	25	12.98	98.1	10.34	7.07	-27.9	180.3	34.8	3.9	0.071
		ERROR	30	11.72	92.3	10.01	7	-24.1	183.9	34	3.1	0.069
		ERROR	35	10.85	88	9.73	6.98	-23	184.9	33.8	3.2	0.067
		ERROR	40	10.73	87	9.65	6.98	-23.1	185.2	33.6	2.5	0.069
		ERROR	45	10.46	85.5	9.55	7	-24.2	184.5	34.2	1.9	0.069
		ERROR	50	10.33	84.9	9.5	7.03	-25.7	183.5	33.7	2.5	0.068
		ERROR	55	10.25	85.4	9.58	7.11	-30	179.3	33.7	2.5	0.068
BZ-7 Upper Lake No-Wake	6/18/2020	9:10:13	0.5	22.97	107	9.14	7.2	-35.9	182.8	40.2	2.1	0.082
		9:09:43	5	22.94	106	9.14	7.16	-33.4	183.4	40.2	3.1	0.083
		9:08:51	10	22.1	104	9.07	7.06	-27.3	185.9	40.5	3.9	0.086
		9:08:04	15	20.41	90.8	8.19	6.83	-14	196	40.7	5	0.091
		9:07:10	20	17.22	76.7	7.38	6.36	12.8	220.6	41.1	2.5	0.095
		9:06:24	25	13.65	63.9	6.64	6.32	14.5	222.3	39.4	1.4	0.078
		9:05:36	30	11.29	61.7	6.76	6.36	12.3	221.4	38.6	1.6	0.072
		9:04:46	35	10.58	60.9	6.78	6.38	10.7	220.4	38.5	2	0.071
		9:03:21	40	10.37	60.8	6.81	6.44	7.6	217.9	38.0	1.5	0.07
		9:02:40	45	10.18	60.8	6.84	6.48	5.4	216.3	38.1	1.3	0.07
		9:02:03	50	10.19	60.7	6.82	6.51	3.3	214.8	38.0	1.4	0.07
		9:00:05	55	10.16	61.3	6.9	6.77	-11.2	202	36.7	0.6	0.07
BZ-7 Upper Lake No-Wake	7/9/2020	8:58:57	0.5	27.35	107	8.43	7.27	-40.3	123.6	31.7	1.6	0.086
		8:57:52	5	27.26	106	8.38	7.2	-35.9	124.7	32.1	1.9	0.086
		8:56:33	10	27.2	104	8.23	7.08	-28.8	127.5	32.4	2.7	0.086
		8:55:16	15	24.88	87.3	7.23	6.86	-15.6	135.9	33.3	3.3	0.094
		8:54:06	20	22.08	71.3	6.23	6.73	-8.1	141.1	33.4	2.6	0.105
		8:52:25	25	19.62	53.4	4.89	6.14	25.9	169.8	33.2	3.1	0.096
		8:51:21	30	15.97	44	4.34	6.12	26.6	168.2	32.4	1.9	0.085
		8:49:58	35	13.44	39.4	4.11	6.11	26.3	165.5	33.0	1.3	0.078
		8:47:21	40	11.34	37.6	4.11	6.18	22	155.3	32.2	1.3	0.073
		8:45:48	45	10.61	37.9	4.21	6.25	18.1	146.7	32.3	1.8	0.071
		8:44:45	50	10.21	38	4.26	6.31	14.9	139.1	31.4	1.4	0.071
		8:43:11	55	10.12	38.5	4.33	6.39	10.4	133.5	30.9	1.2	0.071

2020 Beltzville Reservoir Water Column Profile

Station	Date	Time	Depth	Temp	DO	DO	pH	pHmV	ORP	Turbidity	Chloro.	SpCond
	M/D/Y	hh:mm:ss	ft	C	%	mg/L		mV	mV	NTU	ug/L	mS/cm
		9:34:12	0.5	28.13	112	8.76	8.14	-92.3	148	29.5	2.2	0.089
		9:33:05	5	28.12	112	8.74	7.9	-77.5	149.1	30.2	3.0	0.089
		9:31:37	10	26.83	105	8.38	7.14	-32.6	164	30.0	3.2	0.086
		9:30:37	15	25.93	91	7.39	6.99	-23.5	170.4	30.2	3.8	0.083
		9:29:38	20	25.09	86.2	7.11	7	-23.9	170.7	30.5	3.0	0.08
BZ-7	8/13/2020	9:28:38	25	23.71	91.8	7.77	7.01	-24.7	173.4	31.0	1.6	0.108
Upper Lake		9:27:15	30	22.36	88	7.64	6.95	-21.3	176.6	31.2	1.7	0.114
No-Wake		9:25:42	35	21.5	71.8	6.34	6.83	-14.1	182.7	31.9	1.7	0.106
		9:24:24	40	19.46	52.5	4.82	6.66	-4	194.6	32.1	1.6	0.092
		9:22:33	45	13.43	20.4	2.12	6.26	18	221.4	30.9	1.2	0.077
		9:21:44	50	11.36	19.9	2.18	6.33	13.9	221.4	30.4	1.1	0.074
		9:20:09	55	10.72	22.1	2.46	6.51	3.6	217.9	30.3	0.9	0.072
		9:46:09	0.5	24.91	95.5	7.9	6.84	-14.4	130.8	28.7	1.8	0.082
		9:45:11	5	24.74	95.1	7.9	6.8	-12.3	131	28.3	3.0	0.081
		9:44:09	10	24.71	93.6	7.78	6.77	-10.7	129.7	28.4	3.4	0.081
		9:42:46	15	24.67	86.7	7.21	6.71	-7.1	128.8	28.5	1.4	0.081
		9:41:33	20	24.43	74.9	6.26	6.61	-1	130.5	29.0	1.8	0.086
BZ-7		9:38:59	25	23.72	79.8	6.76	6.58	0.6	126.8	32.4	2.5	0.070
Upper Lake	9/3/2020	9:37:28	30	21.78	85.8	7.53	6.46	7.5	134.3	36.1	17.4	0.094
No-Wake		9:35:51	35	21.38	85.1	7.52	6.26	19.4	141.5	31.5	21.2	0.096
		9:31:40	40	20.02	45.8	4.17	5.92	38.5	134.9	45.4	11.6	0.096
		9:30:25	45	18.43	26	2.44	5.87	41	125.3	30.6	1.4	0.093
		9:28:56	50	16.57	16.5	1.61	5.86	41.6	107.2	451.8	16.2	0.089
		9:27:16	55	15.31	9.2	0.92	5.83	43.1	93	334	-0.2	0.086

APPENDIX B

LABORATORY CUSTODY SHEETS

Certificate of Analysis

M.J. Reider Associates, Inc.
ENVIRONMENTAL TESTING LABORATORY
U.S. EPA/PA DEP #06-00003

Laboratory No.: 2015557
Report: 05/29/20
Lab Contact: Richard A Wheeler

Attention: David Wertz
Reported To: Tetra Tech
USACE, Phila Dist. Env.Resources Branch 100 Penn Square E.
Arlington, VA 22201

Project: 2020 - Beltzville Reservoir

Lab ID: 2015557-01 **Collected By:** Client **Sampled:** 05/21/20 06:45 **Received:** 05/21/20 12:30
Sample Desc: BZ-1S **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	<0.05	mg/l		0.05	SM 4500-P F	05/26/20	G-11, G-17	TML
General Chemistry								
Alkalinity, Total to pH 4.5	12	mg CaCO3/L		2	SM 2320 B	05/22/20	C-51d	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	05/22/20	U	APR
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	05/21/20 14:00		SNF
Nitrate as N	0.92	mg/l	0.18	1.00	EPA 300.0 Rev 2.1	05/21/20 13:22	J	MRW
Nitrite as N	<0.007	mg/l	0.007	0.10	EPA 300.0 Rev 2.1	05/21/20 13:22	U	MRW
Nitrate+Nitrite as N	<0.93	mg/l	0.182	1.10	CALCULATED	05/21/20 13:22		MRW
Nitrogen, Total Kjeldahl (TKN)	<0.37	mg/l	0.37	0.50	EPA 351.2	05/27/20	U	SNF
Phosphorus as P, Total	<0.01	mg/l	0.01	0.05	SM 4500-P E	05/22/20	U	RCE
Solids, Total Dissolved	99	mg/l	4	5	SM 2540 C	05/22/20		TMH
Total Organic Carbon	1.7	mg/l	0.3	0.5	SM 5310 C	05/27/20		MPB
Solids, Total Suspended	3	mg/l	1	1	SM 2540 D	05/22/20		TMH

	Result	Unit	Rep. Limit	Analysis Method	Incubated	Analyzed	Notes	Analyst
Microbiology								
Escherichia coli	1	mpn/100ml	1	SM 9223 B/Quantitray	5/21/20 14:36	5/22/20 9:37		JMW
Total Coliform	194	mpn/100ml	1	SM 9223 B/Quantitray	5/21/20 14:36	5/22/20 9:37		JMW

Lab ID: 2015557-02 **Collected By:** Client **Sampled:** 05/21/20 10:50 **Received:** 05/21/20 12:30
Sample Desc: BZ-2S **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	<0.05	mg/l		0.05	SM 4500-P F	05/26/20	G-11, G-17	TML
General Chemistry								
Alkalinity, Total to pH 4.5	8	mg CaCO3/L		2	SM 2320 B	05/22/20	C-51g	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	05/22/20	U	APR
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	05/21/20 14:00		SNF
Nitrate as N	0.40	mg/l	0.18	1.00	EPA 300.0 Rev 2.1	05/21/20 13:39	J	MRW
Nitrite as N	<0.007	mg/l	0.007	0.10	EPA 300.0 Rev 2.1	05/21/20 13:39	U	MRW
Nitrate+Nitrite as N	<0.41	mg/l	0.182	1.10	CALCULATED	05/21/20 13:39		MRW
Nitrogen, Total Kjeldahl (TKN)	<0.37	mg/l	0.37	0.50	EPA 351.2	05/27/20	U	SNF
Phosphorus as P, Total	<0.01	mg/l	0.01	0.05	SM 4500-P E	05/22/20	U	RCE
Solids, Total Dissolved	68	mg/l	4	5	SM 2540 C	05/22/20		TMH
Total Organic Carbon	0.6	mg/l	0.3	0.5	SM 5310 C	05/27/20		MPB
Solids, Total Suspended	1	mg/l	1	1	SM 2540 D	05/22/20		TMH

	Result	Unit	Rep. Limit	Analysis Method	Incubated	Analyzed	Notes	Analyst
Microbiology								
Escherichia coli	6	mpn/100ml	1	SM 9223 B/Quantitray	5/21/20 14:36	5/22/20 9:37		JMW
Total Coliform	435	mpn/100ml	1	SM 9223 B/Quantitray	5/21/20 14:36	5/22/20 9:37		JMW

Lab ID: 2015557-03 **Collected By:** Client **Sampled:** 05/21/20 08:30 **Received:** 05/21/20 12:30
Sample Desc: BZ-3S **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	<0.05	mg/l		0.05	SM 4500-P F	05/26/20	G-11, G-17	TML
General Chemistry								
Alkalinity, Total to pH 4.5	12	mg CaCO3/L		2	SM 2320 B	05/22/20	C-51a	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	05/22/20	U	APR
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	05/21/20 14:00		SNF
Nitrate as N	0.91	mg/l	0.18	1.00	EPA 300.0 Rev 2.1	05/21/20 13:56	J	MRW
Nitrite as N	<0.007	mg/l	0.007	0.10	EPA 300.0 Rev 2.1	05/21/20 13:56	U	MRW
Nitrate+Nitrite as N	<0.92	mg/l	0.182	1.10	CALCULATED	05/21/20 13:56		MRW
Nitrogen, Total Kjeldahl (TKN)	<0.37	mg/l	0.37	0.50	EPA 351.2	05/27/20	U	SNF
Phosphorus as P, Total	<0.01	mg/l	0.01	0.05	SM 4500-P E	05/22/20	U	RCE
Solids, Total Dissolved	74	mg/l	4	5	SM 2540 C	05/22/20		TMH
Total Organic Carbon	2.0	mg/l	0.3	0.5	SM 5310 C	05/27/20		MPB
Solids, Total Suspended	2	mg/l	1	1	SM 2540 D	05/22/20		TMH

	Result	Unit	Rep. Limit	Analysis Method	Incubated	Analyzed	Notes	Analyst
Microbiology								
Escherichia coli	<1	mpn/100ml	1	SM 9223 B/Quantitray	5/21/20 14:36	5/22/20 9:37		JMW
Total Coliform	9	mpn/100ml	1	SM 9223 B/Quantitray	5/21/20 14:36	5/22/20 9:37		JMW

Lab ID: 2015557-04 **Collected By:** Client **Sampled:** 05/21/20 08:30 **Received:** 05/21/20 12:30
Sample Desc: BZ-3M **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	<0.05	mg/l		0.05	SM 4500-P F	05/26/20	G-11, G-17	TML
General Chemistry								
Alkalinity, Total to pH 4.5	12	mg CaCO3/L		2	SM 2320 B	05/22/20	C-51	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	05/22/20	U	APR
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	05/21/20 14:00		SNF
Nitrate as N	0.96	mg/l	0.18	1.00	EPA 300.0 Rev 2.1	05/21/20 14:13	J	MRW
Nitrite as N	<0.007	mg/l	0.007	0.10	EPA 300.0 Rev 2.1	05/21/20 14:13	U	MRW
Nitrate+Nitrite as N	<0.97	mg/l	0.182	1.10	CALCULATED	05/21/20 14:13		MRW
Nitrogen, Total Kjeldahl (TKN)	<0.37	mg/l	0.37	0.50	EPA 351.2	05/27/20	U	SNF
Phosphorus as P, Total	<0.01	mg/l	0.01	0.05	SM 4500-P E	05/22/20	U	RCE
Solids, Total Dissolved	67	mg/l	4	5	SM 2540 C	05/22/20		TMH
Total Organic Carbon	1.3	mg/l	0.3	0.5	SM 5310 C	05/27/20		MPB
Solids, Total Suspended	3	mg/l	1	1	SM 2540 D	05/22/20		TMH

Lab ID: 2015557-05 **Collected By:** Client **Sampled:** 05/21/20 08:30 **Received:** 05/21/20 12:30
Sample Desc: BZ-3D **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	0.06	mg/l		0.05	SM 4500-P F	05/26/20	G-11, G-17	TML
General Chemistry								
Alkalinity, Total to pH 4.5	12	mg CaCO3/L		2	SM 2320 B	05/22/20	C-51c	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	05/22/20	U	APR
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	05/21/20 14:00		SNF
Nitrate as N	0.97	mg/l	0.18	1.00	EPA 300.0 Rev 2.1	05/21/20 14:29	J	MRW
Nitrite as N	<0.007	mg/l	0.007	0.10	EPA 300.0 Rev 2.1	05/21/20 14:29	U	MRW
Nitrate+Nitrite as N	<0.98	mg/l	0.182	1.10	CALCULATED	05/21/20 14:29		MRW
Nitrogen, Total Kjeldahl (TKN)	<0.37	mg/l	0.37	0.50	EPA 351.2	05/27/20	U	SNF
Phosphorus as P, Total	0.01	mg/l	0.01	0.05	SM 4500-P E	05/22/20	J	RCE
Solids, Total Dissolved	85	mg/l	4	5	SM 2540 C	05/22/20		TMH
Total Organic Carbon	1.2	mg/l	0.3	0.5	SM 5310 C	05/27/20		MPB
Solids, Total Suspended	1	mg/l	1	1	SM 2540 D	05/22/20		TMH

Lab ID: 2015557-06 **Collected By:** Client **Sampled:** 05/21/20 10:35 **Received:** 05/21/20 12:30
Sample Desc: BZ-4S **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	<0.05	mg/l		0.05	SM 4500-P F	05/26/20	G-11, G-17	TML
General Chemistry								
Alkalinity, Total to pH 4.5	6	mg CaCO3/L		2	SM 2320 B	05/22/20	C-51f	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	05/22/20	U	APR
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	05/21/20 14:00		SNF
Nitrate as N	0.26	mg/l	0.18	1.00	EPA 300.0 Rev 2.1	05/21/20 14:46	J	MRW
Nitrite as N	<0.007	mg/l	0.007	0.10	EPA 300.0 Rev 2.1	05/21/20 14:46	U	MRW
Nitrate+Nitrite as N	<0.27	mg/l	0.182	1.10	CALCULATED	05/21/20 14:46		MRW
Nitrogen, Total Kjeldahl (TKN)	<0.37	mg/l	0.37	0.50	EPA 351.2	05/27/20	U	SNF
Phosphorus as P, Total	<0.01	mg/l	0.01	0.05	SM 4500-P E	05/22/20	U	RCE
Solids, Total Dissolved	54	mg/l	4	5	SM 2540 C	05/22/20		TMH
Total Organic Carbon	1.4	mg/l	0.3	0.5	SM 5310 C	05/27/20		MPB
Solids, Total Suspended	1	mg/l	1	1	SM 2540 D	05/22/20		TMH

	Result	Unit	Rep. Limit	Analysis Method	Incubated	Analyzed	Notes	Analyst
Microbiology								
Escherichia coli	3	mpn/100ml	1	SM 9223 B/Quantitray	5/21/20 14:36	5/22/20 9:37		JMW
Total Coliform	261	mpn/100ml	1	SM 9223 B/Quantitray	5/21/20 14:36	5/22/20 9:37		JMW

Lab ID: 2015557-07 **Collected By:** Client **Sampled:** 05/21/20 10:15 **Received:** 05/21/20 12:30
Sample Desc: BZ-5S **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	<0.05	mg/l		0.05	SM 4500-P F	05/26/20	G-11, G-17	TML
General Chemistry								
Alkalinity, Total to pH 4.5	14	mg CaCO3/L		2	SM 2320 B	05/22/20	C-51e	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	05/22/20	U	APR
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	05/21/20 14:00		SNF
Nitrate as N	1.23	mg/l	0.18	1.00	EPA 300.0 Rev 2.1	05/21/20 15:03		MRW
Nitrite as N	<0.007	mg/l	0.007	0.10	EPA 300.0 Rev 2.1	05/21/20 15:03	U	MRW
Nitrate+Nitrite as N	<1.24	mg/l	0.182	1.10	CALCULATED	05/21/20 15:03		MRW
Nitrogen, Total Kjeldahl (TKN)	0.41	mg/l	0.37	0.50	EPA 351.2	05/27/20	J	SNF
Phosphorus as P, Total	0.03	mg/l	0.01	0.05	SM 4500-P E	05/22/20	J	RCE
Solids, Total Dissolved	107	mg/l	4	5	SM 2540 C	05/22/20		TMH
Total Organic Carbon	1.2	mg/l	0.3	0.5	SM 5310 C	05/27/20		MPB
Solids, Total Suspended	37	mg/l	1	1	SM 2540 D	05/22/20		TMH

	Result	Unit	Rep. Limit	Analysis Method	Incubated	Analyzed	Notes	Analyst
Microbiology								
Escherichia coli	32	mpn/100ml	1	SM 9223 B/Quantitray	5/21/20 14:36	5/22/20 9:37		JMW
Total Coliform	816	mpn/100ml	1	SM 9223 B/Quantitray	5/21/20 14:36	5/22/20 9:37		JMW

Lab ID: 2015557-08 **Collected By:** Client **Sampled:** 05/21/20 07:45 **Received:** 05/21/20 12:30
Sample Desc: BZ-6S **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	<0.05	mg/l		0.05	SM 4500-P F	05/26/20	G-11, G-17	TML
General Chemistry								
Alkalinity, Total to pH 4.5	12	mg CaCO3/L		2	SM 2320 B	05/22/20	C-51a	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	05/22/20	U	APR
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	05/21/20 14:00		SNF
Nitrate as N	0.92	mg/l	0.18	1.00	EPA 300.0 Rev 2.1	05/21/20 15:20	J	MRW
Nitrite as N	<0.007	mg/l	0.007	0.10	EPA 300.0 Rev 2.1	05/21/20 15:20	U	MRW
Nitrate+Nitrite as N	<0.93	mg/l	0.182	1.10	CALCULATED	05/21/20 15:20		MRW
Nitrogen, Total Kjeldahl (TKN)	0.37	mg/l	0.37	0.50	EPA 351.2	05/27/20	J	SNF
Phosphorus as P, Total	0.02	mg/l	0.01	0.05	SM 4500-P E	05/22/20	J	RCE
Solids, Total Dissolved	59	mg/l	4	5	SM 2540 C	05/22/20		TMH
Total Organic Carbon	3.4	mg/l	0.3	0.5	SM 5310 C	05/27/20		MPB
Solids, Total Suspended	2	mg/l	1	1	SM 2540 D	05/22/20		TMH

	Result	Unit	Rep. Limit	Analysis Method	Incubated	Analyzed	Notes	Analyst
Microbiology								
Escherichia coli	<1	mpn/100ml	1	SM 9223 B/Quantitray	5/21/20 14:36	5/22/20 9:37		JMW
Total Coliform	40	mpn/100ml	1	SM 9223 B/Quantitray	5/21/20 14:36	5/22/20 9:37		JMW

Lab ID: 2015557-09 **Collected By:** Client **Sampled:** 05/21/20 07:45 **Received:** 05/21/20 12:30
Sample Desc: BZ-6M **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	<0.05	mg/l		0.05	SM 4500-P F	05/26/20	G-11, G-17	TML
General Chemistry								
Alkalinity, Total to pH 4.5	12	mg CaCO3/L		2	SM 2320 B	05/22/20	C-51b	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	05/22/20	U	APR
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	05/21/20 14:00		SNF
Nitrate as N	0.99	mg/l	0.18	1.00	EPA 300.0 Rev 2.1	05/21/20 16:10	J	MRW
Nitrite as N	<0.007	mg/l	0.007	0.10	EPA 300.0 Rev 2.1	05/21/20 16:10	U	MRW
Nitrate+Nitrite as N	<1.00	mg/l	0.182	1.10	CALCULATED	05/21/20 16:10		MRW
Nitrogen, Total Kjeldahl (TKN)	<0.37	mg/l	0.37	0.50	EPA 351.2	05/27/20	U	SNF
Phosphorus as P, Total	0.07	mg/l	0.01	0.05	SM 4500-P E	05/22/20		RCE
Solids, Total Dissolved	70	mg/l	4	5	SM 2540 C	05/22/20		TMH
Total Organic Carbon	1.3	mg/l	0.3	0.5	SM 5310 C	05/27/20		MPB
Solids, Total Suspended	3	mg/l	1	1	SM 2540 D	05/22/20		TMH

Lab ID: 2015557-10 **Collected By:** Client **Sampled:** 05/21/20 07:45 **Received:** 05/21/20 12:30
Sample Desc: BZ-6D **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	<0.05	mg/l		0.05	SM 4500-P F	05/26/20	G-11, G-17	TML
General Chemistry								
Alkalinity, Total to pH 4.5	12	mg CaCO3/L		2	SM 2320 B	05/22/20	C-51c	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	05/22/20	U	APR
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	05/21/20 14:00		SNF
Nitrate as N	0.96	mg/l	0.18	1.00	EPA 300.0 Rev 2.1	05/21/20 17:01	J	MRW
Nitrite as N	<0.007	mg/l	0.007	0.10	EPA 300.0 Rev 2.1	05/21/20 17:01	U	MRW
Nitrate+Nitrite as N	<0.97	mg/l	0.182	1.10	CALCULATED	05/21/20 17:01		MRW
Nitrogen, Total Kjeldahl (TKN)	<0.37	mg/l	0.37	0.50	EPA 351.2	05/27/20	U	SNF
Phosphorus as P, Total	0.02	mg/l	0.01	0.05	SM 4500-P E	05/22/20	J	RCE
Solids, Total Dissolved	70	mg/l	4	5	SM 2540 C	05/22/20		TMH
Total Organic Carbon	1.3	mg/l	0.3	0.5	SM 5310 C	05/27/20		MPB
Solids, Total Suspended	1	mg/l	1	1	SM 2540 D	05/22/20		TMH

