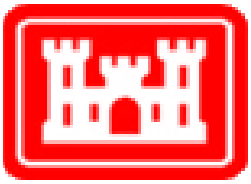
2017 WATER QUALITY MONITORING
BLUE MARSH RESERVOIR
LEESPORT, PENNSYLVANIA



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

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2017 Water Quality Monitoring
Blue Marsh Reservoir
Leesport, Pennsylvania

TABLE OF CONTENTS

2017 Water Quality Monitoring
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TABLE OF CONTENTS

2017 Water Quality Monitoring
Blue Marsh Reservoir
Leesport, Pennsylvania

TABLE OF CONTENTS

SECTION **PAGE NO.**

LIST OF TABLES

2017 Water Quality Monitoring
Blue Marsh Reservoir
Leesport, Pennsylvania

TABLE OF CONTENTS

SECTION **PAGE NO.**

LIST OF FIGURES

1.0 INTRODUCTION

1.1 PURPOSE OF THE MONITORING PROGRAM

The U.S. Army Corps of Engineers (USACE) manages Blue Marsh Reservoir located in east-central Pennsylvania on the Tulpehocken Creek, which is within the Delaware River Basin. Blue Marsh Reservoir provides flood control and a dependable water supply to downstream communities west of Reading, PA. 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 Blue Marsh Reservoir serves, the USACE monitors water quality, and other aspects related to ecological health, primarily to ensure public health safety. Results from water quality monitoring are compared to state water quality standards and used to diagnose other problems that commonly affect reservoir health such as low dissolved oxygen, nutrient enrichment and toxic loadings. This report summarizes the results of water quality monitoring at Blue Marsh Reservoir in 2017.

1.2 DESCRIPTION OF BLUE MARSH RESERVOIR

Blue Marsh Reservoir was designed to provide flood control, a water supply, and enhanced water quality to downstream communities along Tulpehocken Creek. Located about six miles northwest of Reading, Pennsylvania near Route 183, the reservoir dams a drainage area of 175 square miles. The dam, completed in 1979, can impound up to 42.3 billion gallons of water. The primary surface water inputs into Blue Marsh Reservoir other than Tulpehocken Creek include Wolf, Northkill, and Little Northkill Creek from the northwest; Spring Creek from the west; and Licking Creek from the northeast. The reservoir is approximately 6 miles long and is 52 feet deep immediately above the dam near Lower Heidelberg during normal summer pool.

1.3 ELEMENTS OF THE STUDY

The USACE, Philadelphia District, has been monitoring the water quality of Blue Marsh Reservoir since 1979. Over this time, the yearly monitoring designs have evolved to address new concerns such as health of public drinking water and contamination of reservoir bottom sediments. The 2017 monitoring program follows that in most recent years and includes the following major elements:

- Monthly water quality and bacteria 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 09 May and ending on 05 September 2017;
- Monthly profile samples for temperature, dissolved oxygen, chlorophyll, pH, turbidity, and conductivity at all stations in the reservoir and watershed; and
- Twice weekly coliform bacteria monitoring at three beach stations - to ensure public health and safety at the Blue Marsh Reservoir swimming beach area.

2.0 METHODS

2.1 PHYSICAL STRATIFICATION MONITORING

Physical stratification monitoring of the water column was conducted monthly at Blue Marsh Reservoir from May to September 2017 (Table 2-1). Stratification parameters included temperature, dissolved oxygen (DO), pH, Chlorophyll a, turbidity, and conductivity. Monitoring was conducted at nine fixed stations located throughout the reservoir watershed (Fig. 2-1). Six stations were located within the reservoir body (BM-2, BM-6, BM-7, BM-8, BM-9, and BM-10) for which water quality was measured from surface to bottom at 5-ft depth intervals. Three stations (BM-1S, BM-5S, and BM-11S) were monitored for surface water quality only. All water quality parameters were measured with a calibrated YSI 6600 V2-4 water quality meter. For this report, all of the stratification monitoring results, when applicable, were summarized and compared to water quality standards enacted by the Pennsylvania Department of Environmental Protection (PADEP – Chapter 93 Water Quality Standards).

2.2 WATER COLUMN CHEMISTRY MONITORING

Water column chemistry monitoring was conducted five times at Blue Marsh Reservoir during the 2017 sampling season (Table 2-1). Water samples were collected at nine fixed stations in the reservoir watershed (Fig. 2-1). Surface water samples were collected at stations downstream of the reservoir (BM-1S), and upstream of the reservoir on Tulpehocken Creek (BM-5S) and Northkill Creek (BM-11S). Surface, middle, and bottom water samples were collected at the six stations within the reservoir (BM-2, BM-6, BM-7, BM-8, BM-9, and BM-10). Surface water samples were collected by opening sample containers approximately one foot below the surface of the water. Middle and bottom water samples were collected with a Van Dorn design horizontal water bottle sampler.

Water samples from all depths were analyzed for ammonia, nitrite, nitrate, total Kjeldahl nitrogen (TKN), total phosphorus, ortho-phosphate, soluble phosphorus, total dissolved solids (TDS), total suspended solids (TSS), biochemical oxygen demand (BOD), alkalinity, and total organic carbon. Table 2-2 summarizes the laboratory methods detection limits, state water quality standards, and sample holding times for each water quality parameter monitored.

Table 2-1. Water quality monitoring schedule of Blue Marsh Reservoir during 2017. Monitoring was conducted at 9 fixed stations located throughout the reservoir watershed.

Date of Sample Collection	Physical Stratification Monitoring (all stations)	Water Column Chemistry Monitoring (all stations)	Trophic State Assessment (BM-6)	(1) Coliform Bacteria Monitoring (all stations)	Drinking Water Monitoring (2)
09 May	X	X	X	X	
20 June	X	X	X	X	
18 July	X	X	X	X	
15 August	X	X	X	X	
05 September	X	X	X	X	

(1) Surface water bacteria samples only
(2) Drinking water samples are collected quarterly by personnel at each reservoir. This data is not included.

2.3 TROPHIC STATE DETERMINATION

The trophic state of Blue Marsh Reservoir was determined by methods outlined by Carlson (1977) and EPA (1983). In general, these methods 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 averaged in the calculation of monthly TSIs (Table 2-1). Secchi disk depth was measured at station BM-6.

2.4 RESERVOIR COLIFORM BACTERIA MONITORING

Monitoring for coliform bacteria contaminants within the watershed was conducted monthly at Blue Marsh Reservoir. Water samples were analyzed for total and fecal coliforms. Surface water samples were tested at all stations. Table 2-3 presents the test methods, detection limits, PADEP water quality standards, and sample holding times for the bacteria parameters monitored at Blue Marsh Reservoir in 2017. The bacteria analytical method was based on a membrane filtration technique. All of the samples were analyzed within their respective maximum allowable hold times.

Table 2-2. Water quality test methods, detection limits, state regulatory criteria, and sample holding times for water quality parameters monitored at Blue Marsh Reservoir in 2017.

Parameter	(2) Method	Reporting Limit	PADEP Surface Water Quality Criteria	Allowable Hold Times (Days)
Total Alkalinity	SM20 2320B	1.0 mg/L	Min. 20 mg/L $CaCO_3$	14
Biochemical Oxygen Demand (BOD)	SM20 5210B	2.0 mg/L	None	2
Total Phosphorus	SM20 4500-PE	0.01 mg/L	None	28
Diss./Ortho-Phosphate	SM20 4500-PE	0.01 mg/L	None	28
Soluble Phosphorus	SM20 4500-PE	0.05 mg/L	None	28
Total Organic Carbon (TOC)	SM20 5310C	1.0 mg/L	None	28
(3) Total Inorganic Carbon (TIC)	SM20 5310B	NA	None	28
(3) Total Carbon (TOC + TIC)	SM20 5310B	NA	None	28
(1) Chlorophyll *a*	YSI Probe	---	None	In Situ
Total Kjeldahl Nitrogen	351.2 MCAWW	0.25 mg/L	None	28
Ammonia	D6919-03	0.05 mg/L	Temp. and pH dependent	28
Nitrate	MCAWW 353.2	0.05 mg/L	Maximum 10 mg/L (nitrate + nitrite)	28
Nitrite	MCAWW 353.2	0.05 mg/L		28
Total Dissolved Solids	SM20 2540C	5.0 mg/L	Maximum 750 mg/L	7
Total Suspended Solids	SM20 2540D	3.0 mg/L	None	7

(1) Chlorophyll *a* samples were recorded using a YSI 6600 with a chlorophyll sensor.
(2) Laboratory Methods Reference:
MCAWW- "Methods for Chemical Analysis of Water and Wastes", EPA-600/4-79-020, March 1983 and subsequent revisions.
SM-20- "Standard Methods for the Examination of Water and Wastewater", 22nd Edition, 2012.
SW846- "Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods", 3rd. Edition, November 1986 and updates.
(3)Samples were not analyzed for Total Carbon and Total Inorganic Carbon in 2017
NA- Not sampled or analyzed by lab

Figure 2-1. Blue Marsh Reservoir and the location of the 9 fixed stations monitored for water quality during 2017

Table 2-3. Water quality test methods, detection limits, PADEP water quality standards, and sample holding times for bacteria parameters monitored at Blue Marsh Reservoir in 2017.

Parameter	Total Coliform/E-Coli	Fecal Coliform
Test method	SM 9223B	SM9222D
Minimum Detection limit	1 clns/100-mls	2 clns/100-mls
PADEP water quality standard	-	Geometric mean < 200 clns/100-mls
PA Department of Health	-	Geometric mean < 200 clns/100-mls. No sample > 1000 clns/100-mls
Maximum allowable holding time	30 hours	30 hours
Achieved holding time	< 30 hours	< 30 hours

The PADEP monthly coliform bacteria standard is defined as a maximum geometric mean of 200 colonies/100-ml based on 5 consecutive samples collected on different days. In addition, a single sample standard of 1000 colonies/100-ml can also be used. These standards are most applicable at bathing beaches. The Philadelphia District maintains a bathing beach at Blue Marsh Reservoir and conducts separate bacteria sampling of that area. Given our logistical limitations (all monthly reservoir sampling conducted on one day) and the fact that water contact recreation is permitted within the reservoir, the reservoir coliform data collected by the Corps is compared to the single sample standard as a method of collecting and 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 Blue Marsh Reservoir bacteria levels within the main reservoir body.

2.5 SWIMMING BEACH MONITORING

Additional coliform bacteria monitoring was conducted twice weekly near the public swimming beach at the Dry Brooks day use area (Table 2-4). Three stations (SB-1, SB-2, and SB-3) were monitored in the swimming beach area for total coliform, fecal coliform, and Escherichia coli (Figure 2-2). The coliform bacteria samples were collected and analyzed by the same methods used for monthly coliform bacteria sampling. The bacteria monitoring for Blue Marsh Swimming Beach followed a 4-step program of conditional monitoring. Each step or “condition” of monitoring responded to incremental increases of coliform contamination, and therefore reflected the risk to public health at the swimming beach area.

Table 2-4. Sampling dates for coliform bacteria monitoring at the Blue Marsh Reservoir swimming beach during 2017

Week 1	08 and 11 May	**Week 10**	10 and 13 July
Week 2	16 and 18 May	**Week 11**	17 and 20 July
Week 3	22 and 25 May	**Week 12**	24 and 27 July
Week 4	30 May and 01 June	**Week 13**	31 July and 03 August
Week 5	05 and 08 June	**Week 14**	07 and 10 August
Week 6	12 and 15 June	**Week 15**	14 and 17 August
Week 7	19 and 22 June	**Week 16**	21 and 24 August
Week 8	26 and 29 June	**Week 17**	28 and 31 August
Week 9	03 and 06 July		

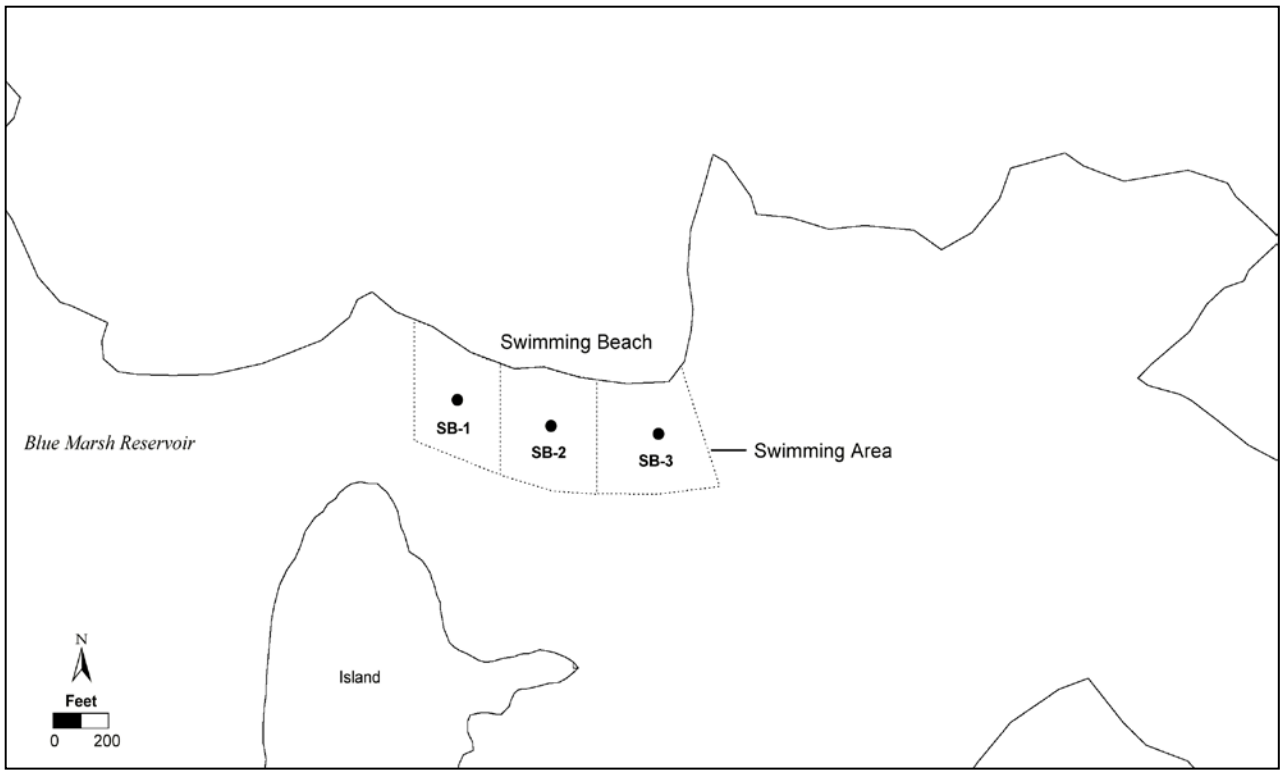

Figure 2-2. Swimming beach bacteriological monitoring stations at Blue Marsh Reservoir in 2017

3.0 RESULTS AND DISCUSSION

3.1 STRATIFICATION MONITORING

The following sections summarize the results of water quality monitoring for 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 water column based on measures from the deepest portion of the reservoir (station BM-6 or the "Tower") are described. It is appropriate to focus discussion on tributary source waters influencing reservoir water quality and lake stratification at station BM-6 as water quality problems related to depth are generally most severe in deep water habitats. Corps personnel collected the physical/chemical water quality data discussed herein over the monitoring period from May to September 2017, the most productive time of the year for the reservoir. All of 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 chemicals' 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 stratification patterns naturally occurring in lakes affect the distribution of dissolved and suspended compounds.

Surface water temperature seasonal patterns upstream of the reservoir at stations BM-5S and BM-11S closely resembled each other throughout the sampling season (Fig. 3-1). Maximum temperatures of 20.13°C and 21.01°C were recorded at station BM-5S and BM-11S respectably in June. The maximum surface water temperature downstream of the reservoir at station BM-1S was 20.96°C in July with a minimum of 13.71°C in May. Downstream temperatures are influenced through selective withdrawals at the Blue Marsh Dam. Annually the Corps performs selective withdrawal releases in an attempt to maintain temperatures downstream in the Tulpehocken Creek of less than 20°C in support of the trout fishery. The ability to meet this objective is dependent on meteorological conditions and other physical and operational limitations. The temperature objective was slightly exceeded in 2017 from mid June through August.

Blue Marsh Reservoir was stratified with respect to temperature during 2017. The stratification pattern was most apparent at station BM-6 or the "Tower" station located in the deepest part of the reservoir (Fig. 3-2). The onset of temperature stratification was evident in May sampling with temperatures from surface (16.08°C) to bottom (9.59°C) differing by 6.49°C. The deeper and cooler temperature (<20°C) water was available for selective withdrawal to attempt to meet downstream temperature objectives throughout the sampling season. Stratification peaked in July and a noticeable shift to deeper warmer water temperatures was

evident in early summer. An erosion of the epilimnion was seen in August as the lake began the process of de-stratifying.

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 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 oxygen can facilitate the release of nutrients from bottom sediments.

Surface waters upstream of the reservoir at tributary stations BM-5S and BM-11S had similar seasonal DO patterns throughout the sampling season (Fig. 3-3). The maximum DO concentration of 11.78 mg/L was recorded in May at station BM-11S with a minum recorded value of 7.75 mg/L recorded in June. The maximum surface water DO concentration downstream of the dam at station BM-1S was 10.53 mg/L recorded in May with a minimum of 8.12 mg/L recorded in July.

Seasonal stratification and chemical and biological processes at Blue Marsh Reservoir dramatically influenced the distribution of DO in the water column during 2017 (Fig. 3-4). Begininning in May and into June (seasonally earlier than most years sampled), the influence of stratification was apparent at station BM-6, as DO concentrations decreased from 9.18 mg/L near the surface to 0.24 mg/L near the lake bottom. Historically, the lower oxygen levels deeper in the lake progressively move up the water column to within approximately 15-feet of the surface in mid- to late August. In most years the surface waters remain oxygenated as a result of surface algal productivity and water surface wind mixing. In 2017, the DO pattern in the deeper water column was not as pronounced as previous years. In July sampling, deeper waters had become more aerated and continued to improve throughout the season. All though not as severe as most years, the low DO conditions can be detrimental to water quality and aquatic life. Nonetheless, dissolved oxygen concentrations in the upper water column of Blue Marsh Reservoir were in compliance with PADEP water quality standards during the 2017 sampling season. The Pennsylvania water quality standard for DO is a minimum concentration of 5 mg/L within the epilimnion of stratified lakes.

The health of aquatic ecosystems can be impaired by low DO concentrations in the water column. Hypoxia, or conditions of DO concentrations less than 2 mg/L, is generally accepted as the threshold at which the most severe effects on biota occur. In June through September of 2017, the lower water column of Blue Marsh was affected by hypoxia (Fig. 3-4). Hypoxic water occupied two thirds of the water column in June. Hypoxia in the lower water column is a symptom of eutrophication. Nutrients in the water column feed explosive algal growth at the surface photic zone. Dead and decaying algae sink to lower levels of the water column and during the process of decay; oxygen is removed from the water.

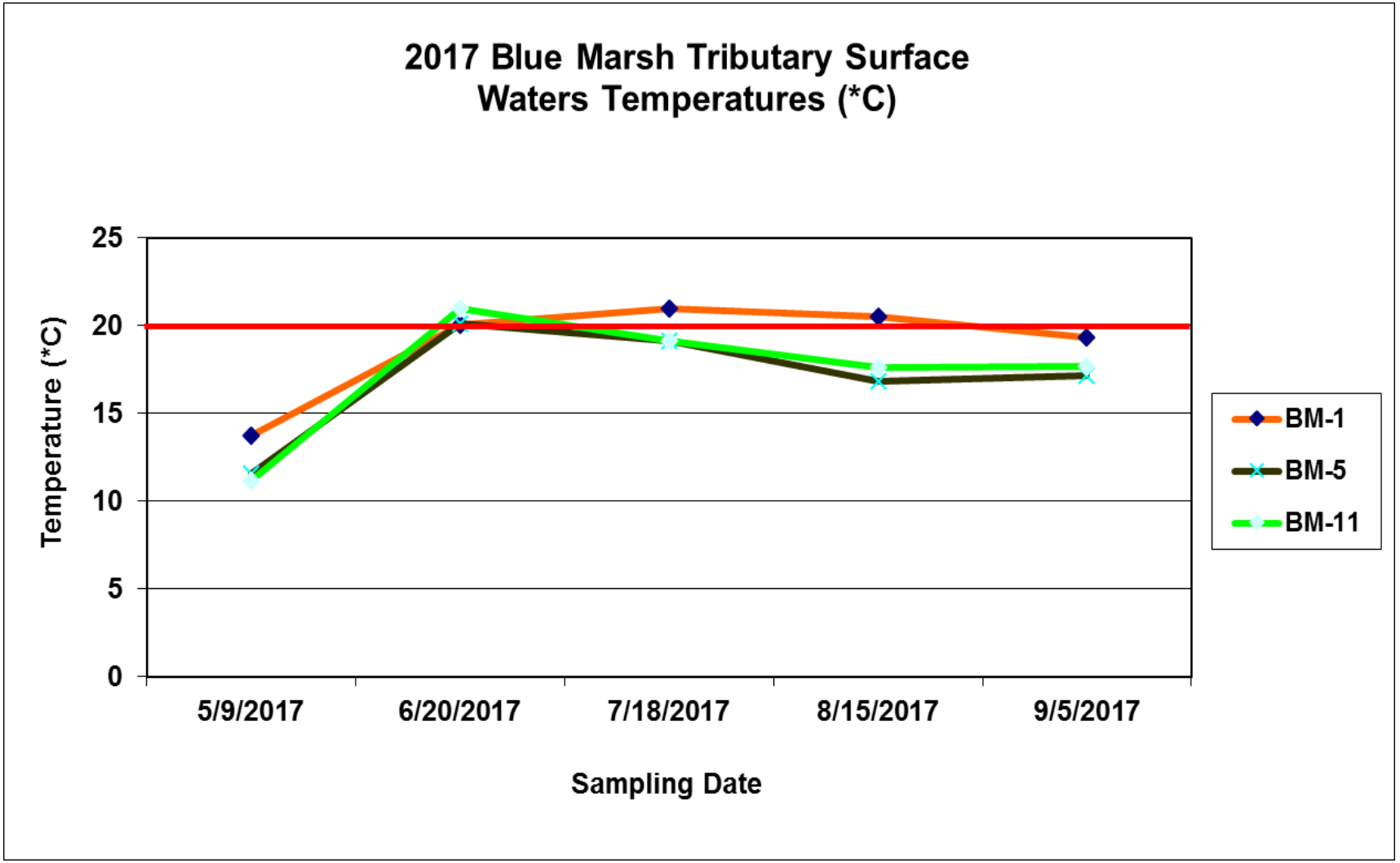

Figure 3-1. Tributary and downstream surface water temperatures (°C) measured at Blue Marsh Reservoir in 2017. Station BM-1S is located downstream of the reservoir. See Appendix A for summary of plotted values. The coldwater species preference temperature of 20°C is shown as a red line reference.

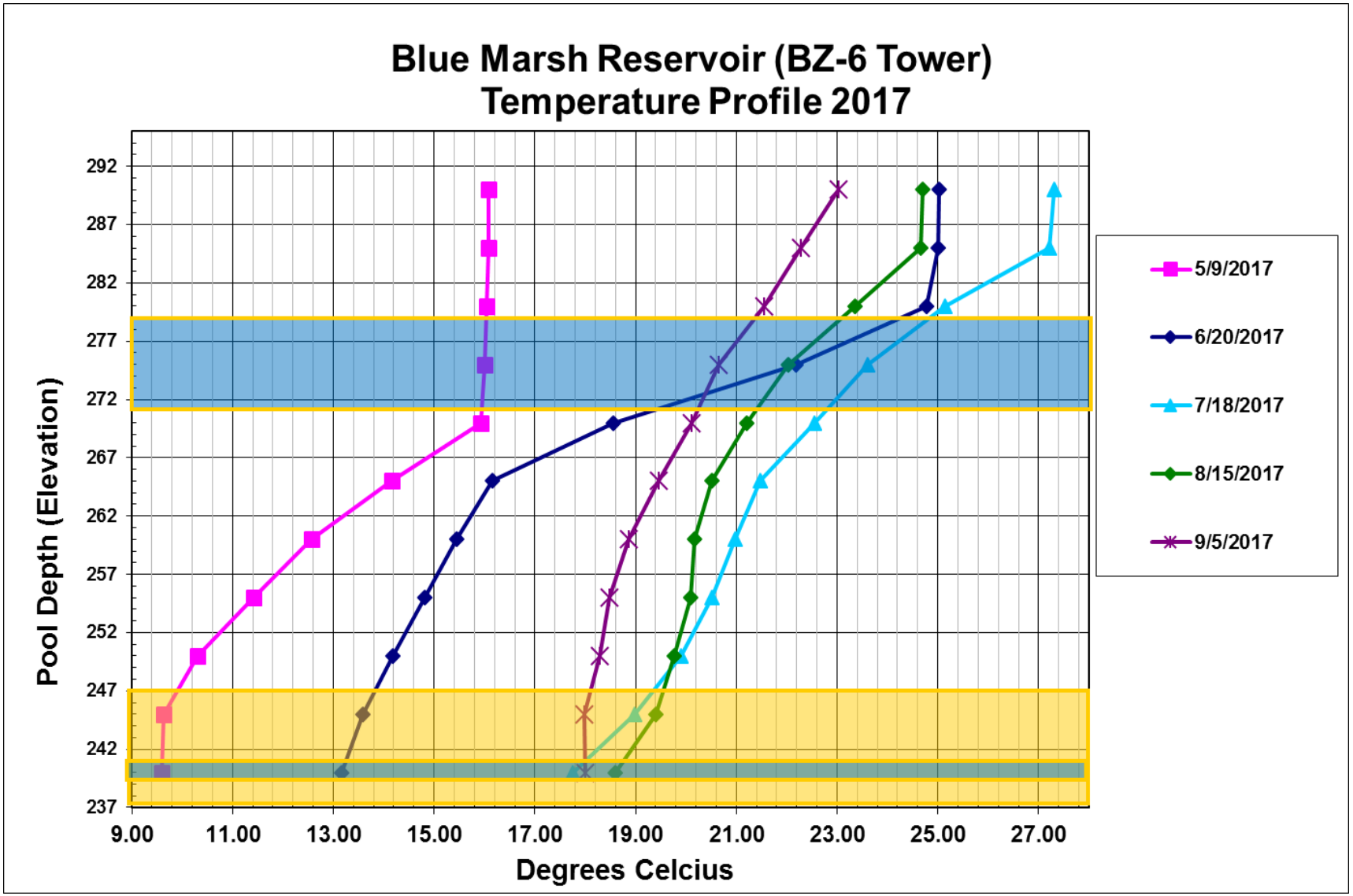

Figure 3-2. Temperature stratification and release portal elevations at station BM-6 of Blue Marsh Reservoir in 2017. See Appendix A for summary of plotted values.