Lab ID: 2015557-11 **Collected By:** Client **Sampled:** 05/21/20 09:10 **Received:** 05/21/20 12:30
Sample Desc: BZ-7S **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	<0.05	mg/l		0.05	SM 4500-P F	05/26/20	G-11, G-17	TML
General Chemistry								
Alkalinity, Total to pH 4.5	12	mg CaCO3/L		2	SM 2320 B	05/22/20	C-51a	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	05/22/20	U	APR
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	05/21/20 14:00		SNF
Nitrate as N	0.93	mg/l	0.18	1.00	EPA 300.0 Rev 2.1	05/21/20 17:18	J	MRW
Nitrite as N	<0.007	mg/l	0.007	0.10	EPA 300.0 Rev 2.1	05/21/20 17:18	U	MRW
Nitrate+Nitrite as N	<0.94	mg/l	0.182	1.10	CALCULATED	05/21/20 17:18		MRW
Nitrogen, Total Kjeldahl (TKN)	<0.37	mg/l	0.37	0.50	EPA 351.2	05/27/20	U	SNF
Phosphorus as P, Total	0.07	mg/l	0.01	0.05	SM 4500-P E	05/22/20		RCE
Solids, Total Dissolved	67	mg/l	4	5	SM 2540 C	05/22/20		TMH
Total Organic Carbon	1.8	mg/l	0.3	0.5	SM 5310 C	05/27/20		MPB
Solids, Total Suspended	1	mg/l	1	1	SM 2540 D	05/22/20		TMH

	Result	Unit	Rep. Limit	Analysis Method	Incubated	Analyzed	Notes	Analyst
Microbiology								
Escherichia coli	<1	mpn/100ml	1	SM 9223 B/Quantitray	5/21/20 14:36	5/22/20 9:37		JMW
Total Coliform	22	mpn/100ml	1	SM 9223 B/Quantitray	5/21/20 14:36	5/22/20 9:37		JMW

Lab ID: 2015557-12 **Collected By:** Client **Sampled:** 05/21/20 09:10 **Received:** 05/21/20 12:30
Sample Desc: BZ-7M **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	<0.05	mg/l		0.05	SM 4500-P F	05/26/20	G-11, G-17	TML
General Chemistry								
Alkalinity, Total to pH 4.5	12	mg CaCO3/L		2	SM 2320 B	05/22/20	C-51a	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	05/22/20	U	APR
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	05/21/20 14:00		SNF
Nitrate as N	0.95	mg/l	0.18	1.00	EPA 300.0 Rev 2.1	05/21/20 17:34	J	MRW
Nitrite as N	<0.007	mg/l	0.007	0.10	EPA 300.0 Rev 2.1	05/21/20 17:34	U	MRW
Nitrate+Nitrite as N	<0.96	mg/l	0.182	1.10	CALCULATED	05/21/20 17:34		MRW
Nitrogen, Total Kjeldahl (TKN)	<0.37	mg/l	0.37	0.50	EPA 351.2	05/27/20	Q-10, U	SNF
Phosphorus as P, Total	0.05	mg/l	0.01	0.05	SM 4500-P E	05/22/20	J	RCE
Solids, Total Dissolved	73	mg/l	4	5	SM 2540 C	05/22/20		TMH
Total Organic Carbon	1.3	mg/l	0.3	0.5	SM 5310 C	05/27/20		MPB
Solids, Total Suspended	<1	mg/l	1	1	SM 2540 D	05/22/20		TMH

Lab ID: 2015557-13 **Collected By:** Client **Sampled:** 05/21/20 09:10 **Received:** 05/21/20 12:30
Sample Desc: BZ-7D **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	<0.05	mg/l		0.05	SM 4500-P F	05/26/20	G-11, G-17	TML
General Chemistry								
Alkalinity, Total to pH 4.5	12	mg CaCO3/L		2	SM 2320 B	05/22/20	C-51a	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	05/22/20	U	APR
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	05/21/20 14:00		SNF
Nitrate as N	0.96	mg/l	0.18	1.00	EPA 300.0 Rev 2.1	05/21/20 17:51	J	MRW
Nitrite as N	<0.007	mg/l	0.007	0.10	EPA 300.0 Rev 2.1	05/21/20 17:51	U	MRW
Nitrate+Nitrite as N	<0.97	mg/l	0.182	1.10	CALCULATED	05/21/20 17:51		MRW
Nitrogen, Total Kjeldahl (TKN)	<0.37	mg/l	0.37	0.50	EPA 351.2	05/27/20	U	SNF
Phosphorus as P, Total	0.02	mg/l	0.01	0.05	SM 4500-P E	05/22/20	J	RCE
Solids, Total Dissolved	69	mg/l	4	5	SM 2540 C	05/22/20		TMH
Total Organic Carbon	1.4	mg/l	0.3	0.5	SM 5310 C	05/27/20		MPB
Solids, Total Suspended	3	mg/l	1	1	SM 2540 D	05/22/20		TMH

Preparation Methods

Specific Method	Preparation Method	Prep Batch	Prepared Date	Prepared By
2015557-01				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0E1315	05/22/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0E1259	05/22/2020	RCE
2015557-02				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0E1315	05/22/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0E1259	05/22/2020	RCE
2015557-03				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0E1315	05/22/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0E1259	05/22/2020	RCE
2015557-04				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0E1315	05/22/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0E1259	05/22/2020	RCE
2015557-05				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0E1315	05/22/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0E1259	05/22/2020	RCE
2015557-06				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0E1315	05/22/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0E1259	05/22/2020	RCE
2015557-07				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0E1258	05/21/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0E1259	05/22/2020	RCE
2015557-08				
Dissolved General Chemistry				

SM 4500-P F	SM 4500-P B	B0E1258	05/21/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0E1259	05/22/2020	RCE
2015557-09				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0E1258	05/21/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0E1259	05/22/2020	RCE
2015557-10				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0E1258	05/21/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0E1259	05/22/2020	RCE
2015557-11				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0E1258	05/21/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0E1259	05/22/2020	RCE
2015557-12				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0E1258	05/21/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0E1259	05/22/2020	RCE
2015557-13				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0E1258	05/21/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0E1259	05/22/2020	RCE

Notes and Definitions

C-51	The alkalinity to pH 4.2 = 11.7 mg CaCO3/L.
C-51a	The alkalinity to pH 4.2 = 11.8 mg CaCO3/L.
C-51b	The alkalinity to pH 4.2 = 11.9 mg CaCO3/L.
C-51c	The alkalinity to pH 4.2 = 12.0 mg CaCO3/L.
C-51d	The alkalinity to pH 4.2 = 12.2 mg CaCO3/L.
C-51e	The alkalinity to pH 4.2 = 13.9 mg CaCO3/L.
C-51f	The alkalinity to pH 4.2 = 6.4 mg CaCO3/L.
C-51g	The alkalinity to pH 4.2 = 7.9 mg CaCO3/L.
G-11	The sample was filtered after it was received at the laboratory.
G-17	The sample was preserved in the laboratory.
J	Estimated value
Q-10	The matrix spike(s) were outside acceptable limits of 90-110% recovery at 114%.
U	Analyte was not detected above the indicated value.

M.J. Reider Associates, Inc.
107 Angelica St, Reading PA, 19611
610-374-5129 www.mjreider.com

WORK ORDER
Chain of Custody

2015557

Client Code: 3157 **Client:** Tetra Tech
Project Manager: Richard A Wheeler **Project:** 2020 - Beltzville Reservoir
Report To: Tetra Tech - David Wertz - USACE, Phila Dist. Env.Resources Branch 100 Penn Square E., Arlington, VA 22201
Invoice To: Tetra Tech - David Wertz - USACE, Phila Dist. Env.Resources Branch 100 Penn Square E., Arlington, VA 22201

Collected By : (Full Name) Gregory Wacik

Comments:

2015557-01 BZ-1S

BOD SM 5210B, EC (#) SM 9223B Confirmation, NO2-N EPA 300.0, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F, TC (#) SM 9223B
Alk SM 2320B, NH3-N D6919-03, PO4 SM 4500P-E, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

Matrix: Non-Potable Water Date: 5/21/20
Type: Grab Time: 0645

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Sterile Pl 125ml NaThio
D - Pl 500ml H2SO4
E - Pl 250ml NP
F - Pl 500ml Lab Filtered
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc
I - Vial Amber 40ml H3PO4, minimal hdspc

2015557-02 BZ-2S

BOD SM 5210B, EC (#) SM 9223B Confirmation, NO2-N EPA 300.0, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F, TC (#) SM 9223B
Alk SM 2320B, NH3-N D6919-03, PO4 SM 4500P-E, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

Matrix: Non-Potable Water Date: 5/21/20
Type: Grab Time: 1050

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Sterile Pl 125ml NaThio
D - Pl 500ml H2SO4
E - Pl 250ml NP
F - Pl 500ml Lab Filtered
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc
I - Vial Amber 40ml H3PO4, minimal hdspc

Relinquished By	5/21/20 1115 Date/Time	Received By	5-21-20 1125 Date/Time
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received at Laboratory By	5-21-20 1230 Date/Time

Sample Kit Prepared By: JSV QMS	Date/Time 5/11/20
Sample Temp (°C):	5
Samples on Ice?	Yes No NA
Approved By:	BSV
Entered By:	

Printed: 5/7/2020 2:03:27PM

Report Template:

M.J. Reider Associates, Inc.

Client Code: 3157 **Client:** Tetra Tech

Project Manager: Richard A Wheeler **Project:** 2020 - Beltzville Reservoir

Comments:

Collected By : (Full Name) Gregory Wacik

2015557-03 BZ-3S

BOD SM 5210B, EC (#) SM 9223B Confirmation, NO2-N EPA 300.0, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F, TC (#) SM 9223B

Alk SM 2320B, NH3-N D6919-03, PO4 SM 4500P-E, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

Matrix: Non-Potable Water Date: 5/21/20
Type: Grab Time: 0830

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Sterile Pl 125ml NaThio
D - Pl 500ml H2SO4
E - Pl 250ml NP
F - Pl 500ml Lab Filtered
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc
I - Vial Amber 40ml H3PO4, minimal hdspc

2015557-04 BZ-3M

BOD SM 5210B, NO2-N EPA 300.0, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F

Alk SM 2320B, NH3-N D6919-03, PO4 SM 4500P-E, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

Matrix: Non-Potable Water Date: 5/21/20
Type: Grab Time: 0830

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Pl 500ml H2SO4
D - Pl 250ml NP
E - Pl 500ml Lab Filtered
F - Vial Amber 40ml H3PO4, minimal hdspc
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc

2015557-05 BZ-3D

NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F, BOD SM 5210B, NO2-N EPA 300.0

PO4 SM 4500P-E, Alk SM 2320B, NH3-N D6919-03, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

Matrix: Non-Potable Water Date: 5/21/20
Type: Grab Time: 0830

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Pl 500ml H2SO4
D - Pl 250ml NP
E - Pl 500ml Lab Filtered
F - Vial Amber 40ml H3PO4, minimal hdspc
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc

Relinquished By	5/21/20 1115 Date/Time	Received By	5-21-20 1125 Date/Time
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received at Laboratory By	5-21-20 1230 Date/Time

Sample Kit Prepared By: JSV QMS	Date/Time 5/11/20
Sample Temp (°C):	5
Samples on Ice?	Yes No NA
Approved By:	BSW
Entered By:	

M.J. Reider Associates, Inc.

2015557

Client Code: 3157 **Client:** Tetra Tech

Project Manager: Richard A Wheeler **Project:** 2020 - Beltzville Reservoir

Comments:

Collected By : (Full Name) Gregory Wacik

2015557-06 BZ-4S

BOD SM 5210B, EC (#) SM 9223B Confirmation, PO4-D SM 4500P-F, TC (#) SM 9223B, NO2-N EPA 300.0, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2

Alk SM 2320B, NH3-N D6919-03, PO4 SM 4500P-E, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

Matrix: Non-Potable Water Date: 5/21/20
Type: Grab Time: 1035

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Sterile Pl 125ml NaThio
D - Pl 500ml H2SO4
E - Pl 250ml NP
F - Pl 500ml Lab Filtered
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc
I - Vial Amber 40ml H3PO4, minimal hdspc

2015557-07 BZ-5S

BOD SM 5210B, EC (#) SM 9223B Confirmation, NO2-N EPA 300.0, TC (#) SM 9223B, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F

NH3-N D6919-03, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, Alk SM 2320B, PO4 SM 4500P-E, TSS SM 2540D

Matrix: Non-Potable Water Date: 5/21/20
Type: Grab Time: 1015

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Sterile Pl 125ml NaThio
D - Pl 500ml H2SO4
E - Pl 250ml NP
F - Pl 500ml Lab Filtered
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc
I - Vial Amber 40ml H3PO4, minimal hdspc

2015557-08 BZ-6S

NO2-N EPA 300.0, NO3-N EPA 300.0, BOD SM 5210B, EC (#) SM 9223B Confirmation, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F, TC (#) SM 9223B

NH3-N D6919-03, Alk SM 2320B, PO4 SM 4500P-E, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

Matrix: Non-Potable Water Date: 5/21/20
Type: Grab Time: 0745

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Sterile Pl 125ml NaThio
D - Pl 500ml H2SO4
E - Pl 250ml NP
F - Pl 500ml Lab Filtered
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc
I - Vial Amber 40ml H3PO4, minimal hdspc

Relinquished By	5/21/20 11:15 Date/Time	Received By	5-21-20 1125 Date/Time
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received at Laboratory By	5-21-20 1230 Date/Time

Sample Kit Prepared By:	Date/Time
VBJ JV QMS	5/11/20
Sample Temp (°C):	5
Samples on Ice?	Yes No NA
Approved By:	
Entered By:	BSW

Printed: 5/7/2020 2:03:27PM

Report Template: wko WorkOrder COC le

M.J. Reider Associates, Inc.

Client Code: 3157 **Client:** Tetra Tech

Project Manager: Richard A Wheeler **Project:** 2020 - Beltzville Reservoir

Comments:

Collected By : (Full Name) Gregory Wacik

2015557-09 BZ-6M

Matrix: Non-Potable Water Date: 5/21/20
Type: Grab Time: 0745

BOD SM 5210B, NO2-N EPA 300.0, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F
Alk SM 2320B, NH3-N D6919-03, PO4 SM 4500P-E, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Pl 500ml H2SO4
D - Pl 250ml NP
E - Pl 500ml Lab Filtered
F - Vial Amber 40ml H3PO4, minimal hdspc
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc

2015557-10 BZ-6D

Matrix: Non-Potable Water Date: 5/21/20
Type: Grab Time: 0745

BOD SM 5210B, NO2-N EPA 300.0, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F
Alk SM 2320B, NH3-N D6919-03, PO4 SM 4500P-E, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Pl 500ml H2SO4
D - Pl 250ml NP
E - Pl 500ml Lab Filtered
F - Vial Amber 40ml H3PO4, minimal hdspc
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc

2015557-11 BZ-7S

Matrix: Non-Potable Water Date: 5/21/20
Type: Grab Time: 0910

BOD SM 5210B, EC (#) SM 9223B Confirmation, NO2-N EPA 300.0, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F, TC (#) SM 9223B
Alk SM 2320B, NH3-N D6919-03, PO4 SM 4500P-E, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Sterile Pl 125ml NaThio
D - Pl 500ml H2SO4
E - Pl 250ml NP
F - Pl 500ml Lab Filtered
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc
I - Vial Amber 40ml H3PO4, minimal hdspc

Relinquished By	5/21/20 11:15 Date/Time	Received By	5-21-20 1125 Date/Time
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received at Laboratory By	5-21-20 1230 Date/Time

Sample Kit Prepared By: VBJ JSV QMS	Date/Time 5/1/20
Sample Temp (°C):	5
Samples on Ice?	Yes No NA
Approved By:	
Entered By:	BSG

Printed: 5/7/2020 2:03:27PM

Report Template: [illegible]

M.J. Reider Associates, Inc.

Client Code: 3157 **Client:** Tetra Tech

Project Manager: Richard A Wheeler **Project:** 2020 - Beltzville Reservoir

Comments:

Collected By : (Full Name) Gregory Wacik

2015557-12 BZ-7M

BOD SM 5210B, NO2-N EPA 300.0, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F
Alk SM 2320B, NH3-N D6919-03, PO4 SM 4500P-E, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

Matrix: Non-Potable Water Date: 5/21/20
Type: Grab Time: 0910

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Pl 500ml H2SO4
D - Pl 250ml NP
E - Pl 500ml Lab Filtered
F - Vial Amber 40ml H3PO4, minimal hdspc
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc

2015557-13 BZ-7D

NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F, BOD SM 5210B, NO2-N EPA 300.0, NO3-N EPA 300.0
PO4 SM 4500P-E, TDS SM 2540C, Alk SM 2320B, NH3-N D6919-03, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

Matrix: Non-Potable Water Date: 5/21/20
Type: Grab Time: 0910

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Pl 500ml H2SO4
D - Pl 250ml NP
E - Pl 500ml Lab Filtered
F - Vial Amber 40ml H3PO4, minimal hdspc
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc

Relinquished By	5/21/20 11:15 Date/Time	Received By	5-21-20 1125 Date/Time
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received at Laboratory By	5-21-20 1230 Date/Time

Sample Kit Prepared By:	Date/Time
	5/11/20
Sample Temp (°C):	5
Samples on Ice?	Yes No NA
Approved By:	BSW
Entered By:	

Printed: 5/7/2020 2:03:27PM

Report Template: [illegible]

MJRA Terms & Conditions

All samples submitted must be accompanied by signed documentation representing a Chain of Custody (COC). The COC Record acts as a contract between the client and MJRA. Signing the COC form gives approval for MJRA to perform the requested analyses and is an agreement to pay for the cost of such analyses**.** COC Records must be completed in black or blue indelible ink (must not run when wet). COC documentation begins at the time of sample collection. Client is required to document all sample details prior to releasing samples to MJRA. All samples must be placed on ice immediately after sampling and shipped or delivered to the laboratory in a manner that will maintain the sample temperature above freezing and below 6C (loose ice is preferred)**.**

Sample Submission, Sample Acceptance & Sampling Containers

Included on the COC must be the sample description, date and time of collection (including start and stop for composites), container size and type, preservative information, sample matrix, indication of whether the sample is a grab or composite, number of containers & a list of the tests to be performed. Poor sample collection technique, inappropriate sampling containers and/or improper sample preservation may lead to sample rejection. Suitable sample containers, labels, and preservatives (as applicable), along with blank COCs are provided at no additional cost.

Turnaround Times (TAT)

Average TAT for test results range from 5 to 15 working days depending on the specific analyses and time of year submitted. Faster turnaround times (*RUSH TAT) may be available depending on the current workload in a particular department and the nature of the analyses requested. We encourage you to verify requests for expedited sample results with one of our Technical Directors prior to sample submittal. Without confirmation from a Technical Director, your results may not be completed by your deadline. *RUSH TAT Surcharges are applied for expedited turnaround times.

Analytical Results, Sample Collection Integrity & Subcontracting

Analytical values are for the sample as submitted and relate only to the item tested. The value indicates a snapshot of the constituent content of the sample at the time of sample collection. Analytical results can be impacted by poor sample collection technique and/or improper preservation. All sample collection completed by MJRA was performed in accordance with applicable regulatory protocols or as specified in customer specific sampling plans. Constituent content will vary over time based on the matrix of the sample and the physical and chemical changes to its environment. All sample results and laboratory reports are strictly confidential. Results will not be available to anyone except the primary client or authorized party representing the client unless MJRA receives additional permissions from the client. When necessary, MJRA will subcontract certain analyses to a third party accredited laboratory. If client prohibits subcontracting, it must be provided in writing and include instruction on how to proceed with client samples that require third party analyses.

Payment Terms

Payment Terms are Net 30 days. Prices are subject to change without notice. A standing monthly charge of 1.5% of the clients over-30-day-unpaid balance may be added to the balance after 30 days and each month thereafter (day 31, 61, 91 etc.). The laboratory accepts all major credit cards, ACH transactions, checks and cash. New clients must pay for all services rendered prior to sample collection and/or in some cases report processing. Clients must contact the MJRA accounting department to pursue a credit-based account. MJRA reserves the right to terminate the client's credit account and to refuse to perform additional services on a credit basis if any balance is outstanding for more than 60 days.

Warranty & Litigation

MJRA does not guarantee any results of its services but has agreed to use its best efforts, in accordance with the standards and practices of the industry, to cause such results to be accurate and complete. We disclaim any other warranties, expressed or implied, including a warranty of fitness for a particular purpose and warranty of merchantability. Clients agree that they shall reimburse MJRA for any and all fees, cost and litigation expenses, including reasonable attorney fees incurred by MJRA in obtaining payment for the services rendered. All costs associated with compliance with any subpoena for documents, testimony, or any other purpose relating to work performed by MJRA, for a client, shall be paid by that client. MJRA's aggregate liability for negligent acts and omissions and of an intentional breach by MJRA will not exceed the fee paid for the services. Client agrees to indemnify and hold MJRA harmless for any and all liabilities in excess of said amount. Neither MJRA nor the client shall be liable to the other for special, incidental consequential or punitive liability or damages included but not limited to those arising from delay, loss of use, loss of profits or revenues. MJRA will not be liable to the client unless the client has notified MJRA of the discovery of the alleged negligent act, error, omissions or breach within 30 days of the

Reviewed and Approved by:

Richard A Wheeler
Director of Field Services

Certificate of Analysis

M.J. Reider Associates, Inc.
ENVIRONMENTAL TESTING LABORATORY
U.S. EPA/PA DEP #06-00003

Laboratory No.: 2016279
Report: 06/24/20
Lab Contact: Richard A Wheeler

Attention: David Wertz
Reported To: Tetra Tech
USACE, Phila Dist. Env.Resources Branch 100 Penn Square E.
Arlington, VA 22201

Project: 2020 - Beltzville Reservoir

Lab ID: 2016279-01 **Collected By:** Client **Sampled:** 06/18/20 06:30 **Received:** 06/18/20 12:40
Sample Desc: BZ-1S **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	<0.05	mg/l		0.05	SM 4500-P F	06/22/20	G-11	TML
General Chemistry								
Alkalinity, Total to pH 4.5	12	mg CaCO3/L		2	SM 2320 B	06/19/20	C-51c	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	06/19/20	U	APR
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	06/18/20 13:45		SNF
Nitrate as N	0.89	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	06/18/20 16:46	J	MRW
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	06/18/20 16:46	U	MRW
Nitrate+Nitrite as N	<0.90	mg/l	0.125	1.10	CALCULATED	06/18/20 16:46		MRW
Nitrogen, Total Kjeldahl (TKN)	<0.37	mg/l	0.37	0.50	EPA 351.2	06/22/20	U	TML
Phosphorus as P, Total	<0.01	mg/l	0.01	0.05	SM 4500-P E	06/19/20	U	RCE
Solids, Total Dissolved	52	mg/l	4	5	SM 2540 C	06/19/20		TMH
Total Organic Carbon	2.0	mg/l	0.3	0.5	SM 5310 C	06/19/20		ALD
Solids, Total Suspended	<1	mg/l	1	1	SM 2540 D	06/19/20		ALD

	Result	Unit	Rep. Limit	Analysis Method	Incubated	Analyzed	Notes	Analyst
Microbiology								
Escherichia coli	6	mpn/100ml	1	SM 9223 B/Quantitray	6/18/20 14:11	6/19/20 9:05		JMW
Total Coliform	488	mpn/100ml	1	SM 9223 B/Quantitray	6/18/20 14:11	6/19/20 9:05		JMW

Lab ID: 2016279-02 **Collected By:** Client **Sampled:** 06/18/20 10:45 **Received:** 06/18/20 12:40
Sample Desc: BZ-2S **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	0.06	mg/l		0.05	SM 4500-P F	06/22/20	G-11	TML
General Chemistry								
Alkalinity, Total to pH 4.5	8	mg CaCO3/L		2	SM 2320 B	06/19/20	C-51k	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	06/19/20	U	APR
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	06/18/20 13:45		SNF
Nitrate as N	0.42	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	06/18/20 17:37	J	MRW
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	06/18/20 17:37	U	MRW
Nitrate+Nitrite as N	<0.43	mg/l	0.125	1.10	CALCULATED	06/18/20 17:37		MRW
Nitrogen, Total Kjeldahl (TKN)	<0.37	mg/l	0.37	0.50	EPA 351.2	06/22/20	U	TML
Phosphorus as P, Total	<0.01	mg/l	0.01	0.05	SM 4500-P E	06/19/20	U	RCE
Solids, Total Dissolved	34	mg/l	4	5	SM 2540 C	06/19/20		TMH
Total Organic Carbon	0.7	mg/l	0.3	0.5	SM 5310 C	06/19/20		ALD
Solids, Total Suspended	3	mg/l	1	1	SM 2540 D	06/19/20		ALD