3.1.3 pH

The hydrogen –ion concentration in water is measured as pH. 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 in the surface waters at Blue Marsh Reservoirs upstream and downstream sampling stations followed a similar pattern during 2017 (Fig. 3-5). Throughout the sampling season, downstream release station BM-1S routinely had slightly lower pH values than upstream stations. In the months sampled, no pH measures violated the PADEP water quality standard maximum and minimum pH level of 9.0 and 6.0, respectably. For the entire monitoring period and at all surface water stream stations, pH ranged from 7.81 to 8.27.

The pH profile in the water column of Blue Marsh Reservoir was consistent with a stratified lake during 2017 (Fig. 3-6). Throughout the monitoring period the upper 10-15 feet of the water column had consistently higher pH measures than the deeper waters. During most months, pH at the surface to a depth of 15 feet ranged between 6.98 and 8.69. In contrast, measures of pH in the lower water column (>15 feet deep) were consistently lower during the monitoring period and ranged between 6.71 and 7.74. The higher pH in surface waters (euphotic zone) of the reservoir is a result of excessive algal blooms. As a function of increased productivity during photosynthesis, algae remove CO_2 from the water column. Dissolved CO_2 is slightly acidic; its reduction in the water column manifests an increase in pH. In 2017, this increased surface water productivity resulted in water samples at Blue Marsh Reservoir station BM-6 being slightly higher in pH than deeper waters.

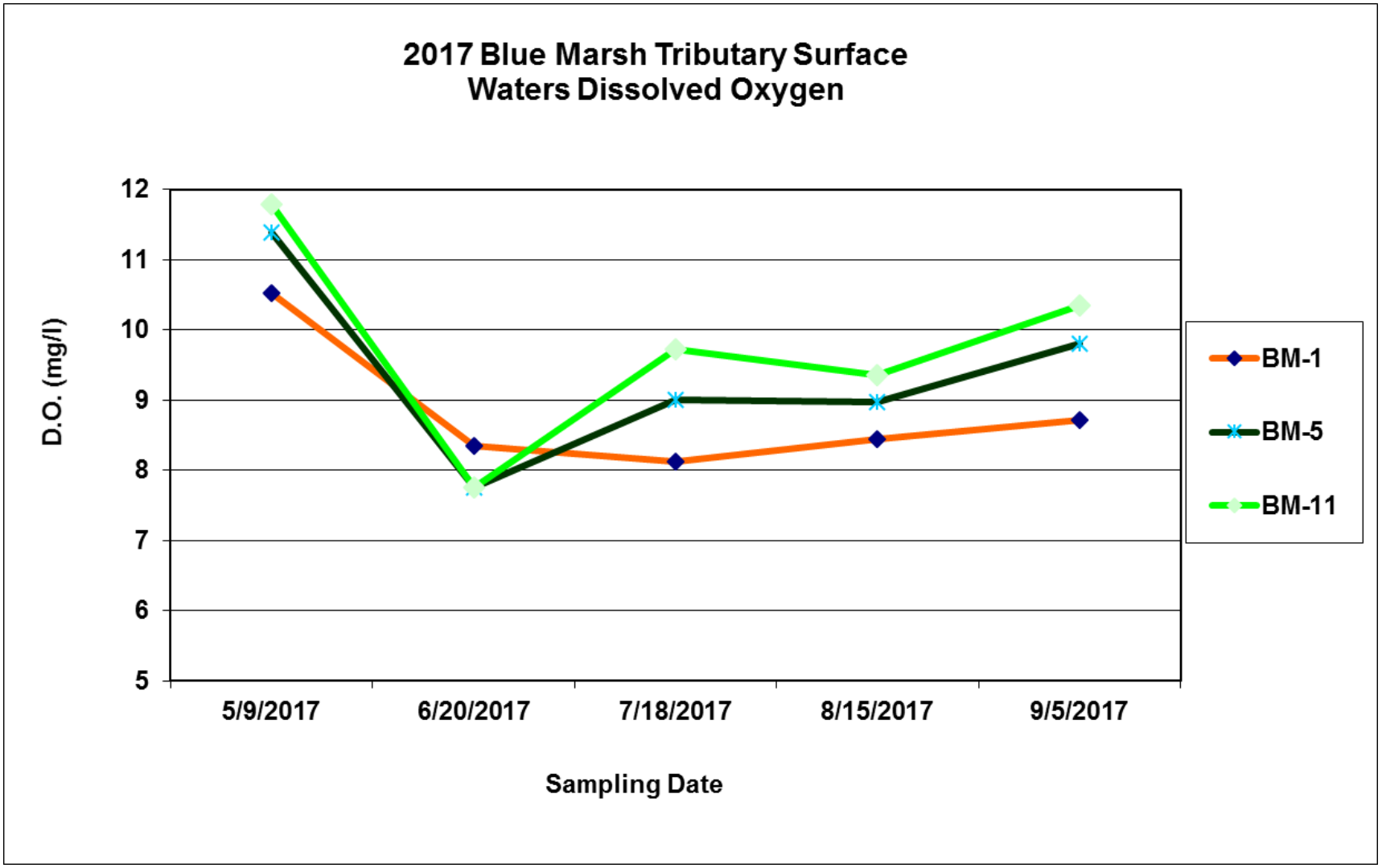

Figure 3-3. Tributary and outflow surface water dissolved oxygen concentrations measured at Blue Marsh Reservoir in 2017. (The PADEP water quality standard for DO is a minimum concentration of 5 mg/L.) See Appendix A for summary of plotted values.

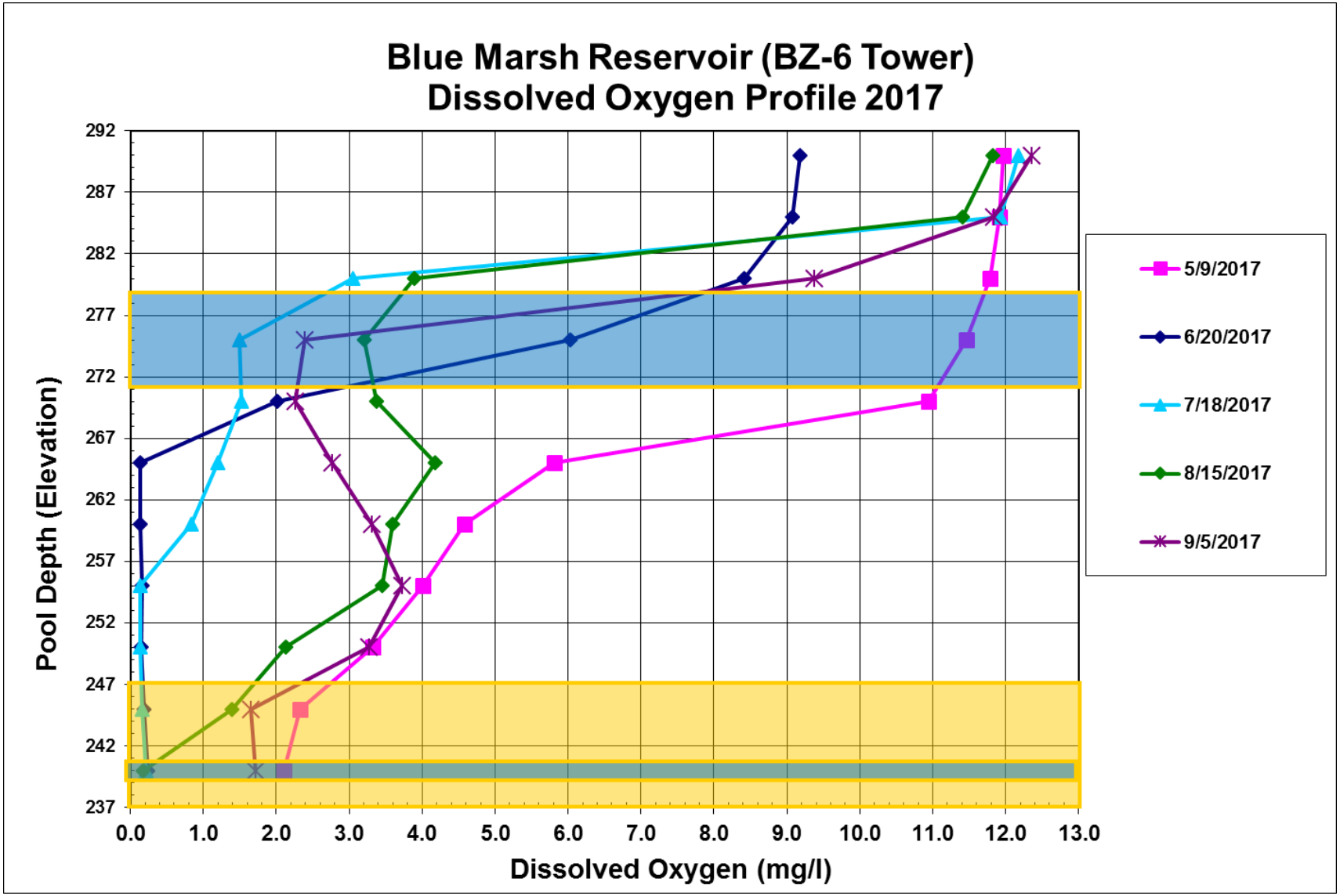

Figure 3-4. Release portal elevations and dissolved oxygen stratification at station BM-6 of Blue Marsh Reservoir in 2017. (PADEP water quality standard for DO is a minimum concentration of 5 mg/L.) See Appendix A for summary of plotted values.

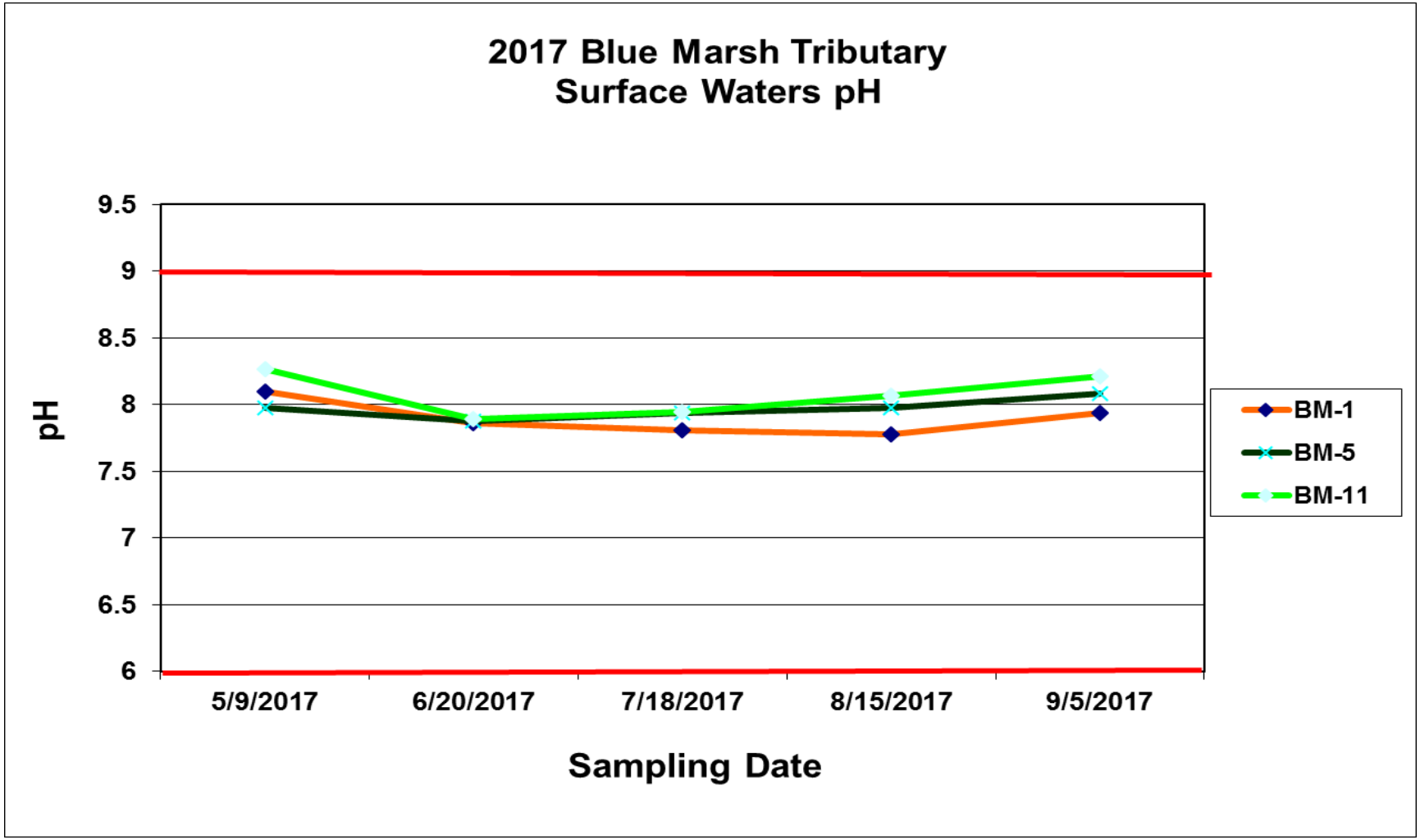

Figure 3-5. Tributary and outflow surface water pH measured at Blue Marsh Reservoir in 2017. (The PADEP water quality standard for pH is a range from 6 to 9.) See Appendix A for summary of plotted values.