	Result	Unit	Rep. Limit	Analysis Method	Incubated	Analyzed	Notes	Analyst
Microbiology								
Escherichia coli	65	mpn/100ml	1	SM 9223 B/Quantitray	6/18/20 14:11	6/19/20 9:05		JMW
Total Coliform	727	mpn/100ml	1	SM 9223 B/Quantitray	6/18/20 14:11	6/19/20 9:05		JMW

Lab ID: 2016279-03 **Collected By:** Client **Sampled:** 06/18/20 08:15 **Received:** 06/18/20 12:40
Sample Desc: BZ-3S **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	<0.05	mg/l		0.05	SM 4500-P F	06/22/20	G-11	TML
General Chemistry								
Alkalinity, Total to pH 4.5	11	mg CaCO3/L		2	SM 2320 B	06/19/20	C-51a	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	06/19/20	U	APR
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	06/18/20 13:45		SNF
Nitrate as N	0.76	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	06/18/20 17:54	J	MRW
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	06/18/20 17:54	U	MRW
Nitrate+Nitrite as N	<0.77	mg/l	0.125	1.10	CALCULATED	06/18/20 17:54		MRW
Nitrogen, Total Kjeldahl (TKN)	<0.37	mg/l	0.37	0.50	EPA 351.2	06/22/20	U	TML
Phosphorus as P, Total	<0.01	mg/l	0.01	0.05	SM 4500-P E	06/19/20	U	RCE
Solids, Total Dissolved	53	mg/l	4	5	SM 2540 C	06/19/20		TMH
Total Organic Carbon	1.7	mg/l	0.3	0.5	SM 5310 C	06/19/20		ALD
Solids, Total Suspended	3	mg/l	1	1	SM 2540 D	06/19/20		ALD

	Result	Unit	Rep. Limit	Analysis Method	Incubated	Analyzed	Notes	Analyst
Microbiology								
Escherichia coli	<1	mpn/100ml	1	SM 9223 B/Quantitray	6/18/20 14:11	6/19/20 9:05		JMW
Total Coliform	64	mpn/100ml	1	SM 9223 B/Quantitray	6/18/20 14:11	6/19/20 9:05		JMW

Lab ID: 2016279-04 **Collected By:** Client **Sampled:** 06/18/20 08:15 **Received:** 06/18/20 12:40
Sample Desc: BZ-3M **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	<0.05	mg/l		0.05	SM 4500-P F	06/22/20	G-11	TML
General Chemistry								
Alkalinity, Total to pH 4.5	12	mg CaCO3/L		2	SM 2320 B	06/19/20	C-51e	APR
Ammonia as N	0.02	mg/l	0.01	0.10	ASTM D6919-03	06/19/20	J	APR
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	06/18/20 13:45		SNF
Nitrate as N	0.92	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	06/18/20 18:10	J	MRW
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	06/18/20 18:10	U	MRW
Nitrate+Nitrite as N	<0.93	mg/l	0.125	1.10	CALCULATED	06/18/20 18:10		MRW
Nitrogen, Total Kjeldahl (TKN)	<0.37	mg/l	0.37	0.50	EPA 351.2	06/22/20	U	TML
Phosphorus as P, Total	<0.01	mg/l	0.01	0.05	SM 4500-P E	06/19/20	U	RCE
Solids, Total Dissolved	44	mg/l	4	5	SM 2540 C	06/19/20		TMH
Total Organic Carbon	1.2	mg/l	0.3	0.5	SM 5310 C	06/19/20		ALD
Solids, Total Suspended	<1	mg/l	1	1	SM 2540 D	06/19/20		ALD

Lab ID: 2016279-05 **Collected By:** Client **Sampled:** 06/18/20 08:15 **Received:** 06/18/20 12:40
Sample Desc: BZ-3D **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	0.05	mg/l		0.05	SM 4500-P F	06/22/20	G-11	TML
General Chemistry								
Alkalinity, Total to pH 4.5	13	mg CaCO3/L		2	SM 2320 B	06/19/20	C-51g	APR
Ammonia as N	0.17	mg/l	0.01	0.10	ASTM D6919-03	06/19/20		APR
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	06/18/20 13:45		SNF
Nitrate as N	0.88	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	06/18/20 18:27	J	MRW
Nitrite as N	0.02	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	06/18/20 18:27	J	MRW
Nitrate+Nitrite as N	0.90	mg/l	0.125	1.10	CALCULATED	06/18/20 18:27		MRW
Nitrogen, Total Kjeldahl (TKN)	<0.37	mg/l	0.37	0.50	EPA 351.2	06/22/20	U	TML
Phosphorus as P, Total	<0.01	mg/l	0.01	0.05	SM 4500-P E	06/19/20	U	RCE
Solids, Total Dissolved	47	mg/l	4	5	SM 2540 C	06/19/20		TMH
Total Organic Carbon	1.3	mg/l	0.3	0.5	SM 5310 C	06/19/20		ALD
Solids, Total Suspended	3	mg/l	1	1	SM 2540 D	06/19/20		ALD

Lab ID: 2016279-06 **Collected By:** Client **Sampled:** 06/18/20 10:30 **Received:** 06/18/20 12:40
Sample Desc: BZ-4S **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	<0.05	mg/l		0.05	SM 4500-P F	06/22/20	G-11	TML
General Chemistry								
Alkalinity, Total to pH 4.5	7	mg CaCO3/L		2	SM 2320 B	06/19/20	C-51j	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	06/19/20	U	APR
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	06/18/20 13:45		SNF
Nitrate as N	0.23	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	06/18/20 13:58	J	MRW
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	06/18/20 13:58	U	MRW
Nitrate+Nitrite as N	<0.24	mg/l	0.125	1.10	CALCULATED	06/18/20 13:58		MRW
Nitrogen, Total Kjeldahl (TKN)	<0.37	mg/l	0.37	0.50	EPA 351.2	06/22/20	U	TML
Phosphorus as P, Total	<0.01	mg/l	0.01	0.05	SM 4500-P E	06/19/20	U	RCE
Solids, Total Dissolved	36	mg/l	4	5	SM 2540 C	06/19/20		TMH
Total Organic Carbon	1.5	mg/l	0.3	0.5	SM 5310 C	06/19/20		ALD
Solids, Total Suspended	1	mg/l	1	1	SM 2540 D	06/19/20		ALD

	Result	Unit	Rep. Limit	Analysis Method	Incubated	Analyzed	Notes	Analyst
Microbiology								
Escherichia coli	26	mpn/100ml	1	SM 9223 B/Quantitray	6/18/20 14:11	6/19/20 9:05		JMW
Total Coliform	1990	mpn/100ml	1	SM 9223 B/Quantitray	6/18/20 14:11	6/19/20 9:05		JMW

Lab ID: 2016279-07 **Collected By:** Client **Sampled:** 06/18/20 10:15 **Received:** 06/18/20 12:40
Sample Desc: BZ-5S **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	0.05	mg/l		0.05	SM 4500-P F	06/22/20	G-11	TML
General Chemistry								
Alkalinity, Total to pH 4.5	14	mg CaCO3/L		2	SM 2320 B	06/19/20	C-51h	APR
Ammonia as N	0.04	mg/l	0.01	0.10	ASTM D6919-03	06/19/20	J	APR
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	06/18/20 13:45		SNF
Nitrate as N	1.29	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	06/18/20 14:15		MRW
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	06/18/20 14:15	U	MRW
Nitrate+Nitrite as N	<1.30	mg/l	0.125	1.10	CALCULATED	06/18/20 14:15		MRW
Nitrogen, Total Kjeldahl (TKN)	<0.37	mg/l	0.37	0.50	EPA 351.2	06/22/20	U	TML
Phosphorus as P, Total	0.03	mg/l	0.01	0.05	SM 4500-P E	06/19/20	J	RCE
Solids, Total Dissolved	66	mg/l	4	5	SM 2540 C	06/19/20		TMH
Total Organic Carbon	1.4	mg/l	0.3	0.5	SM 5310 C	06/19/20		ALD
Solids, Total Suspended	6	mg/l	1	1	SM 2540 D	06/19/20		ALD

	Result	Unit	Rep. Limit	Analysis Method	Incubated	Analyzed	Notes	Analyst
Microbiology								
Escherichia coli	135	mpn/100ml	1	SM 9223 B/Quantitray	6/18/20 14:11	6/19/20 9:05		JMW
Total Coliform	>2420	mpn/100ml	1	SM 9223 B/Quantitray	6/18/20 14:11	6/19/20 9:05		JMW

Lab ID: 2016279-08 **Collected By:** Client **Sampled:** 06/18/20 07:30 **Received:** 06/18/20 12:40
Sample Desc: BZ-6S **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	<0.05	mg/l		0.05	SM 4500-P F	06/22/20	G-11	TML
General Chemistry								
Alkalinity, Total to pH 4.5	11	mg CaCO3/L		2	SM 2320 B	06/19/20	C-51b	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	06/19/20	U	APR
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	06/18/20 13:45		SNF
Nitrate as N	0.76	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	06/18/20 14:32	J	MRW
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	06/18/20 14:32	U	MRW
Nitrate+Nitrite as N	<0.77	mg/l	0.125	1.10	CALCULATED	06/18/20 14:32		MRW
Nitrogen, Total Kjeldahl (TKN)	<0.37	mg/l	0.37	0.50	EPA 351.2	06/22/20	U	TML
Phosphorus as P, Total	0.02	mg/l	0.01	0.05	SM 4500-P E	06/19/20	J	RCE
Solids, Total Dissolved	55	mg/l	4	5	SM 2540 C	06/19/20		TMH
Total Organic Carbon	2.4	mg/l	0.3	0.5	SM 5310 C	06/19/20		ALD
Solids, Total Suspended	2	mg/l	1	1	SM 2540 D	06/19/20		ALD

	Result	Unit	Rep. Limit	Analysis Method	Incubated	Analyzed	Notes	Analyst
Microbiology								
Escherichia coli	7	mpn/100ml	1	SM 9223 B/Quantitray	6/18/20 14:11	6/19/20 9:05		JMW
Total Coliform	228	mpn/100ml	1	SM 9223 B/Quantitray	6/18/20 14:11	6/19/20 9:05		JMW

Lab ID: 2016279-09 **Collected By:** Client **Sampled:** 06/18/20 07:30 **Received:** 06/18/20 12:40
Sample Desc: BZ-6M **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	<0.05	mg/l		0.05	SM 4500-P F	06/22/20	G-11	TML
General Chemistry								
Alkalinity, Total to pH 4.5	12	mg CaCO3/L		2	SM 2320 B	06/19/20	C-51d	APR
Ammonia as N	0.04	mg/l	0.01	0.10	ASTM D6919-03	06/19/20	J	APR
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	06/18/20 13:45		SNF
Nitrate as N	0.93	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	06/18/20 14:49	J	MRW
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	06/18/20 14:49	U	MRW
Nitrate+Nitrite as N	<0.94	mg/l	0.125	1.10	CALCULATED	06/18/20 14:49		MRW
Nitrogen, Total Kjeldahl (TKN)	<0.37	mg/l	0.37	0.50	EPA 351.2	06/22/20	U	TML
Phosphorus as P, Total	<0.01	mg/l	0.01	0.05	SM 4500-P E	06/19/20	U	RCE
Solids, Total Dissolved	58	mg/l	4	5	SM 2540 C	06/19/20		TMH
Total Organic Carbon	1.7	mg/l	0.3	0.5	SM 5310 C	06/19/20		ALD
Solids, Total Suspended	<1	mg/l	1	1	SM 2540 D	06/19/20		ALD

Lab ID: 2016279-10 **Collected By:** Client **Sampled:** 06/18/20 07:30 **Received:** 06/18/20 12:40
Sample Desc: BZ-6D **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	<0.05	mg/l		0.05	SM 4500-P F	06/22/20	G-11	TML
General Chemistry								
Alkalinity, Total to pH 4.5	15	mg CaCO3/L		2	SM 2320 B	06/19/20	C-51i	APR
Ammonia as N	0.09	mg/l	0.01	0.10	ASTM D6919-03	06/19/20	J	APR
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	06/18/20 13:45		SNF
Nitrate as N	0.82	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	06/18/20 15:05	J	MRW
Nitrite as N	0.02	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	06/18/20 15:05	J	MRW
Nitrate+Nitrite as N	0.84	mg/l	0.125	1.10	CALCULATED	06/18/20 15:05		MRW
Nitrogen, Total Kjeldahl (TKN)	<0.37	mg/l	0.37	0.50	EPA 351.2	06/22/20	U	TML
Phosphorus as P, Total	0.13	mg/l	0.01	0.05	SM 4500-P E	06/19/20		RCE
Solids, Total Dissolved	46	mg/l	4	5	SM 2540 C	06/19/20		TMH
Total Organic Carbon	2.8	mg/l	0.3	0.5	SM 5310 C	06/19/20		ALD
Solids, Total Suspended	14	mg/l	1	1	SM 2540 D	06/19/20		ALD

Lab ID: 2016279-11 **Collected By:** Client **Sampled:** 06/18/20 09:00 **Received:** 06/18/20 12:40
Sample Desc: BZ-7S **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	<0.05	mg/l		0.05	SM 4500-P F	06/22/20	G-11	TML
General Chemistry								
Alkalinity, Total to pH 4.5	11	mg CaCO3/L		2	SM 2320 B	06/19/20	C-51	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	06/19/20	U	APR
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	06/18/20 13:45		SNF
Nitrate as N	0.71	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	06/18/20 15:22	J	MRW
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	06/18/20 15:22	U	MRW
Nitrate+Nitrite as N	<0.72	mg/l	0.125	1.10	CALCULATED	06/18/20 15:22		MRW
Nitrogen, Total Kjeldahl (TKN)	<0.37	mg/l	0.37	0.50	EPA 351.2	06/22/20	U	TML
Phosphorus as P, Total	<0.01	mg/l	0.01	0.05	SM 4500-P E	06/19/20	U	RCE
Solids, Total Dissolved	28	mg/l	4	5	SM 2540 C	06/19/20		TMH
Total Organic Carbon	1.9	mg/l	0.3	0.5	SM 5310 C	06/19/20		ALD
Solids, Total Suspended	1	mg/l	1	1	SM 2540 D	06/19/20		ALD

	Result	Unit	Rep. Limit	Analysis Method	Incubated	Analyzed	Notes	Analyst
Microbiology								
Escherichia coli	1	mpn/100ml	1	SM 9223 B/Quantitray	6/18/20 14:11	6/19/20 9:05		JMW
Total Coliform	141	mpn/100ml	1	SM 9223 B/Quantitray	6/18/20 14:11	6/19/20 9:05		JMW

Lab ID: 2016279-12 **Collected By:** Client **Sampled:** 06/18/20 09:00 **Received:** 06/18/20 12:40
Sample Desc: BZ-7M **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	<0.05	mg/l		0.05	SM 4500-P F	06/22/20	G-11	TML
General Chemistry								
Alkalinity, Total to pH 4.5	13	mg CaCO3/L		2	SM 2320 B	06/19/20	C-51f	APR
Ammonia as N	0.05	mg/l	0.01	0.10	ASTM D6919-03	06/19/20	J	APR
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	06/18/20 13:45		SNF
Nitrate as N	0.89	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	06/18/20 15:39	J	MRW
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	06/18/20 15:39	U	MRW
Nitrate+Nitrite as N	<0.90	mg/l	0.125	1.10	CALCULATED	06/18/20 15:39		MRW
Nitrogen, Total Kjeldahl (TKN)	<0.37	mg/l	0.37	0.50	EPA 351.2	06/22/20	U	TML
Phosphorus as P, Total	<0.01	mg/l	0.01	0.05	SM 4500-P E	06/19/20	U	RCE
Solids, Total Dissolved	46	mg/l	4	5	SM 2540 C	06/19/20		TMH
Total Organic Carbon	1.3	mg/l	0.3	0.5	SM 5310 C	06/19/20		ALD
Solids, Total Suspended	<1	mg/l	1	1	SM 2540 D	06/19/20		ALD

Lab ID: 2016279-13 **Collected By:** Client **Sampled:** 06/18/20 09:00 **Received:** 06/18/20 12:40
Sample Desc: BZ-7D **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	<0.05	mg/l		0.05	SM 4500-P F	06/22/20	G-11	TML
General Chemistry								
Alkalinity, Total to pH 4.5	13	mg CaCO3/L		2	SM 2320 B	06/19/20	C-51f	APR
Ammonia as N	0.04	mg/l	0.01	0.10	ASTM D6919-03	06/19/20	J	APR
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	06/18/20 13:45		SNF
Nitrate as N	0.88	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	06/18/20 15:56	J	MRW
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	06/18/20 15:56	U	MRW
Nitrate+Nitrite as N	<0.89	mg/l	0.125	1.10	CALCULATED	06/18/20 15:56		MRW
Nitrogen, Total Kjeldahl (TKN)	<0.37	mg/l	0.37	0.50	EPA 351.2	06/22/20	U	TML
Phosphorus as P, Total	0.03	mg/l	0.01	0.05	SM 4500-P E	06/19/20	J	RCE
Solids, Total Dissolved	65	mg/l	4	5	SM 2540 C	06/19/20		TMH
Total Organic Carbon	1.5	mg/l	0.3	0.5	SM 5310 C	06/19/20		ALD
Solids, Total Suspended	10	mg/l	1	1	SM 2540 D	06/19/20		ALD

Preparation Methods

Specific Method	Preparation Method	Prep Batch	Prepared Date	Prepared By
2016279-01				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0F1193	06/19/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0F1194	06/19/2020	RCE
2016279-02				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0F1193	06/19/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0F1194	06/19/2020	RCE
2016279-03				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0F1193	06/19/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0F1194	06/19/2020	RCE
2016279-04				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0F1193	06/19/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0F1194	06/19/2020	RCE
2016279-05				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0F1193	06/19/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0F1194	06/19/2020	RCE
2016279-06				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0F1193	06/19/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0F1194	06/19/2020	RCE
2016279-07				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0F1193	06/19/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0F1194	06/19/2020	RCE
2016279-08				
Dissolved General Chemistry				

SM 4500-P F	SM 4500-P B	B0F1193	06/19/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0F1194	06/19/2020	RCE
2016279-09				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0F1193	06/19/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0F1194	06/19/2020	RCE
2016279-10				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0F1193	06/19/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0F1194	06/19/2020	RCE
2016279-11				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0F1193	06/19/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0F1194	06/19/2020	RCE
2016279-12				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0F1193	06/19/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0F1194	06/19/2020	RCE
2016279-13				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0F1193	06/19/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0F1194	06/19/2020	RCE

Notes and Definitions

C-51	The alkalinity to pH 4.2 = 11.0 mg CaCO3/L.
C-51a	The alkalinity to pH 4.2 = 11.2 mg CaCO3/L.
C-51b	The alkalinity to pH 4.2 = 11.3 mg CaCO3/L.
C-51c	The alkalinity to pH 4.2 = 11.8 mg CaCO3/L.
C-51d	The alkalinity to pH 4.2 = 12.2 mg CaCO3/L.
C-51e	The alkalinity to pH 4.2 = 12.3 mg CaCO3/L.
C-51f	The alkalinity to pH 4.2 = 12.6 mg CaCO3/L.
C-51g	The alkalinity to pH 4.2 = 12.7 mg CaCO3/L.
C-51h	The alkalinity to pH 4.2 = 14.0 mg CaCO3/L.
C-51i	The alkalinity to pH 4.2 = 14.8 mg CaCO3/L.
C-51j	The alkalinity to pH 4.2 = 6.7 mg CaCO3/L.
C-51k	The alkalinity to pH 4.2 = 8.5 mg CaCO3/L.
G-11	The sample was filtered after it was received at the laboratory.
J	Estimated value
U	Analyte was not detected above the indicated value.

M.J. Reider Associates, Inc.
107 Angelica St, Reading PA, 19611
610-374-5129 www.mjreider.com

WORK ORDER
Chain of Custody

2016279

Client Code: 3157
Project Manager: Richard A Wheeler
Client: Tetra Tech
Project: 2020 - Beltzville Reservoir
Report To: Tetra Tech - David Wertz - USACE, Phila Dist. Env.Resources Branch 100 Penn Square E., Arlington, VA 22201
Invoice To: Tetra Tech - David Wertz - USACE, Phila Dist. Env.Resources Branch 100 Penn Square E., Arlington, VA 22201

Collected By : (Full Name) Gregory Wacik

Comments:

2016279-01 BZ-1S

BOD SM 5210B, EC (#) SM 9223B Confirmation, NO2-N EPA 300.0, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F, TC (#) SM 9223B
Alk SM 2320B, NH3-N D6919-03, PO4 SM 4500P-E, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

Matrix: Non-Potable Water
Type: Grab
Date: 6/18/20
Time: 0630

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Sterile Pl 125ml NaThio
D - Pl 500ml H2SO4
E - Pl 250ml NP
F - Pl 500ml Lab Filtered
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc
I - Vial Amber 40ml H3PO4, minimal hdspc

2016279-02 BZ-2S

BOD SM 5210B, EC (#) SM 9223B Confirmation, NO2-N EPA 300.0, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F, TC (#) SM 9223B
Alk SM 2320B, NH3-N D6919-03, PO4 SM 4500P-E, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

Matrix: Non-Potable Water
Type: Grab
Date: 6/18/20
Time: 1045

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Sterile Pl 125ml NaThio
D - Pl 500ml H2SO4
E - Pl 250ml NP
F - Pl 500ml Lab Filtered
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc
I - Vial Amber 40ml H3PO4, minimal hdspc

	Date/Time		Date/Time
Relinquished By	6/18/20 1130	Received By	6-18-20 1130
Relinquished By		Received By	
Relinquished By		Received at Laboratory By	6-18-20 1240

Sample Kit Prepared By:	Date/Time: 5/18/20
Sample Temp (°C):	6
Samples on Ice?	Yes No NA
Approved By:	BSW
Entered By:	

The Client, by signing (or having the client's agent sign), agrees to MJRA's Terms and Conditions and to pay for the above requested services including any additional associated fees incurred.

Printed: 5/14/2020 10:15:05AM

Report Template: wi

M.J. Reider Associates, Inc.

Client Code: 3157 **Client:** Tetra Tech

Project Manager: Richard A Wheeler **Project:** 2020 - Beltzville Reservoir

Comments:

Collected By : (Full Name) Gregory Wacik

2016279-03 BZ-3S

KPR JAF JAF

BOD SM 5210B, EC (#) SM 9223B Confirmation, NO2-N EPA 300.0, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F, TC (#) SM 9223B

KPR

Alk SM 2320B, NH3-N D6919-03, PO4 SM 4500P-E, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

Matrix: Non-Potable Water Date: 6/18/20
Type: Grab Time: 0815

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Sterile Pl 125ml NaThio
D - Pl 500ml H2SO4
E - Pl 250ml NP
F - Pl 500ml Lab Filtered
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc
I - Vial Amber 40ml H3PO4, minimal hdspc

2016279-04 BZ-3M

KPR JAF JAF KPR

BOD SM 5210B, NO2-N EPA 300.0, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F

Alk SM 2320B, NH3-N D6919-03, PO4 SM 4500P-E, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

Matrix: Non-Potable Water Date: 6/18/20
Type: Grab Time: 0815

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Pl 500ml H2SO4
D - Pl 250ml NP
E - Pl 500ml Lab Filtered
F - Vial Amber 40ml H3PO4, minimal hdspc
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc

2016279-05 BZ-3D

JAF JAF KPR KPR

NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F, BOD SM 5210B, NO2-N EPA 300.0

PO4 SM 4500P-E, Alk SM 2320B, NH3-N D6919-03, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

Matrix: Non-Potable Water Date: 6/18/20
Type: Grab Time: 0815

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Pl 500ml H2SO4
D - Pl 250ml NP
E - Pl 500ml Lab Filtered
F - Vial Amber 40ml H3PO4, minimal hdspc
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc

Relinquished By	Date/Time	Received By	Date/Time
	6/18/20 1130		6-18-20 1130
			6-18-20 1240

Received at Laboratory By

Sample Kit Prepared By:	Date/Time
TA KBW JSV	5/8/20
Sample Temp (°C):	0
Samples on Ice?	Yes No NA
Approved By:	BSW
Entered By:	

The Client by signing (or having the client's agent sign), agrees to MJRA's Terms and Conditions and to pay for the above requested services including any additional associated fees incurred.