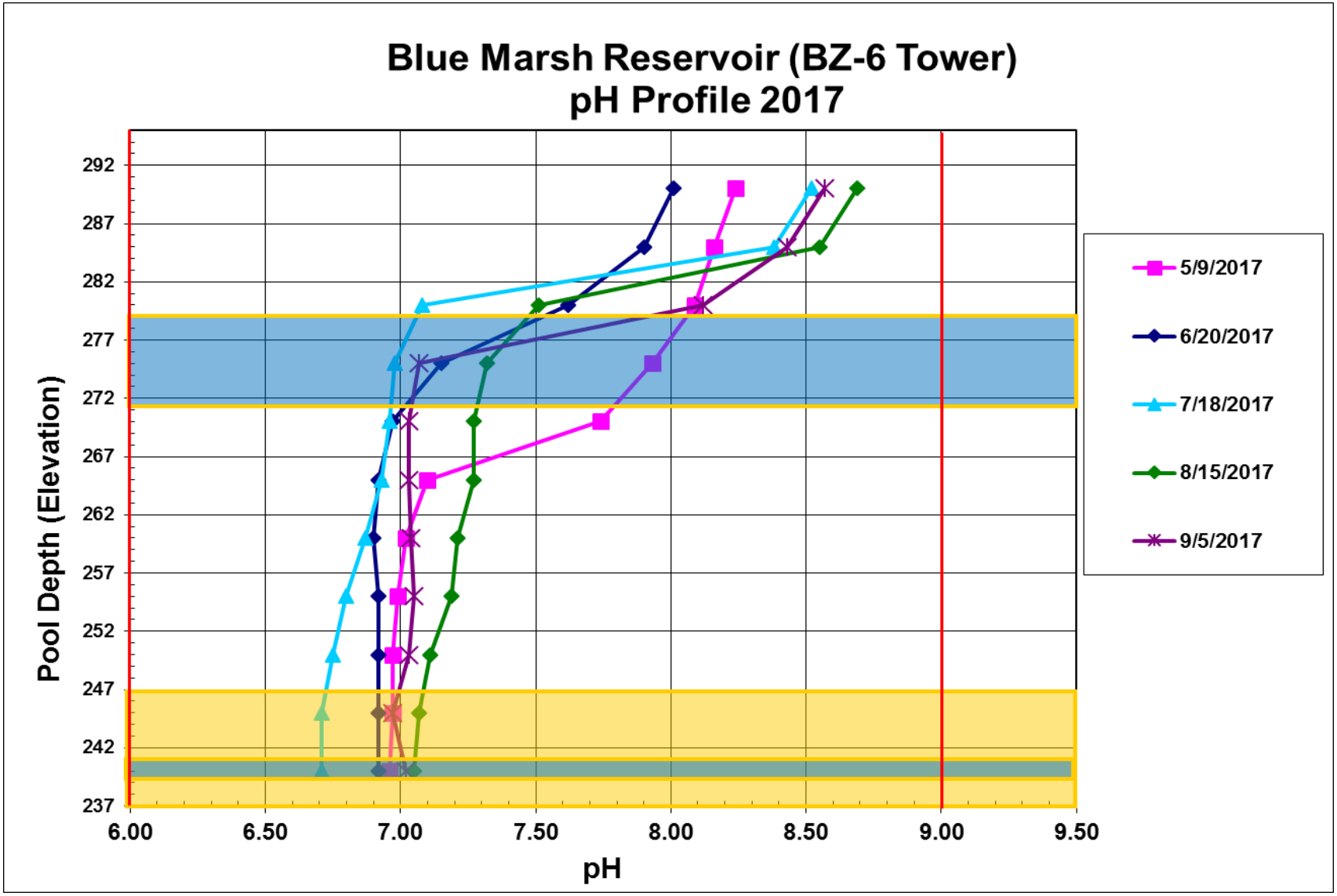

Figure 3-6. Release portal elevations and stratification of pH at station BM-6 of Blue Marsh Reservoir in 2017. (The PADEP water quality standard for pH is a range from 6 to 9.) See Appendix A for summary of plotted values.

3.2 WATER COLUMN CHEMISTRY MONITORING

The following sections describe temporal, spatial, and depth patterns for the water quality parameters measured in surface, middle, and bottom waters of Blue Marsh Reservoir during 2017 (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. Excess ammonia contributes to eutrophication of water bodies. This can result in excessive algal growths and impacts on recreation and drinking water supplies. In high concentrations, ammonia is toxic to aquatic life.

In general, ammonia remained relatively low in the waters of Blue Marsh Reservoir with upstream tributary and lake surface samples less than or slightly greater than the reporting limit (0.05 mg/L). Algal uptake in the surface waters may account for the low concentrations at these stations. Higher concentrations were seen in the middle and deep water samples at the deeper lake stations (Table 3-2). The maximum value recorded during the sampling season of .54 mg/L was measured in the reservoir deep water station BM-2B on 20 June. Concentrations of ammonia measured at Blue Marsh Reservoir were in compliance with PADEP water quality standards during all of the 2017 sampling season. The state water quality standard for ammonia is dependent on temperature and pH (Table 3-1).

Table 3-1. PADEP ammonia nitrogen criteria (Pennsylvania Code, Title 25, Chapter 93, 1996). Specific ammonia (mg/l) criteria dependent on temperature and pH.

Ph	10 °C	15 °C	20 °C	25 °C	30 °C
6.50	25.5	17.4	12.0	8.4	5.9
6.75	23.6	16.0	11.1	7.7	5.5
7.00	20.6	14.0	9.7	6.8	4.8
7.25	16.7	11.4	7.8	5.5	3.9
7.50	12.4	8.5	5.9	4.1	2.9
7.75	8.5	5.8	4.0	2.8	2.0
8.00	5.5	5.8	4.0	2.8	2.0
8.25	3.4	2.3	1.6	1.2	0.9
8.50	2.0	1.4	1.0	0.7	0.6
8.75	1.2	0.9	0.6	0.5	0.4
9.00	0.8	0.5	0.4	0.3	0.3
9.25	0.36	0.24	0.17	0.12	0.08
9.50	0.20	0.13	0.10	0.07	0.05

Table 3-2. Summary of surface, middle, and bottom water quality monitoring data for Blue Marsh Reservoir in 2017

Station	Date	ALK mg/L	BOD5 mg/L	DISS-P mg/L	NH3 mg/L	NO2 mg/L	NO3 mg/L	PO4 mg/L	TDS mg/L	TKN mg/L	TOC mg/L	TP mg/L	TSS mg/L
BM-01S	5/9/2017	119	<2	<.05	0.16	<.05	4.53	<.01	176	0.62	2.2	<.01	5
	6/20/2017	126	<2	<.05	0.07	0.12	3.87	<.05	248	0.5	2.2	<.01	4
	7/18/2017	129	<2	<.05	0.22	0.11	4.7	<.01	208	0.73	2.6	<.01	<3
	8/15/2017	121	3	<.05	0.09	0.19	4.35	<.01	197	0.66	2.8	<.01	6
	9/5/2017	136	<2	<.05	0.1	0.21	4.69	<.01	200	0.64	2.5	<.01	10
	Mean	126	2	0.05	0.13	0.14	4.43	0.02	206	0.63	2.5	0.01	5.6
	Stdev	7	0	0.00	0.06	0.06	0.34	0.02	26	0.08	0.3	0.00	2.7
	Max	136	3	0.05	0.22	0.21	4.7	0.05	248	0.73	2.8	0.01	10
	Min	119	2	0.05	0.07	0.05	3.87	0.01	176	0.5	2.2	0.01	3
	No. of Det	5	1	0	5	4	5	0	5	5	5	0	4
BM-02S	5/9/2017	118	3	<.05	<.05	<.05	4.77	<.01	240	0.64	2.7	0.01	6
	6/20/2017	105	<2	<.05	0.06	<.05	4.16	<.05	208	0.71	2.3	<.01	2
	7/18/2017	87	4	<.05	<.05	<.05	3	<.01	150	1.05	3	<.01	6
	8/15/2017	81	<2	<.05	<.05	0.07	2.25	<.01	137	1.42	3.9	<.01	12
	9/5/2017	93	5	<.05	<.05	0.11	2.64	<.01	141	0.84	4	<.01	14
	Mean	97	3.2	0.05	0.05	0.07	3.36	0.02	175	0.93	3.2	0.01	8
	Stdev	15	1	0	0.00	0.03	1.06	0.02	46	0.31	0.7	0.00	5
	Max	118	5	0.05	0.06	0.11	4.77	0.05	240	1.42	4	0.01	14
	Min	81	2	0.05	0.05	0.05	2.25	0.01	137	0.64	2.3	0.01	2
	No. of Det	5	3	0	1	2	5	0	5	5	5	1	5

Table 3-2 continued. Summary of surface, middle, and bottom water quality monitoring data for Blue Marsh Reservoir in 2017

Station	Date	ALK mg/L	BOD5 mg/L	DISS-P mg/L	NH3 mg/L	NO2 mg/L	NO3 mg/L	PO4 mg/L	TDS mg/L	TKN mg/L	TOC mg/L	TP mg/L	TSS mg/L
BM-02M	5/9/2017	115	2	<.05	<.05	<.05	4.81	<.01	256	0.58	2.2	0.03	6
	6/20/2017	127	<2	<.05	0.05	0.14	2.15	<.05	238	0.58	2.1	0.02	1
	7/18/2017	126	<2	<.05	0.23	0.11	4.62	<.01	204	1.4	2.9	0.02	3
	8/15/2017	104	<2	<.05	<.05	0.13	3.14	<.01	162	0.89	3	0.01	7
	9/5/2017	116	<2	<.05	<.05	0.26	3.91	<.01	143	0.53	2.7	0.01	<3
	Mean	118	2	0.05	0.09	0.14	3.73	0.02	201	0.80	2.6	0.02	4.0
	Stdev	9	0	0.00	0.08	0.08	1.10	0.02	48	0.37	0.4	0.01	2.4
	Max	127	2	0.05	0.23	0.26	4.81	0.05	256	1.4	3	0.03	7
	Min	104	2	0.05	0.05	0.05	2.15	0.01	143	0.53	2.1	0.01	1
	No. of Det	5	1	0	2	4	5	0	5	5	5	5	4
BM-02B	5/9/2017	120	<2	<.05	0.2	<.05	3.75	<.01	229	0.84	1.8	<.01	19
	6/20/2017	158	4	<.05	0.54	0.06	2.13	<.05	247	1.29	2.1	<.01	4
	7/18/2017	141	4	<.05	0.47	0.21	4.14	<.01	215	1.1	2.6	0.01	13
	8/15/2017	138	5	<.05	0.33	0.3	4.1	<.01	227	0.86	2.3	<.01	10
	9/5/2017	141	2	<.05	0.14	0.07	4.61	<.01	189	0.72	2.4	0.01	13
	Mean	140	3	0.05	0.34	0.14	3.75	0.02	221	0.96	2.2	0.01	12
	Stdev	14	1	0.00	0.17	0.11	0.95	0.02	21	0.23	0.3	0.00	5
	Max	158	5	0.05	0.54	0.3	4.61	0.05	247	1.29	2.6	0.01	19
	Min	120	2	0.05	0.14	0.05	2.13	0.01	189	0.72	1.8	0.01	4
	No. of Det	5	4	0	5	4	5	0	5	5	5	2	5

Table 3-2 continued. Summary of surface, middle, and bottom water quality monitoring data for Blue Marsh Reservoir in 2017

Station	Date	ALK mg/L	BOD5 mg/L	DISS-P mg/L	NH3 mg/L	NO2 mg/L	NO3 mg/L	PO4 mg/L	TDS mg/L	TKN mg/L	TOC mg/L	TP mg/L	TSS mg/L
BM-05S	5/9/2017	210	<2	0.05	<.05	<.05	7.73	0.01	313	<.25	1.5	0.06	<1
	6/20/2017	188	<2	<.05	0.05	<.05	6.73	<.05	320	0.55	2.8	0.04	15
	7/18/2017	205	<2	<.05	<.05	<.05	7.78	<.01	298	<.25	1.6	0.05	8
	8/15/2017	198	<2	<.05	<.05	<.05	7.85	<.01	326	0.5	1.7	0.04	12
	9/5/2017	222	<2	<.05	<.05	<.05	8.73	<.01	313	0.37	1.4	0.04	<3
	Mean	205	2	0.05	0.05	0.05	7.76	0.02	314	0.38	1.8	0.05	8
	Stdev	13	0	0.00	0	0	0.71	0.02	10	0.14	0.6	0.01	6
	Max	222	2	0.05	0.05	0.05	8.73	0.05	326	0.55	2.8	0.06	15
	Min	188	2	0.05	0.05	0.05	6.73	0.01	298	0.25	1.4	0.04	1
	No. of Det	5	0	1	1	0	5	1	5	3	5	5	3
BM-06S	5/9/2017	114	3	<.05	<.05	<.05	4.76	<.01	213	0.65	2.5	0.02	6
	6/20/2017	103	2	<.05	0.07	<.05	3.97	<.05	215	0.99	2.8	0.01	4
	7/18/2017	79	4	<.05	<.05	<.05	3.02	<.01	146	0.91	3	0.02	10
	8/15/2017	86	<2	<.05	<.05	0.07	2.3	<.01	145	1.35	4	0.01	11
	9/5/2017	95	5	<.05	<.05	0.1	2.64	<.01	156	0.94	4.4	0.01	18
	Mean	95	3.2	0.05	0.05	0.06	3.34	0.02	175	0.97	3.3	0.01	10
	Stdev	14	1	0	0.01	0.02	1.01	0.02	36	0.25	0.8	0.01	5
	Max	114	5	0.05	0.07	0.1	4.76	0.05	215	1.35	4.4	0.02	18
	Min	79	2	0.05	0.05	0.05	2.3	0.01	145	0.65	2.5	0.01	4
	No. of Det	5	4	0	1	2	5	0	5	5	5	5	5