Printed: 5/14/2020 10:15:05AM

Report Template: w

M.J. Reider Associates, Inc.

Client Code: 3157 **Client:** Tetra Tech

Project Manager: Richard A Wheeler **Project:** 2020 - Beltzville Reservoir

Comments:

Collected By : (Full Name) Gregory Wacik

2016279-06 BZ-4S

BOD SM 5210B, EC (#) SM 9223B Confirmation, PO4-D SM 4500P-F, TC (#) SM 9223B, NO2-N EPA 300.0, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2

Alk SM 2320B, NH3-N D6919-03, PO4 SM 4500P-E, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

Matrix: Non-Potable Water Date: 6/18/20
Type: Grab Time: 1030

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Sterile Pl 125ml NaThio
D - Pl 500ml H2SO4
E - Pl 250ml NP
F - Pl 500ml Lab Filtered
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc
I - Vial Amber 40ml H3PO4, minimal hdspc

2016279-07 BZ-5S

BOD SM 5210B, EC (#) SM 9223B Confirmation, NO2-N EPA 300.0, TC (#) SM 9223B, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F

NH3-N D6919-03, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, Alk SM 2320B, PO4 SM 4500P-E, TSS SM 2540D

Matrix: Non-Potable Water Date: 6/18/20
Type: Grab Time: 1015

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Sterile Pl 125ml NaThio
D - Pl 500ml H2SO4
E - Pl 250ml NP
F - Pl 500ml Lab Filtered
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc
I - Vial Amber 40ml H3PO4, minimal hdspc

2016279-08 BZ-6S

NO2-N EPA 300.0, NO3-N EPA 300.0, BOD SM 5210B, EC (#) SM 9223B Confirmation, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F, TC (#) SM 9223B

NH3-N D6919-03, Alk SM 2320B, PO4 SM 4500P-E, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

Matrix: Non-Potable Water Date: 6/18/20
Type: Grab Time: 0736

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Sterile Pl 125ml NaThio
D - Pl 500ml H2SO4
E - Pl 250ml NP
F - Pl 500ml Lab Filtered
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc
I - Vial Amber 40ml H3PO4, minimal hdspc

	Date/Time		Date/Time
Relinquished By	6/18/20 1130	Received By	6-18-20 1130
Relinquished By		Received By	
Relinquished By		Received at Laboratory By	6-18-20 1240

Sample Kit Prepared By:	Date/Time 5/18/20
Sample Temp (°C):	6
Samples on Ice?	Yes No NA
Approved By:	BSW
Entered By:	

Printed: 5/14/2020 10:15:05AM

Report Template. v

M.J. Reider Associates, Inc.

Client Code: 3157 **Client:** Tetra Tech

Project Manager: Richard A Wheeler **Project:** 2020 - Beltzville Reservoir

Comments:

Collected By : (Full Name) Gregory Wacik

2016279-09 BZ-6M

BOD SM 5210B, NO2-N EPA 300.0, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F
Alk SM 2320B, NH3-N D6919-03, PO4 SM 4500P-E, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

Matrix: Non-Potable Water Date: 6/18/20
Type: Grab Time: 0730

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Pl 500ml H2SO4
D - Pl 250ml NP
E - Pl 500ml Lab Filtered
F - Vial Amber 40ml H3PO4, minimal hdspc
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc

2016279-10 BZ-6D

BOD SM 5210B, NO2-N EPA 300.0, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F
Alk SM 2320B, NH3-N D6919-03, PO4 SM 4500P-E, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

Matrix: Non-Potable Water Date: 6/18/20
Type: Grab Time: 0730

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Pl 500ml H2SO4
D - Pl 250ml NP
E - Pl 500ml Lab Filtered
F - Vial Amber 40ml H3PO4, minimal hdspc
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc

2016279-11 BZ-7S

BOD SM 5210B, EC (#) SM 9223B Confirmation, NO2-N EPA 300.0, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F, TC (#) SM 9223B
Alk SM 2320B, NH3-N D6919-03, PO4 SM 4500P-E, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

Matrix: Non-Potable Water Date: 6/15/20
Type: Grab Time: 0900

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Sterile Pl 125ml NaThio
D - Pl 500ml H2SO4
E - Pl 250ml NP
F - Pl 500ml Lab Filtered
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc
I - Vial Amber 40ml H3PO4, minimal hdspc

Relinquished By	6/18/20 1130 Date/Time	Received By	6-18-20 1130 Date/Time
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received at Laboratory By	6-18-20 1240 Date/Time

Sample Kit Prepared By:	Date/Time 5/18/20
Sample Temp (°C):	6
Samples on Ice?	(Yes) No NA
Approved By:	BSW
Entered By:	

Printed: 5/14/2020 10:15:05AM

Report Template: wk

M.J. Reider Associates, Inc.

Client Code: 3157 **Client:** Tetra Tech

Project Manager: Richard A Wheeler **Project:** 2020 - Beltzville Reservoir

Comments:

Collected By : (Full Name) Gregory Wack

2016279-12 BZ-7M

BOD SM 5210B, NO2-N EPA 300.0, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F
Alk SM 2320B, NH3-N D6919-03, PO4 SM 4500P-E, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

Matrix: Non-Potable Water Date: 6/18/20
Type: Grab Time: 0900

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Pl 500ml H2SO4
D - Pl 250ml NP
E - Pl 500ml Lab Filtered
F - Vial Amber 40ml H3PO4, minimal hdspc
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc

2016279-13 BZ-7D

NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F, BOD SM 5210B, NO2-N EPA 300.0, NO3-N EPA 300.0
PO4 SM 4500P-E, TDS SM 2540C, Alk SM 2320B, NH3-N D6919-03, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

Matrix: Non-Potable Water Date: 6/18/20
Type: Grab Time: 0900

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Pl 500ml H2SO4
D - Pl 250ml NP
E - Pl 500ml Lab Filtered
F - Vial Amber 40ml H3PO4, minimal hdspc
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc

Relinquished By	Date/Time	Received By	Date/Time
	6/18/20 1130		6-18-20 1130
			6-18-20 1240

Sample Kit Prepared By:	Date/Time
	5/18/20
Sample Temp (°C):	6
Samples on Ice?	Yes No NA
Approved By:	BSW
Entered By:	

Printed: 5/14/2020 10:15:05AM

Report Template: wh

MJRA Terms & Conditions

All samples submitted must be accompanied by signed documentation representing a Chain of Custody (COC). The COC Record acts as a contract between the client and MJRA. Signing the COC form gives approval for MJRA to perform the requested analyses and is an agreement to pay for the cost of such analyses**.** COC Records must be completed in black or blue indelible ink (must not run when wet). COC documentation begins at the time of sample collection. Client is required to document all sample details prior to releasing samples to MJRA. All samples must be placed on ice immediately after sampling and shipped or delivered to the laboratory in a manner that will maintain the sample temperature above freezing and below 6C (loose ice is preferred)**.**

Sample Submission, Sample Acceptance & Sampling Containers

Included on the COC must be the sample description, date and time of collection (including start and stop for composites), container size and type, preservative information, sample matrix, indication of whether the sample is a grab or composite, number of containers & a list of the tests to be performed. Poor sample collection technique, inappropriate sampling containers and/or improper sample preservation may lead to sample rejection. Suitable sample containers, labels, and preservatives (as applicable), along with blank COCs are provided at no additional cost.

Turnaround Times (TAT)

Average TAT for test results range from 5 to 15 working days depending on the specific analyses and time of year submitted. Faster turnaround times (*RUSH TAT) may be available depending on the current workload in a particular department and the nature of the analyses requested. We encourage you to verify requests for expedited sample results with one of our Technical Directors prior to sample submittal. Without confirmation from a Technical Director, your results may not be completed by your deadline. *RUSH TAT Surcharges are applied for expedited turnaround times.

Analytical Results, Sample Collection Integrity & Subcontracting

Analytical values are for the sample as submitted and relate only to the item tested. The value indicates a snapshot of the constituent content of the sample at the time of sample collection. Analytical results can be impacted by poor sample collection technique and/or improper preservation. All sample collection completed by MJRA was performed in accordance with applicable regulatory protocols or as specified in customer specific sampling plans. Constituent content will vary over time based on the matrix of the sample and the physical and chemical changes to its environment. All sample results and laboratory reports are strictly confidential. Results will not be available to anyone except the primary client or authorized party representing the client unless MJRA receives additional permissions from the client. When necessary, MJRA will subcontract certain analyses to a third party accredited laboratory. If client prohibits subcontracting, it must be provided in writing and include instruction on how to proceed with client samples that require third party analyses.

Payment Terms

Payment Terms are Net 30 days. Prices are subject to change without notice. A standing monthly charge of 1.5% of the clients over-30-day-unpaid balance may be added to the balance after 30 days and each month thereafter (day 31, 61, 91 etc.). The laboratory accepts all major credit cards, ACH transactions, checks and cash. New clients must pay for all services rendered prior to sample collection and/or in some cases report processing. Clients must contact the MJRA accounting department to pursue a credit-based account. MJRA reserves the right to terminate the client's credit account and to refuse to perform additional services on a credit basis if any balance is outstanding for more than 60 days.

Warranty & Litigation

MJRA does not guarantee any results of its services but has agreed to use its best efforts, in accordance with the standards and practices of the industry, to cause such results to be accurate and complete. We disclaim any other warranties, expressed or implied, including a warranty of fitness for a particular purpose and warranty of merchantability. Clients agree that they shall reimburse MJRA for any and all fees, cost and litigation expenses, including reasonable attorney fees incurred by MJRA in obtaining payment for the services rendered. All costs associated with compliance with any subpoena for documents, testimony, or any other purpose relating to work performed by MJRA, for a client, shall be paid by that client. MJRA's aggregate liability for negligent acts and omissions and of an intentional breach by MJRA will not exceed the fee paid for the services. Client agrees to indemnify and hold MJRA harmless for any and all liabilities in excess of said amount. Neither MJRA nor the client shall be liable to the other for special, incidental consequential or punitive liability or damages included but not limited to those arising from delay, loss of use, loss of profits or revenues. MJRA will not be liable to the client unless the client has notified MJRA of the discovery of the alleged negligent act, error, omissions or breach within 30 days of the

Reviewed and Approved by:

Richard A Wheeler
Director of Field Services

Certificate of Analysis

M.J. Reider Associates, Inc.
ENVIRONMENTAL TESTING LABORATORY
U.S. EPA/PA DEP #06-00003

Laboratory No.: 2019014
Report: 07/16/20
Lab Contact: Richard A Wheeler

Attention: David Wertz
Reported To: Tetra Tech
USACE, Phila Dist. Env.Resources Branch 100 Penn Square E.
Arlington, VA 22201

Project: 2020 - Beltzville Reservoir

Lab ID: 2019014-01 **Collected By:** Client **Sampled:** 07/09/20 06:15 **Received:** 07/09/20 14:40
Sample Desc: BZ-1S **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	<0.05	mg/l		0.05	SM 4500-P F	07/13/20	G-11	TML
General Chemistry								
Alkalinity, Total to pH 4.5	12	mg CaCO3/L		2	SM 2320 B	07/10/20	C-51d	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	07/10/20	U	MRW
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	07/09/20 17:00		KRG
Nitrate as N	0.85	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	07/09/20 19:53	J	JAF
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	07/09/20 19:53	U	JAF
Nitrate+Nitrite as N	<0.86	mg/l	0.125	1.10	CALCULATED	07/09/20 19:53		JAF
Nitrogen, Total Kjeldahl (TKN)	<0.47	mg/l	0.47	0.50	EPA 351.2	07/14/20	U	TML
Phosphorus as P, Total	0.04	mg/l	0.01	0.05	SM 4500-P E	07/14/20	J	RCE
Solids, Total Dissolved	77	mg/l	4	5	SM 2540 C	07/10/20		TMH
Total Organic Carbon	1.8	mg/l	0.3	0.5	SM 5310 C	07/10/20		ALD
Solids, Total Suspended	2	mg/l	1	1	SM 2540 D	07/10/20		TMH

	Result	Unit	Rep. Limit	Analysis Method	Incubated	Analyzed	Notes	Analyst
Microbiology								
Escherichia coli	16	mpn/100ml	1	SM 9223 B/Quantitray	7/9/20 15:40	7/10/20 9:41	M-08	JMW
Total Coliform	613	mpn/100ml	1	SM 9223 B/Quantitray	7/9/20 15:40	7/10/20 9:41	M-08	JMW

Lab ID: 2019014-02 **Collected By:** Client **Sampled:** 07/09/20 10:30 **Received:** 07/09/20 14:40
Sample Desc: BZ-2S **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	0.06	mg/l		0.05	SM 4500-P F	07/13/20	G-11	TML
General Chemistry								
Alkalinity, Total to pH 4.5	10	mg CaCO3/L		2	SM 2320 B	07/10/20	C-51k	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	07/10/20	U	MRW
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	07/09/20 17:00		KRG
Nitrate as N	0.47	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	07/09/20 21:00	J	JAF
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	07/09/20 21:00	U	JAF
Nitrate+Nitrite as N	<0.48	mg/l	0.125	1.10	CALCULATED	07/09/20 21:00		JAF
Nitrogen, Total Kjeldahl (TKN)	<0.47	mg/l	0.47	0.50	EPA 351.2	07/14/20	U	TML
Phosphorus as P, Total	<0.01	mg/l	0.01	0.05	SM 4500-P E	07/14/20	U	RCE
Solids, Total Dissolved	55	mg/l	4	5	SM 2540 C	07/10/20		TMH
Total Organic Carbon	1.1	mg/l	0.3	0.5	SM 5310 C	07/10/20		ALD
Solids, Total Suspended	3	mg/l	1	1	SM 2540 D	07/10/20		TMH

	Result	Unit	Rep. Limit	Analysis Method	Incubated	Analyzed	Notes	Analyst
Microbiology								
Escherichia coli	71	mpn/100ml	1	SM 9223 B/Quantitray	7/9/20 15:40	7/10/20 9:41		JMW
Total Coliform	1550	mpn/100ml	1	SM 9223 B/Quantitray	7/9/20 15:40	7/10/20 9:41		JMW

Lab ID: 2019014-03 **Collected By:** Client **Sampled:** 07/09/20 08:00 **Received:** 07/09/20 14:40
Sample Desc: BZ-3S **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	<0.05	mg/l		0.05	SM 4500-P F	07/13/20	G-11	TML
General Chemistry								
Alkalinity, Total to pH 4.5	11	mg CaCO3/L		2	SM 2320 B	07/10/20	C-51a	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	07/10/20	U	MRW
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	07/09/20 16:40		KRG
Nitrate as N	0.68	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	07/09/20 21:51	J	JAF
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	07/09/20 21:51	U	JAF
Nitrate+Nitrite as N	<0.69	mg/l	0.125	1.10	CALCULATED	07/09/20 21:51		JAF
Nitrogen, Total Kjeldahl (TKN)	<0.47	mg/l	0.47	0.50	EPA 351.2	07/14/20	U	TML
Phosphorus as P, Total	<0.01	mg/l	0.01	0.05	SM 4500-P E	07/14/20	U	RCE
Solids, Total Dissolved	44	mg/l	4	5	SM 2540 C	07/10/20		TMH
Total Organic Carbon	1.8	mg/l	0.3	0.5	SM 5310 C	07/10/20		ALD
Solids, Total Suspended	4	mg/l	1	1	SM 2540 D	07/10/20		TMH

	Result	Unit	Rep. Limit	Analysis Method	Incubated	Analyzed	Notes	Analyst
Microbiology								
Escherichia coli	2	mpn/100ml	1	SM 9223 B/Quantitray	7/9/20 15:40	7/10/20 9:41		JMW
Total Coliform	119	mpn/100ml	1	SM 9223 B/Quantitray	7/9/20 15:40	7/10/20 9:41		JMW

Lab ID: 2019014-04 **Collected By:** Client **Sampled:** 07/09/20 08:00 **Received:** 07/09/20 14:40
Sample Desc: BZ-3M **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	<0.05	mg/l		0.05	SM 4500-P F	07/13/20	G-11	TML
General Chemistry								
Alkalinity, Total to pH 4.5	12	mg CaCO3/L		2	SM 2320 B	07/10/20	C-51b	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	07/10/20	U	MRW
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	07/09/20 16:40		KRG
Nitrate as N	0.93	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	07/09/20 22:08	J	JAF
Nitrite as N	0.03	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	07/09/20 22:08	J	JAF
Nitrate+Nitrite as N	0.96	mg/l	0.125	1.10	CALCULATED	07/09/20 22:08		JAF
Nitrogen, Total Kjeldahl (TKN)	<0.47	mg/l	0.47	0.50	EPA 351.2	07/14/20	U	TML
Phosphorus as P, Total	<0.01	mg/l	0.01	0.05	SM 4500-P E	07/14/20	U	RCE
Solids, Total Dissolved	73	mg/l	4	5	SM 2540 C	07/10/20		TMH
Total Organic Carbon	1.3	mg/l	0.3	0.5	SM 5310 C	07/10/20		ALD
Solids, Total Suspended	1	mg/l	1	1	SM 2540 D	07/10/20		TMH

Lab ID: 2019014-05 **Collected By:** Client **Sampled:** 07/09/20 08:00 **Received:** 07/09/20 14:40
Sample Desc: BZ-3D **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	<0.05	mg/l		0.05	SM 4500-P F	07/13/20	G-11	TML
General Chemistry								
Alkalinity, Total to pH 4.5	13	mg CaCO3/L		2	SM 2320 B	07/10/20	C-51g	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	07/10/20	U	MRW
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	07/09/20 17:00		KRG
Nitrate as N	0.92	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	07/09/20 22:25	J	JAF
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	07/09/20 22:25	U	JAF
Nitrate+Nitrite as N	<0.93	mg/l	0.125	1.10	CALCULATED	07/09/20 22:25		JAF
Nitrogen, Total Kjeldahl (TKN)	<0.47	mg/l	0.47	0.50	EPA 351.2	07/14/20	U	TML
Phosphorus as P, Total	<0.01	mg/l	0.01	0.05	SM 4500-P E	07/14/20	U	RCE
Solids, Total Dissolved	71	mg/l	4	5	SM 2540 C	07/10/20		TMH
Total Organic Carbon	1.3	mg/l	0.3	0.5	SM 5310 C	07/10/20		ALD
Solids, Total Suspended	4	mg/l	1	1	SM 2540 D	07/10/20		TMH

Lab ID: 2019014-06 **Collected By:** Client **Sampled:** 07/09/20 10:15 **Received:** 07/09/20 14:40
Sample Desc: BZ-4S **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	<0.05	mg/l		0.05	SM 4500-P F	07/13/20	G-11	TML
General Chemistry								
Alkalinity, Total to pH 4.5	7	mg CaCO3/L		2	SM 2320 B	07/10/20	C-51j	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	07/10/20	U	MRW
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	07/09/20 16:40		KRG
Nitrate as N	0.24	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	07/09/20 22:41	J	JAF
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	07/09/20 22:41	U	JAF
Nitrate+Nitrite as N	<0.25	mg/l	0.125	1.10	CALCULATED	07/09/20 22:41		JAF
Nitrogen, Total Kjeldahl (TKN)	<0.47	mg/l	0.47	0.50	EPA 351.2	07/14/20	U	TML
Phosphorus as P, Total	0.02	mg/l	0.01	0.05	SM 4500-P E	07/14/20	J	RCE
Solids, Total Dissolved	24	mg/l	4	5	SM 2540 C	07/10/20		TMH
Total Organic Carbon	1.5	mg/l	0.3	0.5	SM 5310 C	07/10/20		ALD
Solids, Total Suspended	2	mg/l	1	1	SM 2540 D	07/10/20		TMH

	Result	Unit	Rep. Limit	Analysis Method	Incubated	Analyzed	Notes	Analyst
Microbiology								
Escherichia coli	28	mpn/100ml	1	SM 9223 B/Quantitray	7/9/20 15:40	7/10/20 9:41		JMW
Total Coliform	2420	mpn/100ml	1	SM 9223 B/Quantitray	7/9/20 15:40	7/10/20 9:41		JMW

Lab ID: 2019014-07 **Collected By:** Client **Sampled:** 07/09/20 09:45 **Received:** 07/09/20 14:40
Sample Desc: BZ-5S **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	0.08	mg/l		0.05	SM 4500-P F	07/13/20	G-11	TML
General Chemistry								
Alkalinity, Total to pH 4.5	16	mg CaCO3/L		2	SM 2320 B	07/10/20	C-51i	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	07/10/20	U	MRW
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	07/09/20 16:40		KRG
Nitrate as N	1.08	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	07/09/20 22:58		JAF
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	07/09/20 22:58	U	JAF
Nitrate+Nitrite as N	<1.09	mg/l	0.125	1.10	CALCULATED	07/09/20 22:58		JAF
Nitrogen, Total Kjeldahl (TKN)	<0.47	mg/l	0.47	0.50	EPA 351.2	07/14/20	Q-10, U	TML
Phosphorus as P, Total	0.05	mg/l	0.01	0.05	SM 4500-P E	07/14/20	J	RCE
Solids, Total Dissolved	82	mg/l	4	5	SM 2540 C	07/10/20		TMH
Total Organic Carbon	2.9	mg/l	0.3	0.5	SM 5310 C	07/10/20		ALD
Solids, Total Suspended	8	mg/l	1	1	SM 2540 D	07/10/20		TMH

	Result	Unit	Rep. Limit	Analysis Method	Incubated	Analyzed	Notes	Analyst
Microbiology								
Escherichia coli	1730	mpn/100ml	1	SM 9223 B/Quantitray	7/9/20 15:40	7/10/20 9:41		JMW
Total Coliform	>2420	mpn/100ml	1	SM 9223 B/Quantitray	7/9/20 15:40	7/10/20 9:41		JMW

Lab ID: 2019014-08 **Collected By:** Client **Sampled:** 07/09/20 07:00 **Received:** 07/09/20 14:40
Sample Desc: BZ-6S **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	0.05	mg/l		0.05	SM 4500-P F	07/13/20	G-11	TML
General Chemistry								
Alkalinity, Total to pH 4.5	10	mg CaCO3/L		2	SM 2320 B	07/10/20	C-51	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	07/10/20	U	MRW
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	07/09/20 17:00		KRG
Nitrate as N	0.67	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	07/09/20 23:15	J	JAF
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	07/09/20 23:15	U	JAF
Nitrate+Nitrite as N	<0.68	mg/l	0.125	1.10	CALCULATED	07/09/20 23:15		JAF
Nitrogen, Total Kjeldahl (TKN)	<0.47	mg/l	0.47	0.50	EPA 351.2	07/14/20	U	TML
Phosphorus as P, Total	<0.01	mg/l	0.01	0.05	SM 4500-P E	07/14/20	U	RCE
Solids, Total Dissolved	53	mg/l	4	5	SM 2540 C	07/10/20		TMH
Total Organic Carbon	2.1	mg/l	0.3	0.5	SM 5310 C	07/10/20		ALD
Solids, Total Suspended	6	mg/l	1	1	SM 2540 D	07/10/20		TMH

	Result	Unit	Rep. Limit	Analysis Method	Incubated	Analyzed	Notes	Analyst
Microbiology								
Escherichia coli	1	mpn/100ml	1	SM 9223 B/Quantitray	7/9/20 15:40	7/10/20 9:41	M-08a	JMW
Total Coliform	272	mpn/100ml	1	SM 9223 B/Quantitray	7/9/20 15:40	7/10/20 9:41	M-08a	JMW

Lab ID: 2019014-09 **Collected By:** Client **Sampled:** 07/09/20 07:00 **Received:** 07/09/20 14:40
Sample Desc: BZ-6M **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	<0.05	mg/l		0.05	SM 4500-P F	07/13/20	G-11	TML
General Chemistry								
Alkalinity, Total to pH 4.5	12	mg CaCO3/L		2	SM 2320 B	07/10/20	C-51c	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	07/10/20	U	MRW
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	07/09/20 17:00		KRG
Nitrate as N	0.91	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	07/09/20 23:32	J	JAF
Nitrite as N	0.02	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	07/09/20 23:32	J	JAF
Nitrate+Nitrite as N	0.93	mg/l	0.125	1.10	CALCULATED	07/09/20 23:32		JAF
Nitrogen, Total Kjeldahl (TKN)	<0.47	mg/l	0.47	0.50	EPA 351.2	07/14/20	U	TML
Phosphorus as P, Total	<0.01	mg/l	0.01	0.05	SM 4500-P E	07/14/20	U	RCE
Solids, Total Dissolved	32	mg/l	4	5	SM 2540 C	07/10/20		TMH
Total Organic Carbon	1.3	mg/l	0.3	0.5	SM 5310 C	07/10/20		ALD
Solids, Total Suspended	1	mg/l	1	1	SM 2540 D	07/10/20		TMH

Lab ID: 2019014-10 **Collected By:** Client **Sampled:** 07/09/20 08:22 **Received:** 07/09/20 14:40
Sample Desc: BZ-6D **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	<0.05	mg/l		0.05	SM 4500-P F	07/13/20	G-11	TML
General Chemistry								
Alkalinity, Total to pH 4.5	14	mg CaCO3/L		2	SM 2320 B	07/10/20	C-51h	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	07/10/20	U	MRW
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	07/09/20 16:40		KRG
Nitrate as N	0.88	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	07/09/20 23:49	J	JAF
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	07/09/20 23:49	U	JAF
Nitrate+Nitrite as N	<0.89	mg/l	0.125	1.10	CALCULATED	07/09/20 23:49		JAF
Nitrogen, Total Kjeldahl (TKN)	<0.47	mg/l	0.47	0.50	EPA 351.2	07/14/20	U	TML
Phosphorus as P, Total	0.02	mg/l	0.01	0.05	SM 4500-P E	07/14/20	J	RCE
Solids, Total Dissolved	50	mg/l	4	5	SM 2540 C	07/10/20		TMH
Total Organic Carbon	1.5	mg/l	0.3	0.5	SM 5310 C	07/10/20		ALD
Solids, Total Suspended	4	mg/l	1	1	SM 2540 D	07/10/20		TMH

Lab ID: 2019014-11 **Collected By:** Client **Sampled:** 07/09/20 08:30 **Received:** 07/09/20 14:40
Sample Desc: BZ-7S **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	<0.05	mg/l		0.05	SM 4500-P F	07/13/20	G-11	TML
General Chemistry								
Alkalinity, Total to pH 4.5	10	mg CaCO3/L		2	SM 2320 B	07/10/20	C-51k	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	07/10/20	U	MRW
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	07/09/20 17:00		KRG
Nitrate as N	0.61	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	07/10/20 0:06	J	JAF
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	07/10/20 0:06	U	JAF
Nitrate+Nitrite as N	<0.62	mg/l	0.125	1.10	CALCULATED	07/10/20 0:06		JAF
Nitrogen, Total Kjeldahl (TKN)	<0.47	mg/l	0.47	0.50	EPA 351.2	07/14/20	U	TML
Phosphorus as P, Total	0.04	mg/l	0.01	0.05	SM 4500-P E	07/14/20	J	RCE
Solids, Total Dissolved	28	mg/l	4	5	SM 2540 C	07/10/20		TMH
Total Organic Carbon	1.6	mg/l	0.3	0.5	SM 5310 C	07/10/20		ALD
Solids, Total Suspended	3	mg/l	1	1	SM 2540 D	07/10/20		TMH

	Result	Unit	Rep. Limit	Analysis Method	Incubated	Analyzed	Notes	Analyst
Microbiology								
Escherichia coli	5	mpn/100ml	1	SM 9223 B/Quantitray	7/9/20 15:40	7/10/20 9:41		JMW
Total Coliform	326	mpn/100ml	1	SM 9223 B/Quantitray	7/9/20 15:40	7/10/20 9:41		JMW

Lab ID: 2019014-12 **Collected By:** Client **Sampled:** 07/09/20 08:30 **Received:** 07/09/20 14:40
Sample Desc: BZ-7M **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	<0.05	mg/l		0.05	SM 4500-P F	07/13/20	G-11	TML
General Chemistry								
Alkalinity, Total to pH 4.5	13	mg CaCO3/L		2	SM 2320 B	07/10/20	C-51e	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	07/10/20	U	MRW
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	07/09/20 17:00		KRG
Nitrate as N	0.94	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	07/10/20 0:56	J	JAF
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	07/10/20 0:56	U	JAF
Nitrate+Nitrite as N	<0.95	mg/l	0.125	1.10	CALCULATED	07/10/20 0:56		JAF
Nitrogen, Total Kjeldahl (TKN)	<0.47	mg/l	0.47	0.50	EPA 351.2	07/14/20	U	TML
Phosphorus as P, Total	<0.01	mg/l	0.01	0.05	SM 4500-P E	07/14/20	U	RCE
Solids, Total Dissolved	45	mg/l	4	5	SM 2540 C	07/10/20		TMH
Total Organic Carbon	1.3	mg/l	0.3	0.5	SM 5310 C	07/10/20		ALD
Solids, Total Suspended	2	mg/l	1	1	SM 2540 D	07/10/20		TMH

Lab ID: 2019014-13 **Collected By:** Client **Sampled:** 07/09/20 08:30 **Received:** 07/09/20 14:40
Sample Desc: BZ-7D **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	<0.05	mg/l		0.05	SM 4500-P F	07/13/20	G-11	TML
General Chemistry								
Alkalinity, Total to pH 4.5	13	mg CaCO3/L		2	SM 2320 B	07/10/20	C-51f	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	07/10/20	U	MRW
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	07/09/20 16:40		KRG
Nitrate as N	0.91	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	07/10/20 1:13	J	JAF
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	07/10/20 1:13	U	JAF
Nitrate+Nitrite as N	<0.92	mg/l	0.125	1.10	CALCULATED	07/10/20 1:13		JAF
Nitrogen, Total Kjeldahl (TKN)	<0.47	mg/l	0.47	0.50	EPA 351.2	07/14/20	U	TML
Phosphorus as P, Total	<0.01	mg/l	0.01	0.05	SM 4500-P E	07/14/20	U	RCE
Solids, Total Dissolved	57	mg/l	4	5	SM 2540 C	07/10/20		TMH
Total Organic Carbon	1.6	mg/l	0.3	0.5	SM 5310 C	07/10/20		ALD
Solids, Total Suspended	3	mg/l	1	1	SM 2540 D	07/10/20		TMH

Preparation Methods

Specific Method	Preparation Method	Prep Batch	Prepared Date	Prepared By
2019014-01				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0G0562	07/09/2020	QMS
General Chemistry				
SM 4500-P E	SM 4500-P B	B0G0774	07/14/2020	SNF
2019014-02				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0G0562	07/09/2020	QMS
General Chemistry				
SM 4500-P E	SM 4500-P B	B0G0774	07/14/2020	SNF
2019014-03				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0G0562	07/09/2020	QMS
General Chemistry				
SM 4500-P E	SM 4500-P B	B0G0774	07/14/2020	SNF
2019014-04				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0G0562	07/09/2020	QMS
General Chemistry				
SM 4500-P E	SM 4500-P B	B0G0774	07/14/2020	SNF
2019014-05				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0G0562	07/09/2020	QMS
General Chemistry				
SM 4500-P E	SM 4500-P B	B0G0774	07/14/2020	SNF
2019014-06				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0G0562	07/09/2020	QMS
General Chemistry				
SM 4500-P E	SM 4500-P B	B0G0774	07/14/2020	SNF
2019014-07				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0G0562	07/09/2020	QMS
General Chemistry				
SM 4500-P E	SM 4500-P B	B0G0774	07/14/2020	SNF
2019014-08				
Dissolved General Chemistry				

SM 4500-P F	SM 4500-P B	B0G0562	07/09/2020	QMS
General Chemistry				
SM 4500-P E	SM 4500-P B	B0G0774	07/14/2020	SNF
2019014-09				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0G0562	07/09/2020	QMS
General Chemistry				
SM 4500-P E	SM 4500-P B	B0G0774	07/14/2020	SNF
2019014-10				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0G0562	07/09/2020	QMS
General Chemistry				
SM 4500-P E	SM 4500-P B	B0G0774	07/14/2020	SNF
2019014-11				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0G0562	07/09/2020	QMS
General Chemistry				
SM 4500-P E	SM 4500-P B	B0G0774	07/14/2020	SNF
2019014-12				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0G0562	07/09/2020	QMS
General Chemistry				
SM 4500-P E	SM 4500-P B	B0G0774	07/14/2020	SNF
2019014-13				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0G0562	07/09/2020	QMS
General Chemistry				
SM 4500-P E	SM 4500-P B	B0G0774	07/14/2020	SNF

Notes and Definitions

C-51	The alkalinity to pH 4.2 = 10.2 mg CaCO3/L.
C-51a	The alkalinity to pH 4.2 = 10.7 mg CaCO3/L.
C-51b	The alkalinity to pH 4.2 = 11.6 mg CaCO3/L.
C-51c	The alkalinity to pH 4.2 = 12.0 mg CaCO3/L.
C-51d	The alkalinity to pH 4.2 = 12.4 mg CaCO3/L.
C-51e	The alkalinity to pH 4.2 = 12.9 mg CaCO3/L.
C-51f	The alkalinity to pH 4.2 = 13.1 mg CaCO3/L.
C-51g	The alkalinity to pH 4.2 = 13.2 mg CaCO3/L.
C-51h	The alkalinity to pH 4.2 = 14.2 mg CaCO3/L.
C-51i	The alkalinity to pH 4.2 = 16.4 mg CaCO3/L.
C-51j	The alkalinity to pH 4.2 = 6.7 mg CaCO3/L.
C-51k	The alkalinity to pH 4.2 = 9.8 mg CaCO3/L.
G-11	The sample was filtered after it was received at the laboratory.
J	Estimated value
M-08	The analysis hold time of 8 hours was exceeded by 1 hour, 25 minutes.
M-08a	The analysis hold time of 8 hours was exceeded by 40 minutes.
Q-10	The matrix spike(s) were outside acceptable limits of 90-110% recovery at 88.6%.
U	Analyte was not detected above the indicated value.

M.J. Reider Associates, Inc.
107 Angelica St, Reading PA, 19611
610-374-5129 www.mjreider.com

WORK ORDER
Chain of Custody

2019014

Client Code: 3157 **Client:** Tetra Tech
Project Manager: Richard A Wheeler **Project:** 2020 - Beltzville Reservoir
Report To: Tetra Tech - David Wertz - USACE, Phila Dist. Env.Resources Branch 100 Penn Square E., Arlington, VA 22201
Invoice To: Tetra Tech - David Wertz - USACE, Phila Dist. Env.Resources Branch 100 Penn Square E., Arlington, VA 22201

Collected By : (Full Name) Gregory Wacik **Comments:**

2019014-01 BZ-1S

Matrix: Non-Potable Water Date: 7/9/20
Type: Grab Time: 0615

BOD SM 5210B, EC (#) SM 9223B Confirmation, NO2-N EPA 300.0, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F, TC (#) SM 9223B
Alk SM 2320B, NH3-N D6919-03, PO4 SM 4500P-E, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Sterile Pl 125ml NaThio
D - Pl 500ml H2SO4
E - Pl 250ml NP
F - Pl 500ml Lab Filtered
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc
I - Vial Amber 40ml H3PO4, minimal hdspc

2019014-02 BZ-2S

Matrix: Non-Potable Water Date: 7/9/20
Type: Grab Time: 1030

BOD SM 5210B, EC (#) SM 9223B Confirmation, NO2-N EPA 300.0, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F, TC (#) SM 9223B
Alk SM 2320B, NH3-N D6919-03, PO4 SM 4500P-E, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Sterile Pl 125ml NaThio
D - Pl 500ml H2SO4
E - Pl 250ml NP
F - Pl 500ml Lab Filtered
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc
I - Vial Amber 40ml H3PO4, minimal hdspc

Relinquished By	Date/Time	Received By	Date/Time
Gregory Wacik	7/9/20 1215	Benj Nieft	7-9-20 1220
Relinquished By	Date/Time	Received By	Date/Time
		Benj Nieft	7-9-20 1440
Relinquished By	Date/Time	Received at Laboratory By	Date/Time

Sample Kit Prepared By:	Date/Time
JSV JSV RL	6/10/20
Sample Temp (°C):	6
Samples on Ice?	Yes No NA
Approved By:	BSW
Entered By:	

Printed: 6/5/2020 8:27:04AM

Report Template: WKO WorkOrder COC 1s

M.J. Reider Associates, Inc.

Client Code: 3157 **Client:** Tetra Tech

Project Manager: Richard A Wheeler **Project:** 2020 - Beltzville Reservoir

Comments:

Collected By : (Full Name) Gregory Wocik

2019014-03 BZ-3S

BOD SM 5210B, EC (#) SM 9223B Confirmation, NO2-N EPA 300.0, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F, TC (#) SM 9223B

Alk SM 2320B, NH3-N D6919-03, PO4 SM 4500P-E, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

Matrix: Non-Potable Water Date: 7/9/20
Type: Grab Time: 0800

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Sterile Pl 125ml NaThio
D - Pl 500ml H2SO4
E - Pl 250ml NP
F - Pl 500ml Lab Filtered
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc
I - Vial Amber 40ml H3PO4, minimal hdspc

2019014-04 BZ-3M

BOD SM 5210B, NO2-N EPA 300.0, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F

Alk SM 2320B, NH3-N D6919-03, PO4 SM 4500P-E, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

Matrix: Non-Potable Water Date: 7/9/20
Type: Grab Time: 0800

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Pl 500ml H2SO4
D - Pl 250ml NP
E - Pl 500ml Lab Filtered
F - Vial Amber 40ml H3PO4, minimal hdspc
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc

2019014-05 BZ-3D

NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F, BOD SM 5210B, NO2-N EPA 300.0

PO4 SM 4500P-E, Alk SM 2320B, NH3-N D6919-03, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

Matrix: Non-Potable Water Date: 7/9/20
Type: Grab Time: 0800

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Pl 500ml H2SO4
D - Pl 250ml NP
E - Pl 500ml Lab Filtered
F - Vial Amber 40ml H3PO4, minimal hdspc
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc

Relinquished By	7/9/20 1215 Date/Time	Received By	7-9-20 1220 Date/Time
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received at Laboratory By	7-9-20 1440 Date/Time

Sample Kit Prepared By:	Date/Time
	6/10/20

Sample Temp (°C): 6
Samples on Ice? Yes No NA
Approved By:
Entered By:

Printed: 6/5/2020 8:27:04AM

Report Template: WO_WorkOrder_COC_ts

M.J. Reider Associates, Inc.

Client Code: 3157 **Client:** Tetra Tech

Project Manager: Richard A Wheeler **Project:** 2020 - Beltzville Reservoir

Comments:

Collected By : (Full Name) Gregory Wacik

2019014-06 BZ-4S

BOD SM 5210B, EC (#) SM 9223B Confirmation, PO4-D SM 4500P-F, TC (#) SM 9223B, NO2-N EPA 300.0, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2

Alk SM 2320B, NH3-N D6919-03, PO4 SM 4500P-E, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

Matrix: Non-Potable Water Date: 7/9/20
Type: Grab Time: 1015

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Sterile Pl 125ml NaThio
D - Pl 500ml H2SO4
E - Pl 250ml NP
F - Pl 500ml Lab Filtered
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc
I - Vial Amber 40ml H3PO4, minimal hdspc

2019014-07 BZ-5S

BOD SM 5210B, EC (#) SM 9223B Confirmation, NO2-N EPA 300.0, TC (#) SM 9223B, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F

NH3-N D6919-03, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, Alk SM 2320B, PO4 SM 4500P-E, TSS SM 2540D

Matrix: Non-Potable Water Date: 7/9/20
Type: Grab Time: 0945

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Sterile Pl 125ml NaThio
D - Pl 500ml H2SO4
E - Pl 250ml NP
F - Pl 500ml Lab Filtered
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc
I - Vial Amber 40ml H3PO4, minimal hdspc

2019014-08 BZ-6S

NO2-N EPA 300.0, NO3-N EPA 300.0, BOD SM 5210B, EC (#) SM 9223B Confirmation, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F, TC (#) SM 9223B

NH3-N D6919-03, Alk SM 2320B, PO4 SM 4500P-E, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

Matrix: Non-Potable Water Date: 7/9/20
Type: Grab Time: 0700

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Sterile Pl 125ml NaThio
D - Pl 500ml H2SO4
E - Pl 250ml NP
F - Pl 500ml Lab Filtered
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc
I - Vial Amber 40ml H3PO4, minimal hdspc

Relinquished By	Date/Time 7/9/20 1215	Received By	Date/Time 7-9-20 1220
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received at Laboratory By	Date/Time 7-9-20 1440

Sample Kit Prepared By:	Date/Time 6/10/20
Sample Temp (°C):	6
Samples on Ice?	Yes No NA
Approved By:	
Entered By:	

Printed: 6/5/2020 8:27:04AM

Report Template: wko WorkOrder COC ls

M.J. Reider Associates, Inc.

Client Code: 3157 **Client:** Tetra Tech

Project Manager: Richard A Wheeler **Project:** 2020 - Beltzville Reservoir

Comments:

Collected By : (Full Name) Gregory Wacik

2019014-12 BZ-7M

JMK JAC JAC QMS

BOD SM 5210B, NO2-N EPA 300.0, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F

Alk SM 2320B, NH3-N D6919-03, PO4 SM 4500P-E, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

Matrix: Non-Potable Water Date: 7/9/20

Type: Grab Time: 0830

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Pl 500ml H2SO4
D - Pl 250ml NP
E - Pl 500ml Lab Filtered
F - Vial Amber 40ml H3PO4, minimal hdspc
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc

2019014-13 BZ-7D

NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F, BOD SM 5210B, NO2-N EPA 300.0, NO3-N EPA 300.0

PO4 SM 4500P-E, TDS SM 2540C, Alk SM 2320B, NH3-N D6919-03, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

Matrix: Non-Potable Water Date: 7/9/20

Type: Grab Time: 0830

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Pl 500ml H2SO4
D - Pl 250ml NP
E - Pl 500ml Lab Filtered
F - Vial Amber 40ml H3PO4, minimal hdspc
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc

Relinquished By	Date/Time	Received By	Date/Time
	7/9/20 1215		7-9-20 1220
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received at Laboratory By	Date/Time
			7-9-20 1440

Sample Kit Prepared By: JSV	Date/Time 6-10-20
Sample Temp (°C):	
Samples on Ice?	Yes No NA
Approved By:	
Entered By:	

Printed: 6/5/2020 8:27:04AM

Report Template: v2.0 WorkOrder COC 18

MJRA Terms & Conditions

All samples submitted must be accompanied by signed documentation representing a Chain of Custody (COC). The COC Record acts as a contract between the client and MJRA. Signing the COC form gives approval for MJRA to perform the requested analyses and is an agreement to pay for the cost of such analyses**.** COC Records must be completed in black or blue indelible ink (must not run when wet). COC documentation begins at the time of sample collection. Client is required to document all sample details prior to releasing samples to MJRA. All samples must be placed on ice immediately after sampling and shipped or delivered to the laboratory in a manner that will maintain the sample temperature above freezing and below 6C (loose ice is preferred)**.**

Sample Submission, Sample Acceptance & Sampling Containers

Included on the COC must be the sample description, date and time of collection (including start and stop for composites), container size and type, preservative information, sample matrix, indication of whether the sample is a grab or composite, number of containers & a list of the tests to be performed. Poor sample collection technique, inappropriate sampling containers and/or improper sample preservation may lead to sample rejection. Suitable sample containers, labels, and preservatives (as applicable), along with blank COCs are provided at no additional cost.

Turnaround Times (TAT)

Average TAT for test results range from 5 to 15 working days depending on the specific analyses and time of year submitted. Faster turnaround times (*RUSH TAT) may be available depending on the current workload in a particular department and the nature of the analyses requested. We encourage you to verify requests for expedited sample results with one of our Technical Directors prior to sample submittal. Without confirmation from a Technical Director, your results may not be completed by your deadline. *RUSH TAT Surcharges are applied for expedited turnaround times.

Analytical Results, Sample Collection Integrity & Subcontracting

Analytical values are for the sample as submitted and relate only to the item tested. The value indicates a snapshot of the constituent content of the sample at the time of sample collection. Analytical results can be impacted by poor sample collection technique and/or improper preservation. All sample collection completed by MJRA was performed in accordance with applicable regulatory protocols or as specified in customer specific sampling plans. Constituent content will vary over time based on the matrix of the sample and the physical and chemical changes to its environment. All sample results and laboratory reports are strictly confidential. Results will not be available to anyone except the primary client or authorized party representing the client unless MJRA receives additional permissions from the client. When necessary, MJRA will subcontract certain analyses to a third party accredited laboratory. If client prohibits subcontracting, it must be provided in writing and include instruction on how to proceed with client samples that require third party analyses.

Payment Terms

Payment Terms are Net 30 days. Prices are subject to change without notice. A standing monthly charge of 1.5% of the clients over-30-day-unpaid balance may be added to the balance after 30 days and each month thereafter (day 31, 61, 91 etc.). The laboratory accepts all major credit cards, ACH transactions, checks and cash. New clients must pay for all services rendered prior to sample collection and/or in some cases report processing. Clients must contact the MJRA accounting department to pursue a credit-based account. MJRA reserves the right to terminate the client's credit account and to refuse to perform additional services on a credit basis if any balance is outstanding for more than 60 days.