Table 3-2 continued. Summary of surface, middle, and bottom water quality monitoring data for Blue Marsh Reservoir in 2017

Station	Date	ALK mg/L	BOD5 mg/L	DISS-P mg/L	NH3 mg/L	NO2 mg/L	NO3 mg/L	PO4 mg/L	TDS mg/L	TKN mg/L	TOC mg/L	TP mg/L	TSS mg/L
BM-06M	5/9/2017	123	<2	<.05	0.14	<.05	4.99	<.01	251	0.52	1.9	0.04	<1
	6/20/2017	137	<2	<.05	<.05	0.24	4.17	<.05	251	0.38	2.1	<.01	3
	7/18/2017	133	3	<.05	0.16	0.26	4.75	<.01	220	0.68	2.7	0.01	<3
	8/15/2017	120	<2	<.05	0.09	0.24	4.26	<.01	199	0.68	3	0.02	8
	9/5/2017	120	<2	<.05	<.05	0.29	4.21	<.01	185	0.54	3	0.02	<3
	Mean	127	2	0.05	0.10	0.22	4.48	0.02	221	0.56	2.5	0.02	4
	Stdev	8	0	0	0.05	0.10	0.37	0.02	30	0.13	0.5	0.01	3
	Max	137	3	0.05	0.16	0.29	4.99	0.05	251	0.68	3	0.04	8
	Min	120	2	0.05	0.05	0.05	4.17	0.01	185	0.38	1.9	0.01	1
	No. of Det	5	1	0	3	4	5	0	5	5	5	4	2
BM-06B	5/9/2017	122	<2	<.05	0.39	<.05	3.48	<.01	220	0.87	2.4	0.03	3
	6/20/2017	153	3	<.05	0.46	0.06	2.39	<.05	256	1.15	2	0.01	12
	7/18/2017	141	5	<.05	0.43	0.25	4.06	<.01	221	0.94	2.3	0.02	3
	8/15/2017	134	10	<.05	0.27	0.46	4.56	<.01	238	1.91	2.9	0.02	56
	9/5/2017	153	4	<.05	0.27	0.2	5.06	<.01	231	0.81	2.1	0.02	6
	Mean	141	5	0.05	0.36	0.20	3.91	0.02	233	1.14	2.3	0.02	16
	Stdev	13	3	0.00	0.09	0.17	1.03	0.02	15	0.45	0.4	0.01	23
	Max	153	10	0.05	0.46	0.46	5.06	0.05	256	1.91	2.9	0.03	56
	Min	122	2	0.05	0.27	0.05	2.39	0.01	220	0.81	2	0.01	3
	No. of Det	5	4	0	5	4	5	0	5	5	5	5	5

Table 3-2 continued. Summary of surface, middle, and bottom water quality monitoring data for Blue Marsh Reservoir in 2017

Station	Date	ALK mg/L	BOD5 mg/L	DISS-P mg/L	NH3 mg/L	NO2 mg/L	NO3 mg/L	PO4 mg/L	TDS mg/L	TKN mg/L	TOC mg/L	TP mg/L	TSS mg/L
BM-07S	5/9/2017	133	3	<.05	<.05	<.05	4.94	<.01	203	0.65	2.6	0.01	5
	6/20/2017	107	<2	<.05	0.06	<.05	4.23	<.05	223	0.64	2.5	<.01	1
	7/18/2017	91	4	<.05	<.05	<.05	3.05	<.01	147	1.17	3	<.01	6
	8/15/2017	84	3	<.05	<.05	0.06	2.4	<.01	156	1.95	3.9	<.01	10
	9/5/2017	95	5	<.05	<.05	0.09	2.21	<.01	119	0.71	3.8	<.01	13
	Mean	102	3	0.05	0.05	0.06	3.37	0.02	170	1.02	3.2	0.01	7
	Stdev	19	1	0.00	0	0.02	1.18	0.02	42.5	0.56	0.66	0.00	5
	Max	133	5	0.05	0.06	0.09	4.94	0.05	223	1.95	3.9	0.01	13
	Min	84	2	0.05	0.05	0.05	2.21	0.01	119	0.64	2.5	0.01	1
	No. of Det	5	4	0	1	2	5	0	5	5	5	1	5
BM-07M	5/9/2017	124	2	<.05	<.05	<.05	4.86	<.01	203	0.72	2.4	0.03	5
	6/20/2017	132	<2	<.05	0.07	0.06	4.84	<.05	267	0.54	2	0.03	2
	7/18/2017	100	<2	<.05	0.2	<.05	4.08	<.01	165	0.83	3.3	0.03	3
	8/15/2017	86	<2	<.05	0.06	0.06	2.75	<.01	170	1.27	3.3	0.02	8
	9/5/2017	97	<2	<.05	<.05	0.09	2.94	<.01	176	0.64	3.3	0.03	6
	Mean	107.8	2	0.05	0.09	0.06	3.89	0.02	196	0.80	2.9	0.03	5
	Stdev	19.4	0.0	0	0.06	0.02	1.01	0.02	42.2	0.28	0.62	0.00	2
	Max	132	2	0.05	0.2	0.09	4.86	0.05	267	1.27	3.3	0.03	8
	Min	86	2	0.05	0.05	0.05	2.75	0.01	165	0.54	2	0.02	2
	No. of Det	5	1	0	3	3	5	0	5	5	5	5	5

Table 3-2 continued. Summary of surface, middle, and bottom water quality monitoring data for Blue Marsh Reservoir in 2017

Station	Date	ALK mg/L	BOD5 mg/L	DISS-P mg/L	NH3 mg/L	NO2 mg/L	NO3 mg/L	PO4 mg/L	TDS mg/L	TKN mg/L	TOC mg/L	TP mg/L	TSS mg/L
BM-07B	5/9/2017	126	<2	0.06	0.14	<.05	4.75	0.02	261	0.48	2.2	0.07	9
	6/20/2017	156	2	<.05	0.08	0.24	3.71	<.05	248	0.85	2.3	0.05	133
	7/18/2017	97	<2	<.05	0.23	<.05	4.86	<.01	173	0.82	3.3	0.06	9
	8/15/2017	105	4	<.05	0.17	<.05	4.4	<.01	188	0.85	3.4	0.05	16
	9/5/2017	114	2	<.05	0.08	0.09	3.8	<.01	188	0.65	2.8	0.05	11
	Mean	120	2	0.05	0.14	0.10	4.30	0.02	212	0.73	2.8	0.06	36
	Stdev	23	1	0.00	0.06	0.08	0.53	0.02	40	0.16	0.6	0.01	55
	Max	156	4	0.06	0.23	0.24	4.86	0.05	261	0.85	3.4	0.07	133
	Min	97	2	0.05	0.08	0.05	3.71	0.01	173	0.48	2.2	0.05	9
	No. of Det	5	3	1	5	2	5	1	5	5	5	5	5
BM-08S	5/9/2017	119	<2	<.05	<.05	<.05	4.71	<.01	193	0.53	2.5	0.02	3
	6/20/2017	105	<2	<.05	0.05	<.05	3.94	<.05	226	0.62	2.5	<.01	2
	7/18/2017	90	4	<.05	<.05	<.05	2.94	<.01	162	1.52	3.2	<.01	10
	8/15/2017	82	2	<.05	<.05	<.05	2.31	<.01	156	1.59	3.8	<.01	11
	9/5/2017	97	3	<.05	<.05	0.07	2.5	<.01	163	0.75	3.7	<.01	14
	Mean	99	2.6	0.05	0.05	0.05	3.28	0.02	180	1.00	3.1	0.01	8
	Stdev	14	0.9	0.00	0.00	0.01	1.02	0.02	29	0.51	0.6	0.00	5
	Max	119	4	0.05	0.05	0.07	4.71	0.05	226	1.59	3.8	0.02	14
	Min	82	2	0.05	0.05	0.05	2.31	0.01	156	0.53	2.5	0.01	2
	No. of Det	5	3	0	1	1	5	0	5	5	5	1	5

Table 3-2 continued. Summary of surface, middle, and bottom water quality monitoring data for Blue Marsh Reservoir in 2017

Station	Date	ALK mg/L	BOD5 mg/L	DISS-P mg/L	NH3 mg/L	NO2 mg/L	NO3 mg/L	PO4 mg/L	TDS mg/L	TKN mg/L	TOC mg/L	TP mg/L	TSS mg/L
BM-08M	5/9/2017	119	2	<.05	<.05	<.05	4.73	<.01	220	0.61	2.1	0.02	3
	6/20/2017	110	2	<.05	0.1	0.06	3.66	<.05	255	<.25	2.3	<.01	6
	7/18/2017	93	2	<.05	0.16	<.05	3.07	<.01	178	0.99	2.7	0.02	4
	8/15/2017	90	2	<.05	0.07	<.05	2.6	<.01	171	1.2	3.2	0.01	10
	9/5/2017	97	3	<.05	<.05	0.06	2.56	<.01	174	0.62	3.4	0.01	8
	Mean	102	2	0.05	0.09	0.05	3.32	0.02	200	0.73	2.7	0.01	6.2
	Stdev	12	0.4	0.00	0.05	0.01	0.90	0.02	37	0.37	0.6	0.01	2.9
	Max	119	3	0.05	0.16	0.06	4.73	0.05	255	1.2	3.4	0.02	10
	Min	90	2	0.05	0.05	0.05	2.56	0.01	171	0.25	2.1	0.01	3
	No. of Det	5	5	0	3	2	5	0	5	4	5	4	5
BM-08B	5/9/2017	99	<2	<.05	<.05	<.05	3.83	0.01	230	0.41	2.2	0.05	11
	6/20/2017	113	<2	<.05	0.1	0.06	3.64	<.05	242	<.25	2	0.02	4
	7/18/2017	105	<2	<.05	0.36	0.05	2.94	<.01	212	0.92	2.7	0.03	8
	8/15/2017	103	5	<.05	0.28	<.05	2.88	<.01	202	1.85	3	0.03	143
	9/5/2017	99	3	<.05	0.06	<.05	2.87	<.01	180	0.68	2.9	0.03	66
	Mean	104	3	0.05	0.17	0.05	3.23	0.02	213	0.82	2.56	0.03	46.4
	Stdev	6	1.3	0.00	0.14	0.00	0.46	0.02	24	0.63	0.4	0.01	60
	Max	113	5	0.05	0.36	0.06	3.83	0.05	242	1.85	3	0.05	143
	Min	99	2	0.05	0.05	0.05	2.87	0.01	180	0.25	2	0.02	4
	No. of Det	5	2	0	4	2	5	1	5	4	5	5	5

Table 3-2 continued. Summary of surface, middle, and bottom water quality monitoring data for Blue Marsh Reservoir in 2017

Station	Date	ALK mg/L	BOD5 mg/L	DISS-P mg/L	NH3 mg/L	NO2 mg/L	NO3 mg/L	PO4 mg/L	TDS mg/L	TKN mg/L	TOC mg/L	TP mg/L	TSS mg/L
BM-09S	5/9/2017	137	2	<.05	<.05	<.05	5.1	<.01	188	0.55	2.3	0.02	5
	6/20/2017	110	<2	<.05	0.06	<.05	4.28	<.05	223	0.69	2.4	<.01	2
	7/18/2017	90	5	<.05	<.05	<.05	2.98	<.01	173	1.67	3.3	0.01	14
	8/15/2017	79	<2	<.05	<.05	0.05	2.35	<.01	166	1.93	4.3	0.01	14
	9/5/2017	92	6	<.05	<.05	0.08	2.56	<.01	595	0.75	4	0.01	16
	Mean	102	3	0.05	0.05	0.06	3.45	0.02	269	1.12	3.3	0.01	10
	Stdev	23	2	0.00	0.00	0.01	1.19	0.02	184	0.63	0.9	0.00	6
	Max	137	6	0.05	0.06	0.08	5.1	0.05	595	1.93	4.3	0.02	16
	Min	79	2	0.05	0.05	0.05	2.35	0.01	166	0.55	2.3	0.01	2
	No. of Det	5	3	0	1	2	5	0	5	5	5	4	5
BM-09M	5/9/2017	131	4	<.05	<.05	<.05	4.95	0.01	216	0.54	2.2	0.04	4
	6/20/2017	141	<2	<.05	0.08	0.06	4.87	<.05	250	0.45	1.9	0.01	3
	7/18/2017	95	<2	<.05	0.18	<.05	4.46	<.01	182	0.79	3.2	0.02	4
	8/15/2017	94	<2	<.05	0.08	<.05	3.12	<.01	165	1.08	3.2	0.03	6
	9/5/2017	97	3	<.05	<.05	0.07	2.8	<.01	166	0.92	3.3	0.02	<3
	Mean	112	2.6	0.05	0.09	0.06	4.04	0.02	196	0.76	2.8	0.02	4
	Stdev	23	0.9	0.00	0.05	0.01	1.01	0.02	37	0.26	0.7	0.01	1.2
	Max	141	4	0.05	0.18	0.07	4.95	0.05	250	1.08	3.3	0.04	6
	Min	94	2	0.05	0.05	0.05	2.8	0.01	165	0.45	1.9	0.01	3
	No. of Det	5	2	0	3	2	5	1	5	5	5	5	4

Table 3-2 continued. Summary of surface, middle, and bottom water quality monitoring data for Blue Marsh Reservoir in 2017

Station	Date	ALK mg/L	BOD5 mg/L	DISS-P mg/L	NH3 mg/L	NO2 mg/L	NO3 mg/L	PO4 mg/L	TDS mg/L	TKN mg/L	TOC mg/L	TP mg/L	TSS mg/L
BM-09B	5/9/2017	145	<2	<.05	0.2	<.05	4.22	<.01	227	0.59	2	0.07	22
	6/20/2017	164	3	<.05	0.21	0.22	3.33	<.05	236	1.85	2.7	0.03	100
	7/18/2017	108	<2	<.05	0.24	<.05	5.3	<.01	216	0.85	2.5	0.05	25
	8/15/2017	125	4	<.05	0.12	<.05	5.51	<.01	230	1.14	2.7	0.05	83
	9/5/2017	95	2	<.05	<.05	0.05	3.91	<.01	174	0.87	2.7	0.05	4
	Mean	127	3	0.05	0.16	0.08	4.45	0.02	217	1.06	2.5	0.05	47
	Stdev	28	1	0.00	0.08	0.08	0.93	0.02	25	0.48	0.3	0.01	42
	Max	164	4	0.05	0.24	0.22	5.51	0.05	236	1.85	2.7	0.07	100
	Min	95	2	0.05	0.05	0.05	3.33	0.01	174	0.59	2	0.03	4
	No. of Det	5	3	0	4	2	5	0	5	5	5	5	5
BM-10S	5/9/2017	147	2	<.05	<.05	<.05	5.24	<.01	235	1.04	2.3	0.05	5
	6/20/2017	113	<2	<.05	<.05	0.05	4.25	<.05	215	0.72	2.5	0.02	5
	7/18/2017	84	4	<.05	<.05	<.05	2.82	<.01	172	1.39	3.1	0.04	8
	8/15/2017	80	3	<.05	<.05	<.05	2.31	<.01	174	1.5	3.8	0.04	10
	9/5/2017	97	6	<.05	<.05	0.07	2.67	<.01	133	1.87	4.6	0.03	25
	Mean	104	3	0.05	0.05	0.05	3.46	0.02	186	1.30	3.3	0.04	11
	Stdev	27	2	0.00	0.00	0.01	1.24	0.02	40	0.44	1.0	0.01	8
	Max	147	6	0.05	0.05	0.07	5.24	0.05	235	1.87	4.6	0.05	25
	Min	80	2	0.05	0.05	0.05	2.31	0.01	133	0.72	2.3	0.02	5
	No. of Det	5	4	0	0	2	5	0	5	5	5	5	5

Table 3-2 continued. Summary of surface, middle, and bottom water quality monitoring data for Blue Marsh Reservoir in 2017

Station	Date	ALK mg/L	BOD5 mg/L	DISS-P mg/L	NH3 mg/L	NO2 mg/L	NO3 mg/L	PO4 mg/L	TDS mg/L	TKN mg/L	TOC mg/L	TP mg/L	TSS mg/L
BM-10M	5/9/2017	149	<2	0.05	<.05	<.05	5.27	0.01	221	0.55	2.3	0.06	10
	6/20/2017	120	<2	<.05	0.07	0.05	4.44	<.05	232	0.74	2.3	0.04	3
	7/18/2017	83	4	<.05	<.05	<.05	3.08	<.01	177	1.34	3.2	0.04	5
	8/15/2017	99	3	<.05	<.05	<.05	3.62	<.01	200	1.27	3.3	0.03	9
	9/5/2017	100	3	<.05	<.05	0.06	3.03	<.01	172	0.99	3.4	0.03	12
	Mean	110	3	0.05	0.05	0.05	3.89	0.02	200	0.98	2.9	0.04	8
	Stdev	25	1	0	0.01	0.00	0.96	0.02	26	0.34	0.6	0.01	4
	Max	149	4	0.05	0.07	0.06	5.27	0.05	232	1.34	3.4	0.06	12
	Min	83	2	0.05	0.05	0.05	3.03	0.01	172	0.55	2.3	0.03	3
	No. of Det	5	3	1	1	2	5	1	5	5	5	5	5
BM-10B	5/9/2017	139	<2	0.05	0.11	<.05	5.37	0.02	211	0.63	2.1	0.08	38
	6/20/2017	161	<2	<.05	0.2	0.12	4.09	<.05	270	0.52	1.8	0.05	17
	7/18/2017	119	3	<.05	0.16	<.05	6.06	<.01	221	1.44	2.2	0.05	416
	8/15/2017	132	<2	<.05	0.06	<.05	5.54	<.01	233	1.18	2.4	0.06	120
	9/5/2017	187	3	<.05	<.05	<.05	6.65	<.01	271	0.62	2.5	0.06	244
	Mean	148	2	0.05	0.12	0.06	5.54	0.02	241	0.88	2.2	0.06	167
	Stdev	27	1	0.00	0.06	0.03	0.95	0.02	28	0.41	0.3	0.01	165
	Max	187	3	0.05	0.2	0.12	6.65	0.05	271	1.44	2.5	0.08	416
	Min	119	2	0.05	0.05	0.05	4.09	0.01	211	0.52	1.8	0.05	17
	No. of Det	5	2	1	4	1	5	1	5	5	5	5	5

Table 3-2 continued. Summary of surface, middle, and bottom water quality monitoring data for Blue Marsh Reservoir in 2017

Station	Date	ALK mg/L	BOD5 mg/L	DISS-P mg/L	NH3 mg/L	NO2 mg/L	NO3 mg/L	PO4 mg/L	TDS mg/L	TKN mg/L	TOC mg/L	TP mg/L	TSS mg/L
BM-11S	5/9/2017	37	<2	<.05	<.05	<.05	2.16	<.01	94	<.25	1.8	0.02	<1
	6/20/2017	99	<2	<.05	<.05	<.05	3.75	<.05	212	0.66	2.9	<.01	15
	7/18/2017	41	<2	<.05	<.05	<.05	5.2	<.01	123	0.48	2.3	<.01	4
	8/15/2017	41	<2	<.05	<.05	<.05	4.46	<.01	132	0.49	2.4	<.01	<3
	9/5/2017	73	<2	<.05	<.05	<.05	3.64	<.01	139	0.53	2	<.01	<3
	Mean	58	2	0.05	0.05	0.05	3.84	0.02	140	0.48	2.3	0.01	5
	Stdev	27	0	0.00	0.00	0.00	1.13	0.02	44	0.15	0.4	0.00	6
	Max	99	2	0.05	0.05	0.05	5.2	0.05	212	0.66	2.9	0.02	15
	Min	37	2	0.05	0.05	0.05	2.16	0.01	94	0.25	1.8	0.01	1
	No. of Det	5	0	0	0	0	5	0	5	4	5	1	2

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. Nitrite concentrations were low at Blue Marsh Reservoir during 2017 (Table 3-1). Concentrations ranged from less than the reporting limit of 0.05 mg/L to 0.46 mg/L during the sampling season.

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 concentrations maintained similar seasonal patterns across all stations in Blue Marsh Reservoir in 2017. Consistently higher concentrations were measured at upstream tributary station BM-5S (Table 3-1). Concentrations at all sampling locations and depths ranged from 2.13 to 8.73 mg/L. Seasonal mean concentrations at surface tributary stations BM-5S (7.76 mg/L) maintained the highest concentrations of all stations and dates sampled. It appears that the elevated nitrate concentrations at this station is originating from somewhere in the upstream watershed.

Concentrations of nitrate and nitrite measured at Blue Marsh Reservoir were in compliance with PADEP water quality standards during 2017. The state water quality standard for nitrogen from nitrite and nitrate sources is a summed concentration of not more than 10 mg/L. Summed concentrations at all stations were less than the State standard. The highest nitrogen summed concentration of 8.78 mg/L occurred in the surface waters at station BM-5S on 5 September.

3.2.3 Total Kjeldahl Nitrogen

Total Kjeldahl nitrogen (TKN) is a measure of organic nitrogen that is inclusive of ammonia. Organic nitrogen is not immediately available for biological activity and is therefore not available for plant growth until decomposition to inorganic form occurs. In general, TKN remained low but variable throughout the water column of Blue Marsh Reservoir in 2017 (Table 3-1). Concentrations measured at all stations and depths of the reservoir and tributaries ranged from less then the laboratory reporting limit of 0.25 mg/L to 1.95 mg/L.

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. Total phosphorus in the watershed and lake body of Blue Marsh Reservoir was frequently measured at concentrations well above this standard during 2017 (Table 3-1). Bottom and mid-depth waters within the lake and upstream tributary station BM-5S routinely had the highest measured concentrations. This may be a direct result of nutrient enrichment in the upstream watershed and phosphorus release from bottom sediments during anoxic conditions experienced at Blue Marsh annually. In 2017, 61 of the 105 samples measured for total phosphorus at Blue Marsh Reservoir, including its tributaries, were greater than the EPA guideline. The single sample values for all stations and depths ranged from 0.08 mg/L to <0.01 mg/L. Agriculture and other land use found in the watershed contribute to the historic and currently measured elevated total phosphorus levels in Blue Marsh reservoir.

3.2.5 Total Dissolved Phosphorus

Total dissolved phosphorus (DISS P) in the water column of Blue Marsh Reservoir was consistently low during 2017. One out of the 105 samples collected during the sampling season was greater than the laboratory reporting limit of 0.05 mg/L (Table 3-1). The maximum value recorded during the sampling season of 0.06 mg/L was measured in the reservoir deep water station BM-7B on 09 May.

3.2.6 Dissolved Phosphate

Orthophosphate (PO4) is a measure of the inorganic oxidized form of soluble phosphorus. This form of phosphorus is the most readily available for uptake during photosynthesis. In freshwater environments, dissolved phosphate is usually a limiting nutrient and is readily taken up by freshwater plants and algae. Dissolved phosphate in the lake waters of Blue Marsh Reservoir were low during 2017 (Table 3-1) with only 2 of the 105 samples collected during the sampling season greater than the laboratory reporting limit of 0.01 mg/L. Algal uptake during photosynthesis likely contributed to lower concentrations in lake waters.

3.2.7 Total Dissolved Solids

Total dissolved solids (TDS) are 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. Total dissolved solids (TDS) in the water column of Blue Marsh Reservoir at all stations and depths ranged from 595 mg/L to 94 mg/L in 2017 (Table 3-1). The state water quality standard for TDS is a maximum concentration of 500 mg/L. Concentrations of total dissolved solids measured at Blue Marsh Reservoir did exceed (595 mg/L) the PADEP water quality standard once on 05 September at Station BM-9S.

3.2.8 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 in the waters of Blue Marsh Reservoir were generally low during the 2017 sampling period (Table 3-1). Sample results at all stations and depths ranged from 416 mg/L to <3 mg/L (laboratory reporting limit). The maximum and consistently higher TSS readings were taken in the bottom water samples at reservoir deep water sampling locations. Uncharacteristically high single sample readings from bottom water samples can be attributed to sample collection error. On occasion, bottom sediments are re-suspended during the sample collection process and are inadvertently included in the sample. Nearly all the elevated sample results occurred at bottom water sampling stations and likely were associated with sediment disturbance. The Pennsylvania Department of Environmental Protection (PADEP) has not issued a water quality standard for TSS.

3.2.9 Biochemical Oxygen Demand

Five-day biochemical oxygen demand (BOD) 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 period of 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;
- 10+ mg/L is associated with very polluted water and large amounts of biodegradable wastes.

BOD in the water column of Blue Marsh Reservoir, for the most part, was relatively low during the 2017 sampling period (Table 3-1) with many concentrations less than the laboratory reporting limit of 2.0 mg/L. The BOD at all monitoring stations and depths ranged from <2.0 mg/L to 10.0 mg/L for the sampling period. Only one sample (10 mg/L) of the 105 samples collected was >5.0 mg/L with the remaining samples within the <2 mg/L to 5.0 mg/L range. In holistically analyzing the BOD results from 2017 and considering the rarity of elevated levels, it is inferred that upstream tributaries of the reservoir remained very clean with little biodegradeable waste throughout the sampling season. It is also inferred that Blue Marsh Reservoir ranges from very clean with little biodegradable wastes in spring and early summer with a transition to moderately clean waters with some biodegradable wastes in late summer and fall. The Pennsylvania Department of Environmental Protection (PADEP) does not issue a water quality standard for BOD.

3.2.10 Alkalinity

Alkalinity 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.

Throughout the monitoring period in 2017, concentrations at all stations and depths for Blue Marsh Reservoir ranged from 37 mg/L $CaCO_3$ to 222 mg/L $CaCO_3$ (Table 3-1). Upstream tributary station BM-5S maintained the highest seasonal mean concentration of 205 mg/L $CaCO_3$. Whereas, upstream tributary station BM-11S maintained the lowest seasonal mean concentration of 58 mg/L $CaCO_3$. Concentrations of alkalinity measured at Blue Marsh Reservoir were in compliance with PADEP water quality standards for all samples collected during 2017.