Warranty & Litigation

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Reviewed and Approved by:

Richard A Wheeler
Director of Field Services

Certificate of Analysis

M.J. Reider Associates, Inc.
ENVIRONMENTAL TESTING LABORATORY
U.S. EPA/PA DEP #06-00003

Laboratory No.: 2021817
Report: 08/24/20
Lab Contact: Richard A Wheeler

Attention: David Wertz
Reported To: Tetra Tech
USACE, Phila Dist. Env.Resources Branch 100 Penn Square E.
Arlington, VA 22201

Project: 2020 - Beltzville Reservoir

Lab ID: 2021817-01 **Collected By:** Client **Sampled:** 08/13/20 06:25 **Received:** 08/13/20 12:50
Sample Desc: BZ-1S **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	<0.05	mg/l		0.05	SM 4500-P F	08/20/20	Q-10, G-11	SNF
General Chemistry								
Alkalinity, Total to pH 4.5	13	mg CaCO3/L		2	SM 2320 B	08/18/20	C-51g	APR
Ammonia as N	0.05	mg/l	0.01	0.10	ASTM D6919-03	08/14/20	J	APR
Biochemical Oxygen Demand	2.7	mg/l	2.0	2.0	SM 5210 B	08/13/20 14:58		KRG
Nitrate as N	0.91	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	08/13/20 16:11	J	TML
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	08/13/20 16:11	U	TML
Nitrate+Nitrite as N	<0.92	mg/l	0.125	1.10	CALCULATED	08/13/20 16:11		TML
Nitrogen, Total Kjeldahl (TKN)	<0.47	mg/l	0.47	0.50	EPA 351.2	08/17/20	U	RCE
Phosphorus as P, Total	0.10	mg/l	0.01	0.05	SM 4500-P E	08/14/20		RCE
Solids, Total Dissolved	57	mg/l	4	5	SM 2540 C	08/14/20		TMH
Total Organic Carbon	2.0	mg/l	0.3	0.5	SM 5310 C	08/14/20		ALD
Solids, Total Suspended	2	mg/l	1	1	SM 2540 D	08/14/20		TMH

	Result	Unit	Rep. Limit	Analysis Method	Incubated	Analyzed	Notes	Analyst
Microbiology								
Escherichia coli	21	mpn/100ml	1	SM 9223 B/Quantitray	8/13/20 14:00	8/14/20 9:22		JMW
Total Coliform	>2420	mpn/100ml	1	SM 9223 B/Quantitray	8/13/20 14:00	8/14/20 9:22		JMW

Lab ID: 2021817-02 **Collected By:** Client **Sampled:** 08/13/20 11:10 **Received:** 08/13/20 12:50
Sample Desc: BZ-2S **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	0.06	mg/l		0.05	SM 4500-P F	08/20/20	G-11	SNF
General Chemistry								
Alkalinity, Total to pH 4.5	10	mg CaCO3/L		2	SM 2320 B	08/18/20	C-51	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	08/14/20	U	APR
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	08/13/20 14:58		KRG
Nitrate as N	0.60	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	08/13/20 17:02	J	TML
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	08/13/20 17:02	U	TML
Nitrate+Nitrite as N	<0.61	mg/l	0.125	1.10	CALCULATED	08/13/20 17:02		TML
Nitrogen, Total Kjeldahl (TKN)	<0.47	mg/l	0.47	0.50	EPA 351.2	08/17/20	U	RCE
Phosphorus as P, Total	0.07	mg/l	0.01	0.05	SM 4500-P E	08/14/20		RCE
Solids, Total Dissolved	70	mg/l	4	5	SM 2540 C	08/14/20		TMH
Total Organic Carbon	1.0	mg/l	0.3	0.5	SM 5310 C	08/14/20		ALD
Solids, Total Suspended	6	mg/l	1	1	SM 2540 D	08/14/20		TMH

	Result	Unit	Rep. Limit	Analysis Method	Incubated	Analyzed	Notes	Analyst
Microbiology								
Escherichia coli	35	mpn/100ml	1	SM 9223 B/Quantitray	8/13/20 14:00	8/14/20 9:22		JMW
Total Coliform	1410	mpn/100ml	1	SM 9223 B/Quantitray	8/13/20 14:00	8/14/20 9:22		JMW

Lab ID: 2021817-03 **Collected By:** Client **Sampled:** 08/13/20 08:40 **Received:** 08/13/20 12:50
Sample Desc: BZ-3S **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	0.05	mg/l		0.05	SM 4500-P F	08/20/20	G-11	SNF
General Chemistry								
Alkalinity, Total to pH 4.5	11	mg CaCO3/L		2	SM 2320 B	08/18/20	C-51b	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	08/14/20	U	APR
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	08/13/20 14:58		KRG
Nitrate as N	0.52	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	08/13/20 17:52	J	TML
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	08/13/20 17:52	U	TML
Nitrate+Nitrite as N	<0.53	mg/l	0.125	1.10	CALCULATED	08/13/20 17:52		TML
Nitrogen, Total Kjeldahl (TKN)	<0.47	mg/l	0.47	0.50	EPA 351.2	08/17/20	U	RCE
Phosphorus as P, Total	0.07	mg/l	0.01	0.05	SM 4500-P E	08/14/20		RCE
Solids, Total Dissolved	66	mg/l	4	5	SM 2540 C	08/14/20		TMH
Total Organic Carbon	1.9	mg/l	0.3	0.5	SM 5310 C	08/14/20		ALD
Solids, Total Suspended	1	mg/l	1	1	SM 2540 D	08/14/20		TMH

	Result	Unit	Rep. Limit	Analysis Method	Incubated	Analyzed	Notes	Analyst
Microbiology								
Escherichia coli	2	mpn/100ml	1	SM 9223 B/Quantitray	8/13/20 14:00	8/14/20 9:22		JMW
Total Coliform	70	mpn/100ml	1	SM 9223 B/Quantitray	8/13/20 14:00	8/14/20 9:22		JMW

Lab ID: 2021817-04 **Collected By:** Client **Sampled:** 08/13/20 08:30 **Received:** 08/13/20 12:50
Sample Desc: BZ-3M **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	0.05	mg/l		0.05	SM 4500-P F	08/17/20	G-11	TML
General Chemistry								
Alkalinity, Total to pH 4.5	12	mg CaCO3/L		2	SM 2320 B	08/18/20	C-51d	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	08/14/20	U	APR
Biochemical Oxygen Demand	2.5	mg/l	2.0	2.0	SM 5210 B	08/13/20 14:58		KRG
Nitrate as N	0.95	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	08/13/20 18:09	J	TML
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	08/13/20 18:09	U	TML
Nitrate+Nitrite as N	<0.96	mg/l	0.125	1.10	CALCULATED	08/13/20 18:09		TML
Nitrogen, Total Kjeldahl (TKN)	<0.47	mg/l	0.47	0.50	EPA 351.2	08/17/20	U	RCE
Phosphorus as P, Total	0.04	mg/l	0.01	0.05	SM 4500-P E	08/14/20	J	RCE
Solids, Total Dissolved	75	mg/l	4	5	SM 2540 C	08/14/20		TMH
Total Organic Carbon	1.2	mg/l	0.3	0.5	SM 5310 C	08/14/20		ALD
Solids, Total Suspended	1	mg/l	1	1	SM 2540 D	08/14/20		TMH

Lab ID: 2021817-05 **Collected By:** Client **Sampled:** 08/13/20 08:20 **Received:** 08/13/20 12:50
Sample Desc: BZ-3D **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	0.07	mg/l		0.05	SM 4500-P F	08/17/20	G-11	TML
General Chemistry								
Alkalinity, Total to pH 4.5	14	mg CaCO3/L		2	SM 2320 B	08/18/20	C-51h	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	08/14/20	U	APR
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	08/13/20 14:58		KRG
Nitrate as N	0.81	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	08/13/20 18:26	J	TML
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	08/13/20 18:26	U	TML
Nitrate+Nitrite as N	<0.82	mg/l	0.125	1.10	CALCULATED	08/13/20 18:26		TML
Nitrogen, Total Kjeldahl (TKN)	<0.47	mg/l	0.47	0.50	EPA 351.2	08/17/20	U	RCE
Phosphorus as P, Total	0.05	mg/l	0.01	0.05	SM 4500-P E	08/14/20	J	RCE
Solids, Total Dissolved	82	mg/l	4	5	SM 2540 C	08/14/20		TMH
Total Organic Carbon	1.4	mg/l	0.3	0.5	SM 5310 C	08/14/20		ALD
Solids, Total Suspended	8	mg/l	1	1	SM 2540 D	08/14/20		TMH

Lab ID: 2021817-06 **Collected By:** Client **Sampled:** 08/13/20 10:50 **Received:** 08/13/20 12:50
Sample Desc: BZ-4S **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	0.06	mg/l		0.05	SM 4500-P F	08/17/20	G-11	TML
General Chemistry								
Alkalinity, Total to pH 4.5	7	mg CaCO3/L		2	SM 2320 B	08/18/20	C-511	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	08/14/20	U	APR
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	08/13/20 14:58		KRG
Nitrate as N	0.29	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	08/13/20 18:43	J	TML
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	08/13/20 18:43	U	TML
Nitrate+Nitrite as N	<0.30	mg/l	0.125	1.10	CALCULATED	08/13/20 18:43		TML
Nitrogen, Total Kjeldahl (TKN)	<0.47	mg/l	0.47	0.50	EPA 351.2	08/17/20	U	RCE
Phosphorus as P, Total	0.06	mg/l	0.01	0.05	SM 4500-P E	08/14/20		RCE
Solids, Total Dissolved	43	mg/l	4	5	SM 2540 C	08/14/20		TMH
Total Organic Carbon	1.4	mg/l	0.3	0.5	SM 5310 C	08/14/20		ALD
Solids, Total Suspended	1	mg/l	1	1	SM 2540 D	08/14/20		TMH

	Result	Unit	Rep. Limit	Analysis Method	Incubated	Analyzed	Notes	Analyst
Microbiology								
Escherichia coli	16	mpn/100ml	1	SM 9223 B/Quantitray	8/13/20 14:00	8/14/20 9:22		JMW
Total Coliform	1990	mpn/100ml	1	SM 9223 B/Quantitray	8/13/20 14:00	8/14/20 9:22		JMW

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Lab ID: 2021817-07 **Collected By:** Client **Sampled:** 08/13/20 10:40 **Received:** 08/13/20 12:50
Sample Desc: BZ-5S **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	0.07	mg/l		0.05	SM 4500-P F	08/17/20	G-11	TML
General Chemistry								
Alkalinity, Total to pH 4.5	18	mg CaCO3/L		2	SM 2320 B	08/18/20	C-51k	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	08/14/20	U	APR
Biochemical Oxygen Demand	2.7	mg/l	2.0	2.0	SM 5210 B	08/13/20 14:58		KRG
Nitrate as N	1.49	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	08/13/20 19:00		TML
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	08/13/20 19:00	U	TML
Nitrate+Nitrite as N	<1.50	mg/l	0.125	1.10	CALCULATED	08/13/20 19:00		TML
Nitrogen, Total Kjeldahl (TKN)	0.62	mg/l	0.47	0.50	EPA 351.2	08/17/20		RCE
Phosphorus as P, Total	0.01	mg/l	0.01	0.05	SM 4500-P E	08/14/20	J	RCE
Solids, Total Dissolved	105	mg/l	4	5	SM 2540 C	08/14/20		TMH
Total Organic Carbon	1.4	mg/l	0.3	0.5	SM 5310 C	08/14/20		ALD
Solids, Total Suspended	3	mg/l	1	1	SM 2540 D	08/14/20		TMH

	Result	Unit	Rep. Limit	Analysis Method	Incubated	Analyzed	Notes	Analyst
Microbiology								
Escherichia coli	166	mpn/100ml	1	SM 9223 B/Quantitray	8/13/20 14:00	8/14/20 9:22		JMW
Total Coliform	>2420	mpn/100ml	1	SM 9223 B/Quantitray	8/13/20 14:00	8/14/20 9:22		JMW

Lab ID: 2021817-08 **Collected By:** Client **Sampled:** 08/13/20 07:55 **Received:** 08/13/20 12:50
Sample Desc: BZ-6S **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	0.06	mg/l		0.05	SM 4500-P F	08/17/20	G-11	TML
General Chemistry								
Alkalinity, Total to pH 4.5	11	mg CaCO3/L		2	SM 2320 B	08/18/20	C-51c	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	08/14/20	U	APR
Biochemical Oxygen Demand	4.3	mg/l	2.0	2.0	SM 5210 B	08/13/20 14:58		KRG
Nitrate as N	0.53	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	08/13/20 19:16	J	TML
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	08/13/20 19:16	U	TML
Nitrate+Nitrite as N	<0.54	mg/l	0.125	1.10	CALCULATED	08/13/20 19:16		TML
Nitrogen, Total Kjeldahl (TKN)	<0.47	mg/l	0.47	0.50	EPA 351.2	08/17/20	U	RCE
Phosphorus as P, Total	0.07	mg/l	0.01	0.05	SM 4500-P E	08/14/20		RCE
Solids, Total Dissolved	74	mg/l	4	5	SM 2540 C	08/14/20		TMH
Total Organic Carbon	1.8	mg/l	0.3	0.5	SM 5310 C	08/14/20		ALD
Solids, Total Suspended	1	mg/l	1	1	SM 2540 D	08/14/20		TMH

	Result	Unit	Rep. Limit	Analysis Method	Incubated	Analyzed	Notes	Analyst
Microbiology								
Escherichia coli	1	mpn/100ml	1	SM 9223 B/Quantitray	8/13/20 14:00	8/14/20 9:22		JMW
Total Coliform	32	mpn/100ml	1	SM 9223 B/Quantitray	8/13/20 14:00	8/14/20 9:22		JMW

Lab ID: 2021817-09 **Collected By:** Client **Sampled:** 08/13/20 07:40 **Received:** 08/13/20 12:50
Sample Desc: BZ-6M **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	0.06	mg/l		0.05	SM 4500-P F	08/17/20	G-11	TML
General Chemistry								
Alkalinity, Total to pH 4.5	13	mg CaCO3/L		2	SM 2320 B	08/18/20	C-51e	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	08/14/20	U	APR
Biochemical Oxygen Demand	2.5	mg/l	2.0	2.0	SM 5210 B	08/13/20 14:58		KRG
Nitrate as N	0.95	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	08/13/20 19:33	J	TML
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	08/13/20 19:33	U	TML
Nitrate+Nitrite as N	<0.96	mg/l	0.125	1.10	CALCULATED	08/13/20 19:33		TML
Nitrogen, Total Kjeldahl (TKN)	<0.47	mg/l	0.47	0.50	EPA 351.2	08/17/20	U	RCE
Phosphorus as P, Total	0.09	mg/l	0.01	0.05	SM 4500-P E	08/14/20		RCE
Solids, Total Dissolved	73	mg/l	4	5	SM 2540 C	08/14/20		TMH
Total Organic Carbon	1.2	mg/l	0.3	0.5	SM 5310 C	08/14/20		ALD
Solids, Total Suspended	1	mg/l	1	1	SM 2540 D	08/14/20		TMH

Lab ID: 2021817-10 **Collected By:** Client **Sampled:** 08/13/20 07:20 **Received:** 08/13/20 12:50
Sample Desc: BZ-6D **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	<0.05	mg/l		0.05	SM 4500-P F	08/17/20	G-11	TML
General Chemistry								
Alkalinity, Total to pH 4.5	13	mg CaCO3/L		2	SM 2320 B	08/18/20	C-51f	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	08/14/20	U	APR
Biochemical Oxygen Demand	2.8	mg/l	2.0	2.0	SM 5210 B	08/13/20 14:58		KRG
Nitrate as N	0.92	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	08/13/20 19:50	J	TML
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	08/13/20 19:50	U	TML
Nitrate+Nitrite as N	<0.93	mg/l	0.125	1.10	CALCULATED	08/13/20 19:50		TML
Nitrogen, Total Kjeldahl (TKN)	<0.47	mg/l	0.47	0.50	EPA 351.2	08/17/20	U	RCE
Phosphorus as P, Total	0.02	mg/l	0.01	0.05	SM 4500-P E	08/14/20	J	RCE
Solids, Total Dissolved	84	mg/l	4	5	SM 2540 C	08/14/20		TMH
Total Organic Carbon	1.3	mg/l	0.3	0.5	SM 5310 C	08/14/20		ALD
Solids, Total Suspended	5	mg/l	1	1	SM 2540 D	08/14/20		TMH

Lab ID: 2021817-11 **Collected By:** Client **Sampled:** 08/13/20 09:40 **Received:** 08/13/20 12:50
Sample Desc: BZ-7S **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	0.06	mg/l		0.05	SM 4500-P F	08/17/20	G-11	TML
General Chemistry								
Alkalinity, Total to pH 4.5	10	mg CaCO3/L		2	SM 2320 B	08/18/20	C-51a	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	08/14/20	U	APR
Biochemical Oxygen Demand	4.9	mg/l	2.0	2.0	SM 5210 B	08/13/20 14:58		KRG
Nitrate as N	0.51	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	08/13/20 20:07	J	TML
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	08/13/20 20:07	U	TML
Nitrate+Nitrite as N	<0.52	mg/l	0.125	1.10	CALCULATED	08/13/20 20:07		TML
Nitrogen, Total Kjeldahl (TKN)	<0.47	mg/l	0.47	0.50	EPA 351.2	08/17/20	U	RCE
Phosphorus as P, Total	<0.01	mg/l	0.01	0.05	SM 4500-P E	08/14/20	U	RCE
Solids, Total Dissolved	67	mg/l	4	5	SM 2540 C	08/14/20		TMH
Total Organic Carbon	2.2	mg/l	0.3	0.5	SM 5310 C	08/14/20		ALD
Solids, Total Suspended	1	mg/l	1	1	SM 2540 D	08/14/20		TMH

	Result	Unit	Rep. Limit	Analysis Method	Incubated	Analyzed	Notes	Analyst
Microbiology								
Escherichia coli	1	mpn/100ml	1	SM 9223 B/Quantitray	8/13/20 14:00	8/14/20 9:22		JMW
Total Coliform	192	mpn/100ml	1	SM 9223 B/Quantitray	8/13/20 14:00	8/14/20 9:22		JMW

Lab ID: 2021817-12 **Collected By:** Client **Sampled:** 08/13/20 09:30 **Received:** 08/13/20 12:50
Sample Desc: BZ-7M **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	0.06	mg/l		0.05	SM 4500-P F	08/17/20	G-11	TML
General Chemistry								
Alkalinity, Total to pH 4.5	14	mg CaCO3/L		2	SM 2320 B	08/18/20	C-51i	APR
Ammonia as N	0.04	mg/l	0.01	0.10	ASTM D6919-03	08/14/20	J	APR
Biochemical Oxygen Demand	2.4	mg/l	2.0	2.0	SM 5210 B	08/13/20 14:58		KRG
Nitrate as N	1.01	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	08/13/20 21:14		TML
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	08/13/20 21:14	U	TML
Nitrate+Nitrite as N	<1.02	mg/l	0.125	1.10	CALCULATED	08/13/20 21:14		TML
Nitrogen, Total Kjeldahl (TKN)	<0.47	mg/l	0.47	0.50	EPA 351.2	08/17/20	U	RCE
Phosphorus as P, Total	0.08	mg/l	0.01	0.05	SM 4500-P E	08/14/20		RCE
Solids, Total Dissolved	84	mg/l	4	5	SM 2540 C	08/14/20		TMH
Total Organic Carbon	2.4	mg/l	0.3	0.5	SM 5310 C	08/14/20		ALD
Solids, Total Suspended	2	mg/l	1	1	SM 2540 D	08/14/20		TMH

Lab ID: 2021817-13 **Collected By:** Client **Sampled:** 08/13/20 09:20 **Received:** 08/13/20 12:50
Sample Desc: BZ-7D **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	0.06	mg/l		0.05	SM 4500-P F	08/17/20	G-11	TML
General Chemistry								
Alkalinity, Total to pH 4.5	15	mg CaCO3/L		2	SM 2320 B	08/18/20	C-51j	APR
Ammonia as N	0.02	mg/l	0.01	0.10	ASTM D6919-03	08/14/20	J	APR
Biochemical Oxygen Demand	3.2	mg/l	2.0	2.0	SM 5210 B	08/13/20 14:58		KRG
Nitrate as N	0.83	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	08/13/20 22:05	J	TML
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	08/13/20 22:05	U	TML
Nitrate+Nitrite as N	<0.84	mg/l	0.125	1.10	CALCULATED	08/13/20 22:05		TML
Nitrogen, Total Kjeldahl (TKN)	<0.47	mg/l	0.47	0.50	EPA 351.2	08/17/20	U	RCE
Phosphorus as P, Total	0.02	mg/l	0.01	0.05	SM 4500-P E	08/14/20	J	RCE
Solids, Total Dissolved	52	mg/l	4	5	SM 2540 C	08/14/20		TMH
Total Organic Carbon	1.4	mg/l	0.3	0.5	SM 5310 C	08/14/20		ALD
Solids, Total Suspended	20	mg/l	1	1	SM 2540 D	08/14/20		TMH

Preparation Methods

Specific Method	Preparation Method	Prep Batch	Prepared Date	Prepared By
2021817-01				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0H1074	08/19/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0H0833	08/14/2020	RCE
2021817-02				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0H1074	08/19/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0H0833	08/14/2020	RCE
2021817-03				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0H1074	08/19/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0H0833	08/14/2020	RCE
2021817-04				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0H0834	08/14/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0H0833	08/14/2020	RCE
2021817-05				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0H0834	08/14/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0H0833	08/14/2020	RCE
2021817-06				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0H0834	08/14/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0H0833	08/14/2020	RCE
2021817-07				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0H0834	08/14/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0H0833	08/14/2020	RCE
2021817-08				
Dissolved General Chemistry				

SM 4500-P F	SM 4500-P B	B0H0834	08/14/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0H0833	08/14/2020	RCE
2021817-09				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0H0834	08/14/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0H0833	08/14/2020	RCE
2021817-10				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0H0834	08/14/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0H0833	08/14/2020	RCE
2021817-11				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0H0834	08/14/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0H0833	08/14/2020	RCE
2021817-12				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0H0834	08/14/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0H0833	08/14/2020	RCE
2021817-13				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0H0834	08/14/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0H0833	08/14/2020	RCE

Notes and Definitions

C-51	The alkalinity to pH 4.2 = 10.2 mg CaCO3/L.
C-51a	The alkalinity to pH 4.2 = 10.4 mg CaCO3/L.
C-51b	The alkalinity to pH 4.2 = 10.8 mg CaCO3/L.
C-51c	The alkalinity to pH 4.2 = 11.0 mg CaCO3/L.
C-51d	The alkalinity to pH 4.2 = 12.1 mg CaCO3/L.
C-51e	The alkalinity to pH 4.2 = 12.6 mg CaCO3/L.
C-51f	The alkalinity to pH 4.2 = 12.8 mg CaCO3/L.
C-51g	The alkalinity to pH 4.2 = 12.9 mg CaCO3/L.
C-51h	The alkalinity to pH 4.2 = 13.6 mg CaCO3/L.
C-51i	The alkalinity to pH 4.2 = 14.0 mg CaCO3/L.
C-51j	The alkalinity to pH 4.2 = 14.6 mg CaCO3/L.
C-51k	The alkalinity to pH 4.2 = 17.7 mg CaCO3/L.
C-51l	The alkalinity to pH 4.2 = 7.4 mg CaCO3/L.
G-11	The sample was filtered after it was received at the laboratory.
J	Estimated value
Q-10	The matrix spike(s) were outside acceptable limits of 90-110% recovery at 110.04% and 110.8%.
U	Analyte was not detected above the indicated value.

M.J. Reider Associates, Inc.
107 Angelica St, Reading PA, 19611
610-374-5129 www.mjreider.com

WORK ORDER
Chain of Custody

2021817

Client Code: 3157 **Client:** Tetra Tech
Project Manager: Richard A Wheeler **Project:** 2020 - Beltzville Reservoir
Report To: Tetra Tech - David Wertz - USACE, Phila Dist. Env.Resources Branch 100 Penn Square E., Arlington, VA 22201
Invoice To: Tetra Tech - David Wertz - USACE, Phila Dist. Env.Resources Branch 100 Penn Square E., Arlington, VA 22201

Collected By : (Full Name) Gregory Wacik

Comments:

2021817-01 BZ-1S

Matrix: Non-Potable Water Date: 8/13/20
Type: Grab Time: 0625

BOD SM 5210B, EC (#) SM 9223B Confirmation, NO2-N EPA 300.0, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F, TC (#) SM 9223B
Alk SM 2320B, NH3-N D6919-03, PO4 SM 4500P-E, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Sterile Pl 125ml NaThio
D - Pl 500ml H2SO4
E - Pl 250ml NP
F - Pl 500ml Lab Filtered
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc
I - Vial Amber 40ml H3PO4, minimal hdspc

2021817-02 BZ-2S

Matrix: Non-Potable Water Date: 8/13/20
Type: Grab Time: 1110

BOD SM 5210B, EC (#) SM 9223B Confirmation, NO2-N EPA 300.0, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F, TC (#) SM 9223B
Alk SM 2320B, NH3-N D6919-03, PO4 SM 4500P-E, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Sterile Pl 125ml NaThio
D - Pl 500ml H2SO4
E - Pl 250ml NP
F - Pl 500ml Lab Filtered
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc
I - Vial Amber 40ml H3PO4, minimal hdspc

	Date/Time		Date/Time
Relinquished By	8/13/20 1130	Received By	8-13-20 1130
Relinquished By		Received By	
Relinquished By		Received at Laboratory By	8-13-20 1250

Sample Kit Prepared By:	Date/Time
JBS	6-30
Sample Temp (°C):	8
Samples on Ice?	(Yes) No NA
Approved By:	BSW
Entered By:	

Printed: 6/29/2020 9:04:07AM

Report Template: [illegible]

M.J. Reider Associates, Inc.