3.2.11 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 also wastewater treatment plants. The amount of carbon in a freshwater stream is an indicator of the organic character of a 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 Blue Marsh Reservoir were low during 2017 (Table 3-1). Concentrations of TOC at all stations and depths ranged from 1.4 mg/L to 4.6 mg/L.

3.2.12 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 measures increase in relation to algal densities in a water body. Chlorophyll *a* is used as a measure of algal biomass. In 2017, the average concentration during the monitoring period for lake surface waters (<15 feet) at lake station BM-6 was 8.53 ug/L with the highest concentrations seen during the month of May (Appendix A). For all reservoir sampling stations, the maximum concentrations were measured in the surface waters at lake station BM-6 and BM-2 in May and the minimum concentration were measured at the upstream surface water station BM-5S and BM-11S throughout most of the sampling season. Algal producitivity in tributary waters would be expected to be less than lake surface waters as a result of thermal warming, longer lake water residence time, and increased nutrient concentrations and availability.

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 depth. 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: oligotrophic (TSI <40), mesotrophic (TSI >40), and eutrophic (TSI >50).

During 2017, TSI's calculated for measures of secchi disk depth classified Blue Marsh Reservoir as eutrophic in May (59.03), June (54.06), July (56.22), August (62.34) and September (62.34) (Fig. 3-7). TSI's calculated for measures of total phosphorus classified Blue Marsh Reservoir as eutrophic in May (53.20), mesotrophic in July (47.35), August (47.35) and September (47.35), and oligotrophic in June (37.35). TSI's calculated for measures of chlorophyll *a* classified Blue Marsh Reservoir as mesotrophic in June (47.09), August (49.87) and September (49.87), and eutrophic in May (57.94) and July (53.54). 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. With this in mind, the trophic state of the reservoir fluctuated between being mesotrophic and eutrophic at different points in time during the 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). Based on these ranges of classification, Blue Marsh Reservoir fluctuated between being mesotrophic and eutrophic at different points in time during the 2017 sampling season

Table 3-3. EPA trophic classification criteria and average monthly measures for Blue Marsh Reservoir in 2017.

Water Quality Variable	Oligo-trophic	Meso-trophic	Eutrophic	09 May	20 June	18 July	15 August	05 September
Total phos. (ppb)	<10	10-20	>20	30	10	20	20	20
Chlorophyll (ppb)	<4	4-10	>10	16.2	5.4	10.4	7.1	7.1
Secchi depth (m)	>4	2-4	<2	1.07	1.51	1.3	0.85	0.85

3.4 RESERVOIR COLIFORM BACTERIA MONITORING

Two forms of coliform bacteria contamination were monitored in the tributary and lake surface waters at Blue Marsh Reservoir during 2017 including total and fecal coliform (Table 3-4). Total coliform includes *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.

Total coliform contamination of Blue Marsh Reservoir was relatively high at most stations during the 2017 monitoring period and exceed the sample detection limit of 2400 colonies/100-ml on 13 occasions throughout the sampling season. Upstream tributary stations BM-5S and BM-11S exceeded the detection limit in all months sampled. Total coliform values for all stations ranged from 19 colonies/100-ml to greater than the detection limit of 2400 colonies/100-ml. Bacteria in natural waters are common and their presence in the sample is not necessarily a human health concern. No State or federal standards exist for total coliform for water contact recreation.

The PADEP standard for fecal coliform bacteria during the swimming season (from 1 May to 30 September) is a geometric mean not greater than 200 colonies/100-ml calculated for not less than five fecal coliform samples collected over a consecutive thirty day period. Given that our regular monitoring was completed on one day as grab samples, single sample results were then compared to the Pennsylvania Department of Health single sample standard of <1000 colonies/100-ml. Fecal coliform contamination in surface waters of Blue Marsh Reservoir during 2017 ranged from less than the 2 clns/100-ml detection limit to a high of 3,100 clns/100-ml. Elevated bacteria readings were routinely seen in upstream tributary surface waters at stations BM-11S and BM-5S. The fecal coliform samples collected at Blue Marsh Reservoir did exceed the State single sample standard in 2017 on 3 occasions at the upstream tributary stations. Elevated counts at stations BM-5S and BM-11S are likely attributed to agricultural activities in those upstream watersheds. Water contact recreation, such as water skiing, is permitted at Blue Marsh Reservoir. The Corps recreational swimming beach is monitored and managed separately from the monthly routine lake water quality sampling (see Section 3.5).

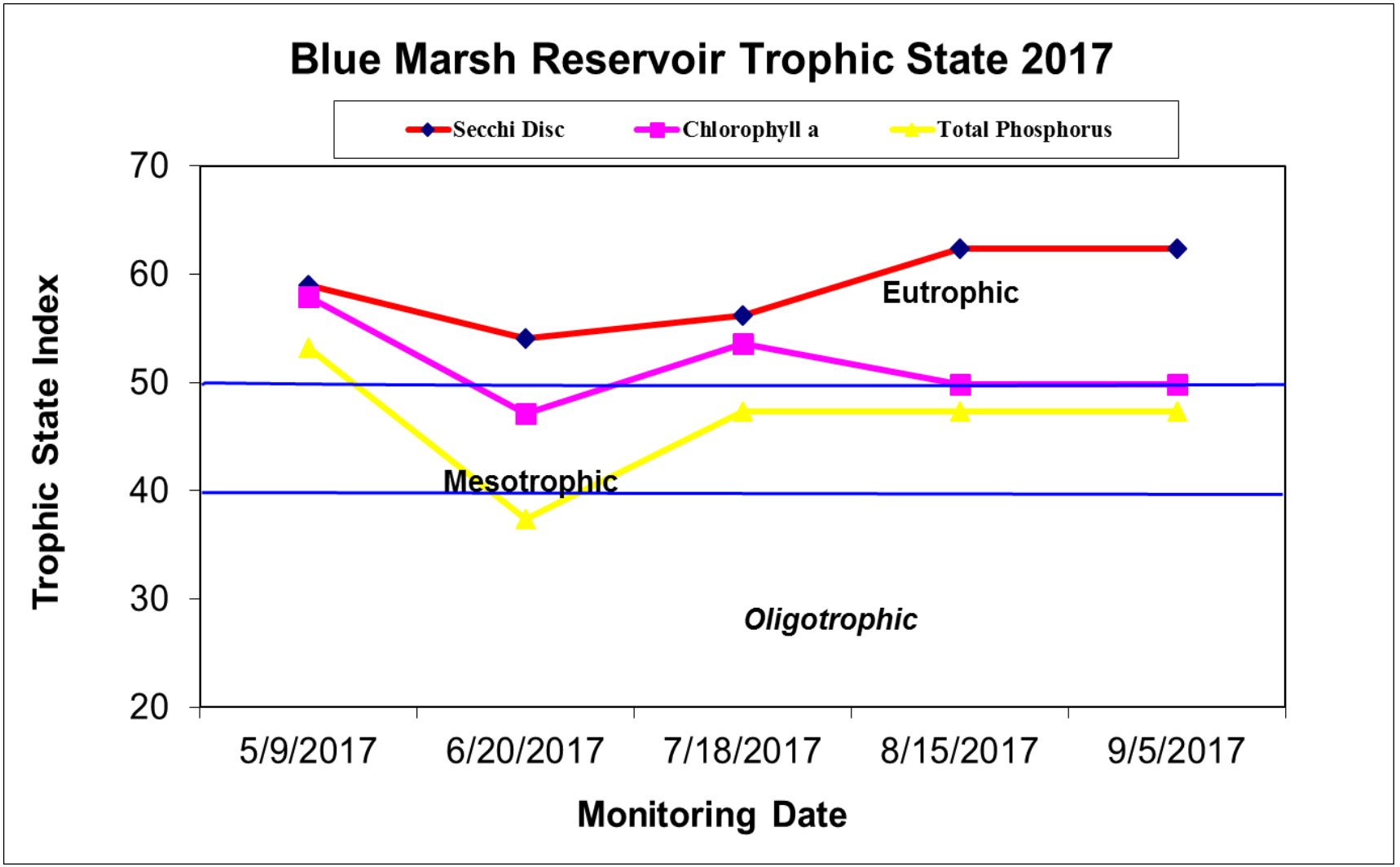

Figure 3-7. Trophic state indices calculated from secchi disk depth and concentrations of total phosphorus and chlorophyll *a* at Blue Marsh Reservoir in 2017.

Table 3-4. Bacteria counts (colonies/100 ml) at Blue Marsh Reservoir during 2017. Shaded values exceed the Pennsylvania Department of Health water quality standard for bathing beach of 1,000 fecal coliform colonies/100-ml. NS = Not Sampled in 2017

STATION	DATE	Total Coliform		Fecal Coliform (FC)		Escherichia coli	
BM-1S	5/9/17		200	<	2		NS
	6/20/17		920		11		NS
	7/18/17	>	2400		56		NS
	8/15/17	>	2400		300		NS
	9/5/17		920		21		NS
BM-2S	5/9/17		26	<	2		NS
	6/20/17		160	<	2		NS
	7/18/17		1400		2		NS
	8/15/17		140		2		NS
	9/5/17		240	<	2		NS
BM-5S	5/9/17	>	2400		82		NS
	6/20/17	>	2400		3100		NS
	7/18/17	>	2400		3000		NS
	8/15/17	>	2400		860		NS
	9/5/17	>	2400		220		NS
BM-6S	5/9/17		19	<	2		NS
	6/20/17		160		10		NS
	7/18/17		2400		10		NS
	8/15/17		1000		6		NS
	9/5/17		340		2		NS
BM-7S	5/9/17		66	<	2		NS
	6/20/17		330		8		NS
	7/18/17	>	2400		3		NS
	8/15/17		610		2		NS
	9/5/17		440		6		NS
BM-8S	5/9/17		290		10		NS
	6/20/17		220		2		NS
	7/18/17		2400		2		NS
	8/15/17		550		2		NS
	9/5/17		440		2		NS
BM-9S	5/9/17		230		10		NS
	6/20/17		250		6		NS
	7/18/17		690		2		NS
	8/15/17		1000	<	2		NS
	9/5/17		440	<	2		NS
BM-10S	5/9/17		610		42		NS
	6/20/17		490		42		NS
	7/18/17		340	<	2		NS
	8/15/17		410		10		NS
	9/5/17		310		2		NS
BM-11S	5/9/17	>	2400		28		NS
	6/20/17	>	2400		2100		NS
	7/18/17	>	2400		550		NS
	8/15/17	>	2400		450		NS
	9/5/17	>	2400		470		NS

3.5 WEEKLY SWIMMING BEACH BACTERIA MONITORING

Weekly coliform bacteria monitoring was conducted at the public swimming beach of the Dry Brooks Day Use Area of Blue Marsh Reservoir to gauge compliance with Pennsylvania Department of Health bathing beach water quality standards to ensure public safety in this water contact recreation area. The bathing beach contamination standard, like the PADEP swimming season water quality standard, is based on a geometric mean of less than 200 colonies/100-ml for five samples collected over not more than a 30 consecutive day period, but also stipulates that no single sample should exceed 1,000 fecal coliform colonies/100-ml. Samples for coliform analysis were collected twice weekly from 3 fixed stations on each date in the regulated swimming area. During 2017, fecal coliform contamination at the swimming beach area of Blue Marsh Reservoir never exceeded the State single sample or geometric mean fecal criteria (Table 3-5).

Escherichia coli (E. coli) was monitored at the swimming beach to better understand bacteria trends. E. 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 standard for E. coli is based on two criteria: a geometric mean of 126 organisms/ 100 ml (geometric mean) threshold and 235 organisms/ 100 ml (single water sample) threshold. Escherichia coli measures never exeeded the EPA geometric mean standard or the single sample standard at the Blue Marsh Reservoir swimming beach area in 2017 (Table 3-6).

Table 3-5. Single sample Maximum counts and 5-day running fecal coliform geometric means at the three swimming beach stations of Blue Marsh Reservoir in 2017. Shaded values indicate results were not in compliance with PA Dep. of Health water quality standards for bathing beaches: maximum count greater than 1,000 colonies/100-ml; 5-day geometric mean greater than 200 colonies/100-ml.