Client Code: 3157 **Client:** Tetra Tech

Project Manager: Richard A Wheeler **Project:** 2020 - Beltzville Reservoir

Comments:

Collected By : (Full Name) Gregory Wacik

2021817-03 BZ-3S

Matrix: Non-Potable Water Date: 8/13/20
Type: Grab Time: 0840

BOD SM 5210B, EC (#) SM 9223B Confirmation, NO2-N EPA 300.0, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F, TC (#) SM 9223B
Alk SM 2320B, NH3-N D6919-03, PO4 SM 4500P-E, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Sterile Pl 125ml NaThio
D - Pl 500ml H2SO4
E - Pl 250ml NP
F - Pl 500ml Lab Filtered
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc
I - Vial Amber 40ml H3PO4, minimal hdspc

2021817-04 BZ-3M

Matrix: Non-Potable Water Date: 8/13/20
Type: Grab Time: 0830

BOD SM 5210B, NO2-N EPA 300.0, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F
Alk SM 2320B, NH3-N D6919-03, PO4 SM 4500P-E, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Pl 500ml H2SO4
D - Pl 250ml NP
E - Pl 500ml Lab Filtered
F - Vial Amber 40ml H3PO4, minimal hdspc
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc

2021817-05 BZ-3D

Matrix: Non-Potable Water Date: 8/13/20
Type: Grab Time: 0820

NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F, BOD SM 5210B, NO2-N EPA 300.0
PO4 SM 4500P-E, Alk SM 2320B, NH3-N D6919-03, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Pl 500ml H2SO4
D - Pl 250ml NP
E - Pl 500ml Lab Filtered
F - Vial Amber 40ml H3PO4, minimal hdspc
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc

Relinquished By	Date/Time	Received By	Date/Time
	8/13/20 1130		8-13-20 1130
			8/13/20 1250

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	8
Samples on Ice?	Yes No NA
Approved By:	
Entered By:	

Printed: 6/29/2020 9:04:07AM

Report Template: [illegible]

M.J. Reider Associates, Inc.

Client Code: 3157 **Client:** Tetra Tech

Project Manager: Richard A Wheeler **Project:** 2020 - Beltzville Reservoir

Collected By : (Full Name) Gregory Wacik **Comments:**

2021817-06 BZ-4S

BOD SM 5210B, EC (#) SM 9223B Confirmation, PO4-D SM 4500P-F, TC (#) SM 9223B, NO2-N EPA 300.0, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2
Alk SM 2320B, NH3-N D6919-03, PO4 SM 4500P-E, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

Matrix: Non-Potable Water Date: 8/13/20
Type: Grab Time: 1050
A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Sterile Pl 125ml NaThio
D - Pl 500ml H2SO4
E - Pl 250ml NP
F - Pl 500ml Lab Filtered
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc
I - Vial Amber 40ml H3PO4, minimal hdspc

2021817-07 BZ-5S

BOD SM 5210B, EC (#) SM 9223B Confirmation, NO2-N EPA 300.0, TC (#) SM 9223B, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F
NH3-N D6919-03, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, Alk SM 2320B, PO4 SM 4500P-E, TSS SM 2540D

Matrix: Non-Potable Water Date: 8/13/20
Type: Grab Time: 1040
A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Sterile Pl 125ml NaThio
D - Pl 500ml H2SO4
E - Pl 250ml NP
F - Pl 500ml Lab Filtered
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc
I - Vial Amber 40ml H3PO4, minimal hdspc

2021817-08 BZ-6S

NO2-N EPA 300.0, NO3-N EPA 300.0, BOD SM 5210B, EC (#) SM 9223B Confirmation, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F, TC (#) SM 9223B
NH3-N D6919-03, Alk SM 2320B, PO4 SM 4500P-E, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

Matrix: Non-Potable Water Date: 8/13/20
Type: Grab Time: 0755
A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Sterile Pl 125ml NaThio
D - Pl 500ml H2SO4
E - Pl 250ml NP
F - Pl 500ml Lab Filtered
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc
I - Vial Amber 40ml H3PO4, minimal hdspc

Relinquished By	Date/Time 8/13/20 1130	Received By	Date/Time 8-13-20 1130
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received at Laboratory By	Date/Time 8-13-20 1250

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	8
Samples on Ice?	Yes No NA
Approved By:	BSW
Entered By:	

Printed: 6/29/2020 9:04:07AM

Report Template: [illegible]

M.J. Reider Associates, Inc.

2021817

Client Code: 3157 **Client:** Tetra Tech

Project Manager: Richard A Wheeler **Project:** 2020 - Beltzville Reservoir

Comments:

Collected By : (Full Name) Gregory Wacik

2021817-12 BZ-7M

SM TM TM Li in

BOD SM 5210B, NO2-N EPA 300.0, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F

Alk SM 2320B, NH3-N D6919-03, PO4 SM 4500P-E, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

Matrix: Non-Potable Water Date: 8/13/20

Type: Grab Time: 0930

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Pl 500ml H2SO4
D - Pl 250ml NP
E - Pl 500ml Lab Filtered
F - Vial Amber 40ml H3PO4, minimal hdspc
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc

2021817-13 BZ-7D

KM SM TM TML

NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F, BOD SM 5210B, NO2-N EPA 300.0, NO3-N EPA 300.0

PO4 SM 4500P-E, TDS SM 2540C, Alk SM 2320B, NH3-N D6919-03, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

Matrix: Non-Potable Water Date: 8/13/20

Type: Grab Time: 0920

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Pl 500ml H2SO4
D - Pl 250ml NP
E - Pl 500ml Lab Filtered
F - Vial Amber 40ml H3PO4, minimal hdspc
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc

Relinquished By	Date/Time 8/13/20 1130	Received By	Date/Time 8-13-20 1130
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received at Laboratory By	Date/Time 8-13-20 1250

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	8
Samples on Ice?	(Yes) No NA
Approved By:	BSW
Entered By:	

The Client, by signing (or having the client's agent sign), agrees to MJRA's Terms and Conditions and to pay for the above requested services including any additional associated fees incurred.

Printed: 6/29/2020 9:04:07AM

Report Template:

MJRA Terms & Conditions

All samples submitted must be accompanied by signed documentation representing a Chain of Custody (COC). The COC Record acts as a contract between the client and MJRA. Signing the COC form gives approval for MJRA to perform the requested analyses and is an agreement to pay for the cost of such analyses**.** COC Records must be completed in black or blue indelible ink (must not run when wet). COC documentation begins at the time of sample collection. Client is required to document all sample details prior to releasing samples to MJRA. All samples must be placed on ice immediately after sampling and shipped or delivered to the laboratory in a manner that will maintain the sample temperature above freezing and below 6C (loose ice is preferred)**.**

Sample Submission, Sample Acceptance & Sampling Containers

Included on the COC must be the sample description, date and time of collection (including start and stop for composites), container size and type, preservative information, sample matrix, indication of whether the sample is a grab or composite, number of containers & a list of the tests to be performed. Poor sample collection technique, inappropriate sampling containers and/or improper sample preservation may lead to sample rejection. Suitable sample containers, labels, and preservatives (as applicable), along with blank COCs are provided at no additional cost.

Turnaround Times (TAT)

Average TAT for test results range from 5 to 15 working days depending on the specific analyses and time of year submitted. Faster turnaround times (*RUSH TAT) may be available depending on the current workload in a particular department and the nature of the analyses requested. We encourage you to verify requests for expedited sample results with one of our Technical Directors prior to sample submittal. Without confirmation from a Technical Director, your results may not be completed by your deadline. *RUSH TAT Surcharges are applied for expedited turnaround times.

Analytical Results, Sample Collection Integrity & Subcontracting

Analytical values are for the sample as submitted and relate only to the item tested. The value indicates a snapshot of the constituent content of the sample at the time of sample collection. Analytical results can be impacted by poor sample collection technique and/or improper preservation. All sample collection completed by MJRA was performed in accordance with applicable regulatory protocols or as specified in customer specific sampling plans. Constituent content will vary over time based on the matrix of the sample and the physical and chemical changes to its environment. All sample results and laboratory reports are strictly confidential. Results will not be available to anyone except the primary client or authorized party representing the client unless MJRA receives additional permissions from the client. When necessary, MJRA will subcontract certain analyses to a third party accredited laboratory. If client prohibits subcontracting, it must be provided in writing and include instruction on how to proceed with client samples that require third party analyses.

Payment Terms

Payment Terms are Net 30 days. Prices are subject to change without notice. A standing monthly charge of 1.5% of the clients over-30-day-unpaid balance may be added to the balance after 30 days and each month thereafter (day 31, 61, 91 etc.). The laboratory accepts all major credit cards, ACH transactions, checks and cash. New clients must pay for all services rendered prior to sample collection and/or in some cases report processing. Clients must contact the MJRA accounting department to pursue a credit-based account. MJRA reserves the right to terminate the client's credit account and to refuse to perform additional services on a credit basis if any balance is outstanding for more than 60 days.

Warranty & Litigation

MJRA does not guarantee any results of its services but has agreed to use its best efforts, in accordance with the standards and practices of the industry, to cause such results to be accurate and complete. We disclaim any other warranties, expressed or implied, including a warranty of fitness for a particular purpose and warranty of merchantability. Clients agree that they shall reimburse MJRA for any and all fees, cost and litigation expenses, including reasonable attorney fees incurred by MJRA in obtaining payment for the services rendered. All costs associated with compliance with any subpoena for documents, testimony, or any other purpose relating to work performed by MJRA, for a client, shall be paid by that client. MJRA's aggregate liability for negligent acts and omissions and of an intentional breach by MJRA will not exceed the fee paid for the services. Client agrees to indemnify and hold MJRA harmless for any and all liabilities in excess of said amount. Neither MJRA nor the client shall be liable to the other for special, incidental consequential or punitive liability or damages included but not limited to those arising from delay, loss of use, loss of profits or revenues. MJRA will not be liable to the client unless the client has notified MJRA of the discovery of the alleged negligent act, error, omissions or breach within 30 days of the

Reviewed and Approved by:

Richard A Wheeler
Director of Field Services

Certificate of Analysis

M.J. Reider Associates, Inc.
ENVIRONMENTAL TESTING LABORATORY
U.S. EPA/PA DEP #06-00003

Laboratory No.: 2026759
Report: 09/11/20
Lab Contact: Richard A Wheeler

Attention: David Wertz
Reported To: Tetra Tech
USACE, Phila Dist. Env.Resources Branch 100 Penn Square E.
Arlington, VA 22201

Project: 2020 - Beltzville Reservoir

Lab ID: 2026759-01 **Collected By:** Client **Sampled:** 09/03/20 06:40 **Received:** 09/03/20 13:50
Sample Desc: BZ-1S **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	<0.05	mg/l		0.05	SM 4500-P F	09/08/20	G-11	SNF
General Chemistry								
Alkalinity, Total to pH 4.5	14	mg CaCO3/L		2	SM 2320 B	09/09/20	C-51e	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	09/08/20	U	APR
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	09/03/20 16:21		SLM
Nitrate as N	0.92	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	09/03/20 18:19	J	TML
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	09/03/20 18:19	U	TML
Nitrate+Nitrite as N	<0.93	mg/l	0.125	1.10	CALCULATED	09/03/20 18:19		TML
Nitrogen, Total Kjeldahl (TKN)	<0.47	mg/l	0.47	0.50	EPA 351.2	09/09/20	U	SNF
Phosphorus as P, Total	<0.01	mg/l	0.01	0.05	SM 4500-P E	09/04/20	U	RCE
Solids, Total Dissolved	71	mg/l	4	5	SM 2540 C	09/04/20		TMH
Total Organic Carbon	2.0	mg/l	0.3	0.5	SM 5310 C	09/09/20		ALD
Solids, Total Suspended	1	mg/l	1	1	SM 2540 D	09/04/20		TMH

	Result	Unit	Rep. Limit	Analysis Method	Incubated	Analyzed	Notes	Analyst
Microbiology								
Escherichia coli	66	mpn/100ml	1	SM 9223 B/Quantitray	9/3/20 14:40	9/4/20 10:31		JMW
Total Coliform	>2420	mpn/100ml	1	SM 9223 B/Quantitray	9/3/20 14:40	9/4/20 10:31		JMW

Lab ID: 2026759-02 **Collected By:** Client **Sampled:** 09/03/20 11:10 **Received:** 09/03/20 13:50
Sample Desc: BZ-2S **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	0.05	mg/l		0.05	SM 4500-P F	09/08/20	G-11	SNF
General Chemistry								
Alkalinity, Total to pH 4.5	14	mg CaCO3/L		2	SM 2320 B	09/09/20	C-51f	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	09/08/20	U	APR
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	09/03/20 16:21		SLM
Nitrate as N	0.57	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	09/03/20 18:36	J	TML
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	09/03/20 18:36	U	TML
Nitrate+Nitrite as N	<0.58	mg/l	0.125	1.10	CALCULATED	09/03/20 18:36		TML
Nitrogen, Total Kjeldahl (TKN)	<0.47	mg/l	0.47	0.50	EPA 351.2	09/09/20	U	SNF
Phosphorus as P, Total	0.02	mg/l	0.01	0.05	SM 4500-P E	09/04/20	J	RCE
Solids, Total Dissolved	56	mg/l	4	5	SM 2540 C	09/04/20		TMH
Total Organic Carbon	3.5	mg/l	0.3	0.5	SM 5310 C	09/09/20		ALD
Solids, Total Suspended	2	mg/l	1	1	SM 2540 D	09/04/20		TMH

	Result	Unit	Rep. Limit	Analysis Method	Incubated	Analyzed	Notes	Analyst
Microbiology								
Escherichia coli	980	mpn/100ml	1	SM 9223 B/Quantitray	9/3/20 15:48	9/4/20 10:31		JMW
Total Coliform	>2420	mpn/100ml	1	SM 9223 B/Quantitray	9/3/20 15:48	9/4/20 10:31		JMW

Lab ID: 2026759-03 **Collected By:** Client **Sampled:** 09/03/20 08:30 **Received:** 09/03/20 13:50
Sample Desc: BZ-3S **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	<0.05	mg/l		0.05	SM 4500-P F	09/08/20	G-11	SNF
General Chemistry								
Alkalinity, Total to pH 4.5	11	mg CaCO3/L		2	SM 2320 B	09/09/20	C-51b	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	09/08/20	U	APR
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	09/03/20 16:21		SLM
Nitrate as N	0.54	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	09/03/20 18:53	J	TML
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	09/03/20 18:53	U	TML
Nitrate+Nitrite as N	<0.55	mg/l	0.125	1.10	CALCULATED	09/03/20 18:53		TML
Nitrogen, Total Kjeldahl (TKN)	<0.47	mg/l	0.47	0.50	EPA 351.2	09/09/20	U	SNF
Phosphorus as P, Total	<0.01	mg/l	0.01	0.05	SM 4500-P E	09/04/20	U	RCE
Solids, Total Dissolved	57	mg/l	4	5	SM 2540 C	09/04/20		TMH
Total Organic Carbon	1.7	mg/l	0.3	0.5	SM 5310 C	09/09/20		ALD
Solids, Total Suspended	1	mg/l	1	1	SM 2540 D	09/04/20		TMH

	Result	Unit	Rep. Limit	Analysis Method	Incubated	Analyzed	Notes	Analyst
Microbiology								
Escherichia coli	<1	mpn/100ml	1	SM 9223 B/Quantitray	9/3/20 15:48	9/4/20 10:31		JMW
Total Coliform	121	mpn/100ml	1	SM 9223 B/Quantitray	9/3/20 15:48	9/4/20 10:31		JMW

Lab ID: 2026759-04 **Collected By:** Client **Sampled:** 09/03/20 08:30 **Received:** 09/03/20 13:50
Sample Desc: BZ-3M **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	<0.05	mg/l		0.05	SM 4500-P F	09/08/20	G-11	SNF
General Chemistry								
Alkalinity, Total to pH 4.5	13	mg CaCO3/L		2	SM 2320 B	09/09/20	C-51c	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	09/08/20	U	APR
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	09/03/20 16:21		SLM
Nitrate as N	0.91	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	09/03/20 20:00	J	TML
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	09/03/20 20:00	U	TML
Nitrate+Nitrite as N	<0.92	mg/l	0.125	1.10	CALCULATED	09/03/20 20:00		TML
Nitrogen, Total Kjeldahl (TKN)	0.54	mg/l	0.47	0.50	EPA 351.2	09/09/20		SNF
Phosphorus as P, Total	<0.01	mg/l	0.01	0.05	SM 4500-P E	09/04/20	U	RCE
Solids, Total Dissolved	55	mg/l	4	5	SM 2540 C	09/04/20		TMH
Total Organic Carbon	1.3	mg/l	0.3	0.5	SM 5310 C	09/09/20		ALD
Solids, Total Suspended	2	mg/l	1	1	SM 2540 D	09/04/20		TMH

Lab ID: 2026759-05 **Collected By:** Client **Sampled:** 09/03/20 08:30 **Received:** 09/03/20 13:50
Sample Desc: BZ-3D **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	<0.05	mg/l		0.05	SM 4500-P F	09/08/20	G-11	SNF
General Chemistry								
Alkalinity, Total to pH 4.5	13	mg CaCO3/L		2	SM 2320 B	09/09/20	C-51d	APR
Ammonia as N	0.01	mg/l	0.01	0.10	ASTM D6919-03	09/08/20	J	APR
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	09/03/20 16:21		SLM
Nitrate as N	0.86	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	09/03/20 20:51	J	TML
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	09/03/20 20:51	U	TML
Nitrate+Nitrite as N	<0.87	mg/l	0.125	1.10	CALCULATED	09/03/20 20:51		TML
Nitrogen, Total Kjeldahl (TKN)	0.58	mg/l	0.47	0.50	EPA 351.2	09/09/20	Q-10	SNF
Phosphorus as P, Total	<0.01	mg/l	0.01	0.05	SM 4500-P E	09/04/20	U	RCE
Solids, Total Dissolved	56	mg/l	4	5	SM 2540 C	09/04/20		TMH
Total Organic Carbon	1.2	mg/l	0.3	0.5	SM 5310 C	09/09/20		ALD
Solids, Total Suspended	6	mg/l	1	1	SM 2540 D	09/04/20		TMH

Lab ID: 2026759-06 **Collected By:** Client **Sampled:** 09/03/20 10:55 **Received:** 09/03/20 13:50
Sample Desc: BZ-4S **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	<0.05	mg/l		0.05	SM 4500-P F	09/08/20	G-11	SNF
General Chemistry								
Alkalinity, Total to pH 4.5	7	mg CaCO3/L		2	SM 2320 B	09/09/20	C-51k	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	09/08/20	U	APR
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	09/03/20 16:21		SLM
Nitrate as N	0.26	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	09/03/20 21:08	J	TML
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	09/03/20 21:08	U	TML
Nitrate+Nitrite as N	<0.27	mg/l	0.125	1.10	CALCULATED	09/03/20 21:08		TML
Nitrogen, Total Kjeldahl (TKN)	<0.47	mg/l	0.47	0.50	EPA 351.2	09/09/20	U	SNF
Phosphorus as P, Total	<0.01	mg/l	0.01	0.05	SM 4500-P E	09/04/20	U	RCE
Solids, Total Dissolved	22	mg/l	4	5	SM 2540 C	09/04/20		TMH
Total Organic Carbon	1.4	mg/l	0.3	0.5	SM 5310 C	09/09/20		ALD
Solids, Total Suspended	2	mg/l	1	1	SM 2540 D	09/04/20		TMH

	Result	Unit	Rep. Limit	Analysis Method	Incubated	Analyzed	Notes	Analyst
Microbiology								
Escherichia coli	62	mpn/100ml	1	SM 9223 B/Quantitray	9/3/20 15:48	9/4/20 10:31		JMW
Total Coliform	>2420	mpn/100ml	1	SM 9223 B/Quantitray	9/3/20 15:48	9/4/20 10:31		JMW

Lab ID: 2026759-07 **Collected By:** Client **Sampled:** 09/03/20 10:40 **Received:** 09/03/20 13:50
Sample Desc: BZ-5S **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	0.07	mg/l		0.05	SM 4500-P F	09/08/20	G-11	SNF
General Chemistry								
Alkalinity, Total to pH 4.5	15	mg CaCO3/L		2	SM 2320 B	09/09/20	C-51g	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	09/08/20	U	APR
Biochemical Oxygen Demand	2.2	mg/l	2.0	2.0	SM 5210 B	09/03/20 16:21		SLM
Nitrate as N	0.72	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	09/03/20 21:25	J	TML
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	09/03/20 21:25	U	TML
Nitrate+Nitrite as N	<0.73	mg/l	0.125	1.10	CALCULATED	09/03/20 21:25		TML
Nitrogen, Total Kjeldahl (TKN)	1.45	mg/l	0.47	0.50	EPA 351.2	09/09/20		SNF
Phosphorus as P, Total	0.09	mg/l	0.01	0.05	SM 4500-P E	09/04/20		RCE
Solids, Total Dissolved	57	mg/l	4	5	SM 2540 C	09/04/20		TMH
Total Organic Carbon	8.0	mg/l	0.3	0.5	SM 5310 C	09/09/20		ALD
Solids, Total Suspended	22	mg/l	1	1	SM 2540 D	09/04/20		TMH

	Result	Unit	Rep. Limit	Analysis Method	Incubated	Analyzed	Notes	Analyst
Microbiology								
Escherichia coli	>2420	mpn/100ml	1	SM 9223 B/Quantitray	9/3/20 15:48	9/4/20 10:31		JMW
Total Coliform	>2420	mpn/100ml	1	SM 9223 B/Quantitray	9/3/20 15:48	9/4/20 10:31		JMW

Lab ID: 2026759-08 **Collected By:** Client **Sampled:** 09/03/20 07:35 **Received:** 09/03/20 13:50
Sample Desc: BZ-6S **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	<0.05	mg/l		0.05	SM 4500-P F	09/08/20	G-11	SNF
General Chemistry								
Alkalinity, Total to pH 4.5	11	mg CaCO3/L		2	SM 2320 B	09/09/20	C-51	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	09/08/20	U	APR
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	09/03/20 16:21		SLM
Nitrate as N	0.54	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	09/03/20 21:41	J	TML
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	09/03/20 21:41	U	TML
Nitrate+Nitrite as N	<0.55	mg/l	0.125	1.10	CALCULATED	09/03/20 21:41		TML
Nitrogen, Total Kjeldahl (TKN)	0.51	mg/l	0.47	0.50	EPA 351.2	09/09/20		SNF
Phosphorus as P, Total	<0.01	mg/l	0.01	0.05	SM 4500-P E	09/04/20	U	RCE
Solids, Total Dissolved	45	mg/l	4	5	SM 2540 C	09/04/20		TMH
Total Organic Carbon	1.8	mg/l	0.3	0.5	SM 5310 C	09/09/20		ALD
Solids, Total Suspended	1	mg/l	1	1	SM 2540 D	09/04/20		TMH

	Result	Unit	Rep. Limit	Analysis Method	Incubated	Analyzed	Notes	Analyst
Microbiology								
Escherichia coli	1	mpn/100ml	1	SM 9223 B/Quantitray	9/3/20 14:40	9/4/20 10:31		JMW
Total Coliform	102	mpn/100ml	1	SM 9223 B/Quantitray	9/3/20 14:40	9/4/20 10:31		JMW

Lab ID: 2026759-09 **Collected By:** Client **Sampled:** 09/03/20 07:35 **Received:** 09/03/20 13:50
Sample Desc: BZ-6M **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	0.06	mg/l		0.05	SM 4500-P F	09/08/20	G-11	SNF
General Chemistry								
Alkalinity, Total to pH 4.5	7	mg CaCO3/L		2	SM 2320 B	09/09/20	C-51j	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	09/08/20	U	APR
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	09/03/20 16:21		SLM
Nitrate as N	0.92	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	09/03/20 21:58	J	TML
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	09/03/20 21:58	U	TML
Nitrate+Nitrite as N	<0.93	mg/l	0.125	1.10	CALCULATED	09/03/20 21:58		TML
Nitrogen, Total Kjeldahl (TKN)	0.71	mg/l	0.47	0.50	EPA 351.2	09/09/20		SNF
Phosphorus as P, Total	0.08	mg/l	0.01	0.05	SM 4500-P E	09/04/20		RCE
Solids, Total Dissolved	57	mg/l	4	5	SM 2540 C	09/04/20		TMH
Total Organic Carbon	1.2	mg/l	0.3	0.5	SM 5310 C	09/09/20		ALD
Solids, Total Suspended	1	mg/l	1	1	SM 2540 D	09/04/20		TMH

Lab ID: 2026759-10 **Collected By:** Client **Sampled:** 09/03/20 07:35 **Received:** 09/03/20 13:50
Sample Desc: BZ-6D **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	<0.05	mg/l		0.05	SM 4500-P F	09/08/20	G-11	SNF
General Chemistry								
Alkalinity, Total to pH 4.5	15	mg CaCO3/L		2	SM 2320 B	09/09/20	C-51h	APR
Ammonia as N	0.02	mg/l	0.01	0.10	ASTM D6919-03	09/08/20	J	APR
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	09/03/20 16:21		SLM
Nitrate as N	0.69	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	09/03/20 22:15	J	TML
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	09/03/20 22:15	U	TML
Nitrate+Nitrite as N	<0.70	mg/l	0.125	1.10	CALCULATED	09/03/20 22:15		TML
Nitrogen, Total Kjeldahl (TKN)	0.74	mg/l	0.47	0.50	EPA 351.2	09/09/20		SNF
Phosphorus as P, Total	<0.01	mg/l	0.01	0.05	SM 4500-P E	09/04/20	U	RCE
Solids, Total Dissolved	73	mg/l	4	5	SM 2540 C	09/04/20		TMH
Total Organic Carbon	1.6	mg/l	0.3	0.5	SM 5310 C	09/09/20		ALD
Solids, Total Suspended	2	mg/l	1	1	SM 2540 D	09/04/20		TMH

Lab ID: 2026759-11 **Collected By:** Client **Sampled:** 09/03/20 09:30 **Received:** 09/03/20 13:50
Sample Desc: BZ-7S **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	<0.05	mg/l		0.05	SM 4500-P F	09/08/20	G-11	SNF
General Chemistry								
Alkalinity, Total to pH 4.5	11	mg CaCO3/L		2	SM 2320 B	09/09/20	C-51	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	09/08/20	U	APR
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	09/03/20 16:21		SLM
Nitrate as N	0.51	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	09/03/20 22:32	J	TML
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	09/03/20 22:32	U	TML
Nitrate+Nitrite as N	<0.52	mg/l	0.125	1.10	CALCULATED	09/03/20 22:32		TML
Nitrogen, Total Kjeldahl (TKN)	<0.47	mg/l	0.47	0.50	EPA 351.2	09/09/20	U	SNF
Phosphorus as P, Total	<0.01	mg/l	0.01	0.05	SM 4500-P E	09/04/20	U	RCE
Solids, Total Dissolved	50	mg/l	4	5	SM 2540 C	09/04/20		TMH
Total Organic Carbon	1.7	mg/l	0.3	0.5	SM 5310 C	09/09/20		ALD
Solids, Total Suspended	1	mg/l	1	1	SM 2540 D	09/04/20		TMH

	Result	Unit	Rep. Limit	Analysis Method	Incubated	Analyzed	Notes	Analyst
Microbiology								
Escherichia coli	1	mpn/100ml	1	SM 9223 B/Quantitray	9/3/20 15:48	9/4/20 10:31		JMW
Total Coliform	326	mpn/100ml	1	SM 9223 B/Quantitray	9/3/20 15:48	9/4/20 10:31		JMW

Lab ID: 2026759-12 **Collected By:** Client **Sampled:** 09/03/20 09:30 **Received:** 09/03/20 13:50
Sample Desc: BZ-7M **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	<0.05	mg/l		0.05	SM 4500-P F	09/08/20	G-11	SNF
General Chemistry								
Alkalinity, Total to pH 4.5	11	mg CaCO3/L		2	SM 2320 B	09/09/20	C-51a	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	09/08/20	U	APR
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	09/03/20 16:21		SLM
Nitrate as N	0.59	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	09/03/20 22:49	J	TML
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	09/03/20 22:49	U	TML
Nitrate+Nitrite as N	<0.60	mg/l	0.125	1.10	CALCULATED	09/03/20 22:49		TML
Nitrogen, Total Kjeldahl (TKN)	0.50	mg/l	0.47	0.50	EPA 351.2	09/09/20	J	SNF
Phosphorus as P, Total	<0.01	mg/l	0.01	0.05	SM 4500-P E	09/04/20	U	RCE
Solids, Total Dissolved	60	mg/l	4	5	SM 2540 C	09/04/20		TMH
Total Organic Carbon	1.7	mg/l	0.3	0.5	SM 5310 C	09/09/20		ALD
Solids, Total Suspended	3	mg/l	1	1	SM 2540 D	09/04/20		TMH

Lab ID: 2026759-13 **Collected By:** Client **Sampled:** 09/03/20 09:30 **Received:** 09/03/20 13:50
Sample Desc: BZ-7D **Sample Type:** Grab

	Result	Unit	MDL	Rep. Limit	Analysis Method	Analyzed	Notes	Analyst
Dissolved General Chemistry								
Phosphorus as P, Dissolved	<0.05	mg/l		0.05	SM 4500-P F	09/08/20	G-11	SNF
General Chemistry								
Alkalinity, Total to pH 4.5	15	mg CaCO3/L		2	SM 2320 B	09/09/20	C-51i	APR
Ammonia as N	<0.01	mg/l	0.01	0.10	ASTM D6919-03	09/08/20	U	APR
Biochemical Oxygen Demand	<2.0	mg/l	2.0	2.0	SM 5210 B	09/03/20 16:21		SLM
Nitrate as N	0.92	mg/l	0.11	1.00	EPA 300.0 Rev 2.1	09/03/20 23:05	J	TML
Nitrite as N	<0.01	mg/l	0.01	0.10	EPA 300.0 Rev 2.1	09/03/20 23:05	U	TML
Nitrate+Nitrite as N	<0.93	mg/l	0.125	1.10	CALCULATED	09/03/20 23:05		TML
Nitrogen, Total Kjeldahl (TKN)	0.66	mg/l	0.47	0.50	EPA 351.2	09/09/20		SNF
Phosphorus as P, Total	<0.01	mg/l	0.01	0.05	SM 4500-P E	09/04/20	U	RCE
Solids, Total Dissolved	81	mg/l	4	5	SM 2540 C	09/04/20		TMH
Total Organic Carbon	1.6	mg/l	0.3	0.5	SM 5310 C	09/09/20		ALD
Solids, Total Suspended	4	mg/l	1	1	SM 2540 D	09/04/20		TMH

Preparation Methods

Specific Method	Preparation Method	Prep Batch	Prepared Date	Prepared By
2026759-01				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0I0288	09/04/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0I0289	09/04/2020	RCE
2026759-02				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0I0288	09/04/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0I0289	09/04/2020	RCE
2026759-03				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0I0288	09/04/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0I0289	09/04/2020	RCE
2026759-04				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0I0288	09/04/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0I0289	09/04/2020	RCE
2026759-05				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0I0288	09/04/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0I0289	09/04/2020	RCE
2026759-06				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0I0288	09/04/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0I0289	09/04/2020	RCE
2026759-07				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0I0288	09/04/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0I0289	09/04/2020	RCE
2026759-08				
Dissolved General Chemistry				

SM 4500-P F	SM 4500-P B	B0I0288	09/04/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0I0289	09/04/2020	RCE
2026759-09				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0I0288	09/04/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0I0289	09/04/2020	RCE
2026759-10				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0I0288	09/04/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0I0289	09/04/2020	RCE
2026759-11				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0I0288	09/04/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0I0289	09/04/2020	RCE
2026759-12				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0I0288	09/04/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0I0289	09/04/2020	RCE
2026759-13				
Dissolved General Chemistry				
SM 4500-P F	SM 4500-P B	B0I0288	09/04/2020	RCE
General Chemistry				
SM 4500-P E	SM 4500-P B	B0I0289	09/04/2020	RCE

Notes and Definitions

C-51	The alkalinity to pH 4.2 = 10.6 mg CaCO3/L.
C-51a	The alkalinity to pH 4.2 = 10.7 mg CaCO3/L.
C-51b	The alkalinity to pH 4.2 = 11.0 mg CaCO3/L.
C-51c	The alkalinity to pH 4.2 = 12.9 mg CaCO3/L.
C-51d	The alkalinity to pH 4.2 = 13.4 mg CaCO3/L.
C-51e	The alkalinity to pH 4.2 = 13.8 mg CaCO3/L.
C-51f	The alkalinity to pH 4.2 = 14.4 mg CaCO3/L.
C-51g	The alkalinity to pH 4.2 = 14.7 mg CaCO3/L.
C-51h	The alkalinity to pH 4.2 = 14.8 mg CaCO3/L.
C-51i	The alkalinity to pH 4.2 = 15.0 mg CaCO3/L.
C-51j	The alkalinity to pH 4.2 = 7.2 mg CaCO3/L.
C-51k	The alkalinity to pH 4.2 = 7.4 mg CaCO3/L.
G-11	The sample was filtered after it was received at the laboratory.
J	Estimated value
Q-10	The matrix spike(s) were outside acceptable limits of 90-110% recovery at 113%.
U	Analyte was not detected above the indicated value.

M.J. Reider Associates, Inc.
107 Angelica St, Reading PA, 19611
610-374-5129 www.mjreider.com

WORK ORDER
Chain of Custody

2026759

Client Code: 3157
Project Manager: Richard A Wheeler
Client: Tetra Tech
Project: 2020 - Beltzville Reservoir
Report To: Tetra Tech - David Wertz - USACE, Phila Dist. Env.Resources Branch 100 Penn Square E., Arlington, VA 22201
Invoice To: Tetra Tech - David Wertz - USACE, Phila Dist. Env.Resources Branch 100 Penn Square E., Arlington, VA 22201

Collected By : (Full Name) Gregory Wacik

Comments:

2026759-01 BZ-1S

BOD SM 5210B, EC (#) SM 9223B Confirmation, NO2-N EPA 300.0, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F, TC (#) SM 9223B
Alk SM 2320B, NH3-N D6919-03, PO4 SM 4500P-E, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

Matrix: Non-Potable Water Date: 9/3/20
Type: Grab Time: 0640

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Sterile Pl 125ml NaThio
D - Pl 500ml H2SO4
E - Pl 250ml NP
F - Pl 500ml Lab Filtered
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc
I - Vial Amber 40ml H3PO4, minimal hdspc

2026759-02 BZ-2S

BOD SM 5210B, EC (#) SM 9223B Confirmation, NO2-N EPA 300.0, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F, TC (#) SM 9223B
Alk SM 2320B, NH3-N D6919-03, PO4 SM 4500P-E, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

Matrix: Non-Potable Water Date: 9/3/20
Type: Grab Time: 1110

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Sterile Pl 125ml NaThio
D - Pl 500ml H2SO4
E - Pl 250ml NP
F - Pl 500ml Lab Filtered
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc
I - Vial Amber 40ml H3PO4, minimal hdspc

	Date/Time		Date/Time
Relinquished By	9/3/20 1150	Received By	9-3-20 1155
Relinquished By		Received By	
Relinquished By		Received at Laboratory By	9-3-20 1350

Sample Kit Prepared By:	Date/Time
	8-10-20

Sample Temp (°C): 8
Samples on Ice? Yes No NA
Approved By:
Entered By:

The Client, by signing (or having the client's agent sign), agrees to MJRA's Terms and Conditions and to pay for the above requested services including any additional associated fees incurred.

Printed: 8/6/2020 12:24:07

Report Template:

M.J. Reider Associates, Inc. **2026759**

Client Code: 3157
Project Manager: Richard A Wheeler

Client: Tetra Tech
Project: 2020 - Beltzville Reservoir

Collected By : (Full Name) Gregory Wacik

Comments:

2026759-03 BZ-3S

BOD SM 5210B, EC (#) SM 9223B Confirmation, NO2-N EPA 300.0, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F, TC (#) SM 9223B
Alk SM 2320B, NH3-N D6919-03, PO4 SM 4500P-E, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

Matrix: Non-Potable Water Date: 9/3/20
Type: Grab Time: 0830

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Sterile Pl 125ml NaThio
D - Pl 500ml H2SO4
E - Pl 250ml NP
F - Pl 500ml Lab Filtered
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc
I - Vial Amber 40ml H3PO4, minimal hdspc

2026759-04 BZ-3M

BOD SM 5210B, NO2-N EPA 300.0, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F
Alk SM 2320B, NH3-N D6919-03, PO4 SM 4500P-E, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

Matrix: Non-Potable Water Date: 9/3/20
Type: Grab Time: 0830

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Pl 500ml H2SO4
D - Pl 250ml NP
E - Pl 500ml Lab Filtered
F - Vial Amber 40ml H3PO4, minimal hdspc
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc

2026759-05 BZ-3D

BOD SM 5210B, PO4-D SM 4500P-F, NO2-N EPA 300.0, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2
Alk SM 2320B, PO4 SM 4500P-E, TDS SM 2540C, TKN EPA 351.2, NH3-N D6919-03, TOC SM 5310C, TSS SM 2540D

Matrix: Non-Potable Water Date: 9/3/20
Type: Grab Time: 0830

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Pl 500ml H2SO4
D - Pl 250ml NP
E - Pl 500ml Lab Filtered
F - Vial Amber 40ml H3PO4, minimal hdspc
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc

Relinquished By	9/3/20 1150 Date/Time	Received By	9-3-20 1155 Date/Time
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received at Laboratory By	9-3-20 1350 Date/Time

Sample Kit Prepared By:	Date/Time
	8-10-20
Sample Temp (°C):	8
Samples on Ice?	Yes No NA
Approved By:	
Entered By:	BSW

The Client, by signing (or having the client's agent sign), agrees to MJRA's Terms and Conditions and to pay for the above requested services including any additional associated fees incurred.

Printed: 8/6/2020 12:24:07

Report Template: [illegible] WetlOrder COC is

M.J. Reider Associates, Inc.

2026759

Client Code: 3157
Project Manager: Richard A Wheeler

Client: Tetra Tech
Project: 2020 - Beltzville Reservoir

Collected By : (Full Name) Gregory Wacik

Comments:

2026759-06 BZ-4S

EC (#) SM 9223B Confirmation, NO2-N EPA 300.0, NO3-N EPA 300.0, BOD SM 5210B, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F, TC (#) SM 9223B
NH3-N D6919-03, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D, Alk SM 2320B, PO4 SM 4500P-E

Matrix: Non-Potable Water
Type: Grab
Date: 9/3/20
Time: 1055

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Sterile Pl 125ml NaThio
D - Pl 500ml H2SO4
E - Pl 250ml NP
F - Pl 500ml Lab Filtered
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc
I - Vial Amber 40ml H3PO4, minimal hdspc

2026759-07 BZ-5S

NO2-N EPA 300.0, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2, BOD SM 5210B, EC (#) SM 9223B Confirmation, PO4-D SM 4500P-F, TC (#) SM 9223B
PO4 SM 4500P-E, TOC SM 5310C, TSS SM 2540D, Alk SM 2320B, NH3-N D6919-03, TDS SM 2540C, TKN EPA 351.2

Matrix: Non-Potable Water
Type: Grab
Date: 9/3/20
Time: 1040

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Sterile Pl 125ml NaThio
D - Pl 500ml H2SO4
E - Pl 250ml NP
F - Pl 500ml Lab Filtered
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc
I - Vial Amber 40ml H3PO4, minimal hdspc

2026759-08 BZ-6S

BOD SM 5210B, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F, TC (#) SM 9223B, EC (#) SM 9223B Confirmation, NO2-N EPA 300.0, NO3-N EPA 300.0
Alk SM 2320B, PO4 SM 4500P-E, NH3-N D6919-03, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

Matrix: Non-Potable Water
Type: Grab
Date: 9/3/20
Time: 0735

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Sterile Pl 125ml NaThio
D - Pl 500ml H2SO4
E - Pl 250ml NP
F - Pl 500ml Lab Filtered
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc
I - Vial Amber 40ml H3PO4, minimal hdspc

Relinquished By	9/3/20 1150 Date/Time	Received By	9-3-20 1155 Date/Time
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received at Laboratory By	9-3-20 1350 Date/Time

Sample Kit Prepared By:	Date/Time
	8-10-20
Sample Temp (°C):	8
Samples on Ice?	Yes No NA
Approved By:	BSW
Entered By:	

The Client, by signing (or having the client's agent sign), agrees to MJRA's Terms and Conditions and to pay for the above requested services including any additional associated fees incurred.

Printed: 8/6/2020 12:24:07

Report Template: wke_workOrder_COC_ls

M.J. Reider Associates, Inc.

2026759

Client Code: 3157
Project Manager: Richard A Wheeler

Client: Tetra Tech
Project: 2020 - Beltzville Reservoir

Collected By : (Full Name) Gregory Wacik

Comments:

2026759-09 BZ-6M

Matrix: Non-Potable Water
Type: Grab
Date: 9/3/20
Time: 0735

BOD SM 5210B, NO2-N EPA 300.0, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F
Alk SM 2320B, NH3-N D6919-03, PO4 SM 4500P-E, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Pl 500ml H2SO4
D - Pl 250ml NP
E - Pl 500ml Lab Filtered
F - Vial Amber 40ml H3PO4, minimal hdspc
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc

2026759-10 BZ-6D

Matrix: Non-Potable Water
Type: Grab
Date: 9/3/20
Time: 0735

BOD SM 5210B, NO2-N EPA 300.0, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F
Alk SM 2320B, NH3-N D6919-03, PO4 SM 4500P-E, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Pl 500ml H2SO4
D - Pl 250ml NP
E - Pl 500ml Lab Filtered
F - Vial Amber 40ml H3PO4, minimal hdspc
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc

2026759-11 BZ-7S

Matrix: Non-Potable Water
Type: Grab
Date: 9/3/20
Time: 0930

BOD SM 5210B, EC (#) SM 9223B Confirmation, NO2-N EPA 300.0, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F, TC (#) SM 9223B
Alk SM 2320B, NH3-N D6919-03, PO4 SM 4500P-E, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Sterile Pl 125ml NaThio
D - Pl 500ml H2SO4
E - Pl 250ml NP
F - Pl 500ml Lab Filtered
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc
I - Vial Amber 40ml H3PO4, minimal hdspc

Relinquished By	9/3/20 1150 Date/Time	Received By	9-3-20 1155 Date/Time
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received at Laboratory By	9-3-20 1350 Date/Time

Sample Kit Prepared By:	Date/Time: 8-10-20
Sample Temp (°C):	8
Samples on Ice?	Yes / No / NA
Approved By:	BSW
Entered By:	BSW

The Client, by signing (or having the client's agent sign), agrees to MJRA's Terms and Conditions and to pay for the above requested services including any additional associated fees incurred.

Printed: 8/6/2020 12:24:07

Report Template: w...

M.J. Reider Associates, Inc.

2026759

Client Code: 3157
Project Manager: Richard A Wheeler

Client: Tetra Tech
Project: 2020 - Beltzville Reservoir

Collected By : (Full Name) Gregory Wacik

Comments:

2026759-12 BZ-7M

JMK DM DM

BOD SM 5210B, NO2-N EPA 300.0, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F
Alk SM 2320B, NH3-N D6919-03, PO4 SM 4500P-E, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

Matrix: Non-Potable Water
Type: Grab
Date: 9/3/20
Time: 0930

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Pl 500ml H2SO4
D - Pl 250ml NP
E - Pl 500ml Lab Filtered
F - Vial Amber 40ml H3PO4, minimal hdspc
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc

2026759-13 BZ-7D

JMK DM DM

BOD SM 5210B, NO2-N EPA 300.0, NO3-N EPA 300.0, NO2-N, NO3-N, Combined NO3+NO2, PO4-D SM 4500P-F
Alk SM 2320B, NH3-N D6919-03, PO4 SM 4500P-E, TDS SM 2540C, TKN EPA 351.2, TOC SM 5310C, TSS SM 2540D

Matrix: Non-Potable Water
Type: Grab
Date: 9/3/20
Time: 0930

A - Pl 500ml NP, minimal hdspc
B - Pl Liter NP
C - Pl 500ml H2SO4
D - Pl 250ml NP
E - Pl 500ml Lab Filtered
F - Vial Amber 40ml H3PO4, minimal hdspc
G - Vial Amber 40ml H3PO4, minimal hdspc
H - Vial Amber 40ml H3PO4, minimal hdspc

Relinquished By	9/3/20 1150 Date/Time	Received By	9-3-20 1155 Date/Time
Relinquished By	Date/Time	Received By	Date/Time
Relinquished By	Date/Time	Received at Laboratory By	9-3-20 1350 Date/Time

Sample Kit Prepared By:	Date/Time
	8-10-20
Sample Temp (°C):	8
Samples on Ice?	Yes No NA
Approved By:	BSW
Entered By:	

The Client, by signing (or having the client's agent sign), agrees to MJRA's Terms and Conditions and to pay for the above requested services including any additional associated fees incurred.

Printed: 8/6/2020 12:24:07

Report Template: wko WorkOrder COC ls

MJRA Terms & Conditions

All samples submitted must be accompanied by signed documentation representing a Chain of Custody (COC). The COC Record acts as a contract between the client and MJRA. Signing the COC form gives approval for MJRA to perform the requested analyses and is an agreement to pay for the cost of such analyses**.** COC Records must be completed in black or blue indelible ink (must not run when wet). COC documentation begins at the time of sample collection. Client is required to document all sample details prior to releasing samples to MJRA. All samples must be placed on ice immediately after sampling and shipped or delivered to the laboratory in a manner that will maintain the sample temperature above freezing and below 6C (loose ice is preferred)**.**

Sample Submission, Sample Acceptance & Sampling Containers

Included on the COC must be the sample description, date and time of collection (including start and stop for composites), container size and type, preservative information, sample matrix, indication of whether the sample is a grab or composite, number of containers & a list of the tests to be performed. Poor sample collection technique, inappropriate sampling containers and/or improper sample preservation may lead to sample rejection. Suitable sample containers, labels, and preservatives (as applicable), along with blank COCs are provided at no additional cost.

Turnaround Times (TAT)

Average TAT for test results range from 5 to 15 working days depending on the specific analyses and time of year submitted. Faster turnaround times (*RUSH TAT) may be available depending on the current workload in a particular department and the nature of the analyses requested. We encourage you to verify requests for expedited sample results with one of our Technical Directors prior to sample submittal. Without confirmation from a Technical Director, your results may not be completed by your deadline. *RUSH TAT Surcharges are applied for expedited turnaround times.

Analytical Results, Sample Collection Integrity & Subcontracting

Analytical values are for the sample as submitted and relate only to the item tested. The value indicates a snapshot of the constituent content of the sample at the time of sample collection. Analytical results can be impacted by poor sample collection technique and/or improper preservation. All sample collection completed by MJRA was performed in accordance with applicable regulatory protocols or as specified in customer specific sampling plans. Constituent content will vary over time based on the matrix of the sample and the physical and chemical changes to its environment. All sample results and laboratory reports are strictly confidential. Results will not be available to anyone except the primary client or authorized party representing the client unless MJRA receives additional permissions from the client. When necessary, MJRA will subcontract certain analyses to a third party accredited laboratory. If client prohibits subcontracting, it must be provided in writing and include instruction on how to proceed with client samples that require third party analyses.

Payment Terms

Payment Terms are Net 30 days. Prices are subject to change without notice. A standing monthly charge of 1.5% of the clients over-30-day-unpaid balance may be added to the balance after 30 days and each month thereafter (day 31, 61, 91 etc.). The laboratory accepts all major credit cards, ACH transactions, checks and cash. New clients must pay for all services rendered prior to sample collection and/or in some cases report processing. Clients must contact the MJRA accounting department to pursue a credit-based account. MJRA reserves the right to terminate the client's credit account and to refuse to perform additional services on a credit basis if any balance is outstanding for more than 60 days.

Warranty & Litigation

MJRA does not guarantee any results of its services but has agreed to use its best efforts, in accordance with the standards and practices of the industry, to cause such results to be accurate and complete. We disclaim any other warranties, expressed or implied, including a warranty of fitness for a particular purpose and warranty of merchantability. Clients agree that they shall reimburse MJRA for any and all fees, cost and litigation expenses, including reasonable attorney fees incurred by MJRA in obtaining payment for the services rendered. All costs associated with compliance with any subpoena for documents, testimony, or any other purpose relating to work performed by MJRA, for a client, shall be paid by that client. MJRA's aggregate liability for negligent acts and omissions and of an intentional breach by MJRA will not exceed the fee paid for the services. Client agrees to indemnify and hold MJRA harmless for any and all liabilities in excess of said amount. Neither MJRA nor the client shall be liable to the other for special, incidental consequential or punitive liability or damages included but not limited to those arising from delay, loss of use, loss of profits or revenues. MJRA will not be liable to the client unless the client has notified MJRA of the discovery of the alleged negligent act, error, omissions or breach within 30 days of the

Reviewed and Approved by:

Richard A Wheeler
Director of Field Services