Week	Date	Single Maximum Count	Sampling Station 5-Day Geometric Means		
			sb1	sb2	sb3
Week 1	08-May	2.00	-	-	-
	11-May	6.00	-	-	-
Week 2	16-May	36.00	-	-	-
	18-May	8.00	-	-	-
Week 3	22-May	5.00	4.28	3.29	3.48
	25-May	10.00	4.28	4.54	3.48
Week 4	30-May	10.00	4.64	5.02	4.80
	01-June	5.00	2.83	4.57	3.64
Week 5	05-June	8.00	3.73	4.96	2.76
	08-June	16.00	4.70	6.54	4.01
Week 6	12-June	31.00	8.09	8.21	6.80
	15-June	38.00	13.44	10.08	7.89
Week 7	19-June	24.00	17.42	13.80	11.96
	22-June	8.00	15.86	15.85	15.78
Week 8	26-June	23.00	15.66	19.58	15.26
	29-June	11.00	11.35	15.61	12.66
Week 9	03-July	15.00	7.84	13.78	8.58
	06-July	30.00	6.70	14.21	9.73
Week 10	10-July	110.00	6.70	25.43	8.86
	13-July	10.00	4.86	21.52	7.84
Week 11	17-July	23.00	6.35	21.94	7.84
	20-July	34.00	8.16	23.47	12.75
Week 12	24-July	230.00	14.86	31.90	19.16
	27-July	13.00	14.86	17.83	23.19
Week 13	31-July	13.00	17.07	18.79	25.69
	03-August	120.00	16.76	28.35	41.43
Week 14	07-August	15.00	13.82	25.76	35.17
	10-August	11.00	8.34	13.42	19.15
Week 15	14-August	13.00	9.58	11.69	19.15
	17-August	110.00	12.64	17.91	21.54
Week 16	21-August	40.00	11.82	12.28	17.29
	24-August	20.00	12.36	11.14	18.31
Week 17	28-August	20.00	11.67	14.70	17.18
	31-August	3.00	9.17	13.55	12.81

Table 3-6. Maximum counts and 5-day e-coli running geometric means of the three swimming beach stations of Blue Marsh Reservoir in 2017. Shaded values indicate results were not in compliance with PA Dep. of Health water quality standards for E-coli levels at bathing beaches: maximum single count greater than 235 colonies/100-ml; 5-day geometric mean greater than 126 colonies/100-ml.

Week	Date	Single Maximum Count	Sampling Station 5-Day Geometric Means		
			sb1	sb2	sb3
Week 1	08-May	1.00	-	-	-
	11-May	2.00	-	-	-
Week 2	16-May	24.00	-	-	-
	18-May	8.00	-	-	-
Week 3	22-May	3.00	2.35	1.43	2.17
	25-May	4.00	2.35	1.89	2.49
Week 4	30-May	7.00	2.35	2.17	3.68
	01-June	3.00	1.25	2.17	2.95
Week 5	05-June	4.00	1.64	2.70	2.24
	08-June	9.00	2.05	3.57	3.20
Week 6	12-June	13.00	2.83	4.10	4.65
	15-June	38.00	5.85	6.04	6.23
Week 7	19-June	19.00	9.27	8.74	9.44
	22-June	5.00	8.75	9.68	11.34
Week 8	26-June	17.00	9.11	12.93	10.93
	29-June	5.00	8.71	11.26	9.03
Week 9	03-July	11.00	5.24	9.34	5.70
	06-July	25.00	4.12	9.13	6.23
Week 10	10-July	91.00	3.80	16.32	5.96
	13-July	8.00	2.70	14.03	4.32
Week 11	17-July	19.00	3.69	15.70	4.74
	20-July	22.00	5.34	16.92	7.06
Week 12	24-July	110.00	10.16	24.58	9.50
	27-July	12.00	11.67	13.16	11.84
Week 13	31-July	11.00	14.54	14.02	14.74
	03-August	59.00	14.69	21.33	21.99
Week 14	07-August	13.00	11.67	20.46	19.48
	10-August	3.00	5.65	9.18	9.48
Week 15	14-August	5.00	5.91	6.96	7.61
	17-August	80.00	7.19	10.35	10.63
Week 16	21-August	26.00	6.60	6.80	9.03
	24-August	9.00	6.80	5.07	8.52
Week 17	28-August	14.00	7.81	7.49	9.44
	31-August	3.00	7.05	7.49	8.91

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APPENDIX A

STRATIFICATION DATA TABLES

2017 Blue Marsh Stratification/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
	5/9/2017	12:52:03	0.5	13.71	101.6	10.53	8.1	-125.7	172.9	7.4	6	0.305
	6/20/2017	13:08:28	0.5	20.08	92	8.34	7.86	-113.3	103.3	5.9	4.1	0.379
BM-1	7/18/2017	12:54:59	0.5	20.96	91.1	8.12	7.81	-110.9	81.3	7	1.4	0.385
	8/15/2017	12:58:53	0.5	20.5	93.8	8.44	7.78	-109	54.3	18.3	0.5	0.367
	9/5/2017	14:41:09	0.5	19.3	94.7	8.72	7.94	-117.9	50.9	13.5	0.4	0.393
		9:28:02	0.5	16.19	124.7	12.24	8.49	-147.9	97.4	9.4	9.5	0.322
		9:27:00	5.0	16.18	124.1	12.19	8.46	-146	97.6	9.8	18.9	0.322
		9:25:03	10.0	16.17	122.7	12.06	8.37	-141.2	98.5	9.4	20.5	0.322
BM-2		9:23:35	15.0	16.13	119.3	11.74	8.26	-134.8	101.1	9.4	20.8	0.322
	5/9/2017	9:22:14	20.0	16.07	115.2	11.34	8.14	-128.3	102.5	9.9	19.7	0.323
		9:20:18	25.0	13.96	56.8	5.85	7.58	-97	124.2	5.9	10.8	0.339
		9:18:53	30.0	12.43	37.6	4.01	7.53	-94.1	128.1	6.9	6.2	0.331
		9:17:11	35.0	10.37	23.2	2.59	7.58	-96.5	130	6.8	6.3	0.279
		9:15:28	40.0	9.71	12.4	1.4	7.62	-98.6	132.1	12.6	8.5	0.266
		9:13:27	45	9.6	11.1	1.27	7.67	-101.2	131.1	12.4	8.5	0.264
		9:47:15	0.5	24.9	106.3	8.79	8.06	-125.4	58.8	5	3.8	0.382
		9:45:59	5	24.88	105.4	8.72	8	-122.2	59.2	5	4.5	0.382
		9:45:12	10	24.85	103.3	8.56	7.95	-119.5	60	5.7	4.6	0.381
BM-2		9:43:49	15	20.74	54.2	4.85	7.41	-88.1	79.5	6.2	5.4	0.388
	6/20/2017	9:41:49	20	17.98	16.9	1.6	7.29	-81.4	82.7	5.1	4.5	0.377
		9:40:10	25	16.58	3	0.3	7.29	-81.1	81.4	5.1	3.9	0.369
		9:39:09	30	15.93	1.6	0.16	7.3	-81.7	80.6	4.9	3	0.365
		9:37:37	35	15.21	2	0.2	7.34	-84	77.1	4.9	3.1	0.363
		9:36:43	40	14.02	2	0.21	7.38	-85.8	75.1	5.7	2.6	0.361
		9:34:58	45	13.43	3	0.31	7.42	-88.2	85.9	7.3	2.5	0.358
		9:51:07	0.5	27.2	158.4	12.56	8.75	-165.9	22	12.4	12.2	0.322
		9:48:56	5	26.79	150.5	12.03	8.56	-154.7	19.6	16.5	11.4	0.320
		9:47:28	10	26.03	80.2	6.5	7.66	-102.8	42.8	21.6	7.2	0.352
BM-2		9:44:37	15	22.96	32.9	2.82	7.34	-84.4	50.5	15.7	3.1	0.369
	7/18/2017	9:43:54	20	21.94	21.9	1.92	7.31	-82.3	51.6	14.4	3.5	0.389
		9:42:30	25	21.38	30.2	2.67	7.33	-83.6	50.2	10.8	3.2	0.365
		9:41:42	30	20.88	28.7	2.56	7.34	-84.2	48.3	13.7	3.2	0.357
		9:40:26	35	20.63	3.9	0.35	7.3	-82.1	46.9	9.60	2.3	0.395
		9:39:19	40	19.61	3	0.27	7.34	-84.1	45.7	8.60	2	0.399
		9:38:17	45	19.47	4.2	0.39	7.38	-86.3	41.2	6.7	2	0.399
		9:49:23	0.5	24.62	163	13.56	8.97	-177.5	3.5	27.2	11.4	0.274
		9:48:28	5	24.62	160.3	13.33	8.89	-172.9	1.9	31.2	11.5	0.274
BM-2		9:47:02	10	23.82	67	5.65	8.03	-123.6	17.8	17.2	6.7	0.309
		9:43:25	15	22.12	53.9	4.7	7.66	-102.2	26.1	7.9	2.5	0.344
	8/15/2017	9:42:27	20	21.08	50.6	4.5	7.55	-96.3	30	16.6	1.6	0.367
		9:41:32	25	20.52	59.3	5.33	7.58	-97.9	28.8	29.8	1.4	0.337
		9:40:06	30	20	59.8	5.43	7.56	-96.3	28.2	49.1	1.5	0.308
		9:38:06	35	19.86	47.1	4.29	7.54	-95.2	21.8	49.9	2.3	0.324
		9:36:26	40	19.58	15.3	1.4	7.46	-90.7	15.4	25.1	0	0.415

2017 Blue Marsh Stratification/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
		11:52:28	0.5	22.36	140.8	12.22	8.78	-166.1	15.6	42.3	8	0.286
		11:51:10	5	21.66	118.6	10.43	8.61	-156	17.3	24.0	4.5	0.285
BM-2		11:50:14	10	21.47	104.1	9.19	8.5	-149.6	18.5	17.1	3.7	0.284
	9/5/2017	11:48:34	15	21	62	5.53	7.8	-110.2	37.2	7.4	2.7	0.321
		11:47:12	20	20.05	40.4	3.67	7.53	-95	47.3	8.6	0.3	0.368
		11:46:03	25	19.19	58.1	5.37	7.65	-101.6	41.4	11.9	1.1	0.380
		11:44:58	30	18.78	60.7	5.65	7.69	-103.8	37.9	19.0	0.6	0.396
		11:44:14	35	18.28	66.7	6.27	7.75	-106.9	34	28.2	1.7	0.409
		11:43:15	40	17.61	77	7.34	7.89	-114.8	23.4	36.7	2	0.385
BM-4			**Inactive Sampling Station**									
	5/9/2017	12:22:48	0.5	11.59	104.8	11.38	7.98	-118.7	191.6	9.2	2.1	0.470
	6/20/2017	12:37:44	0.5	20.13	85.6	7.75	7.88	-114.4	115.9	48	3.2	0.567
BM-5	7/18/2017	12:24:57	0.5	19.15	97.5	9	7.94	-118	79.7	39.5	2.7	0.554
	8/15/2017	12:26:27	0.5	16.8	92.6	8.97	7.98	-119.3	53.1	37.8	0	0.526
	9/5/2017	14:10:03	1.0	17.13	101.9	9.81	8.08	-124.9	55.4	7.3	1.4	0.562
		8:49:05	0.5	16.08	121.5	11.96	8.24	-133.6	111.3	8.9	9.9	0.317
BM-6		8:47:45	5	16.08	121.1	11.92	8.16	-129.5	111.7	10.4	18.5	0.318
		8:46:30	10	16.05	119.7	11.79	8.09	-125.3	112	10.9	20.3	0.317
		8:44:38	15	16.01	116.2	11.46	7.93	-116.8	112.8	11.3	21.9	0.317
Secchi		8:42:52	20	15.92	110.8	10.94	7.74	-106.2	113.8	10.5	18.5	0.318
	5/9/2017	8:40:26	25	14.16	56.6	5.81	7.1	-70.6	135.4	5.1	9.3	0.340
1.07 M		8:38:18	30	12.57	43.1	4.58	7.02	-65.9	138.4	3.9	7	0.321
		8:36:43	35	11.41	36.7	4.01	6.99	-64.3	140	4.2	5.4	0.294
		8:35:16	40	10.3	29.7	3.32	6.97	-63.4	140.8	6.2	6.9	0.271
		8:33:29	45	9.63	20.5	2.33	6.97	-63.2	142.3	15.9	7.8	0.260
		8:32:03	50	9.59	18.4	2.1	6.96	-63	143.3	13.9	8.5	0.260
		8:29:02	52	9.5	18.5	2.11	6.97	-63.4	143.6	17.9	8	0.258
		9:16:19	0.5	25.02	111.3	9.18	8.01	-122.7	47.1	5.3	5.4	0.378
		9:14:46	5	25.01	110	9.08	7.9	-116.7	47.7	5.8	5.9	0.378
BM-6		9:12:29	10	24.77	101.5	8.41	7.62	-100.2	52.2	6.2	4.8	0.383
		9:11:09	15	22.18	69.3	6.03	7.15	-73.3	66.7	6.1	4.6	0.395
		9:09:54	20	18.56	21.7	2.02	6.97	-63.2	69.7	4.3	4.5	0.378
Secchi	6/20/2017	9:08:27	25	16.16	1.4	0.14	6.92	-60.5	69.1	3.8	2.6	0.372
		9:06:22	30	15.44	1.4	0.14	6.9	-59.7	67.1	3.6	3.1	0.368
1.51 M		9:05:01	35	14.82	1.5	0.16	6.92	-60.4	63.8	3.1	3	0.362
		9:04:11	40	14.18	1.5	0.15	6.92	-60.6	62.3	3.2	2.8	0.359
		9:03:05	45	13.59	1.7	0.18	6.92	-60.9	61.5	2.4	2.9	0.355
		9:01:06	50	13.16	2.3	0.24	6.92	-60.4	57.6	5.1	2.6	0.354

2017 Blue Marsh Stratification/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
		9:14:34	0.5	27.31	153.7	12.17	8.52	-152.4	27.1	15.4	13.1	0.320
		9:13:13	5	27.21	150.3	11.93	8.38	-144.7	25.7	16.1	12.9	0.319
BM-6		9:10:54	10	25.14	37	3.05	7.08	-69.5	58.3	21.8	5.1	0.375
		9:09:46	15	23.6	17.6	1.49	6.98	-63.7	61.2	7.9	3	0.393
Secchi	7/18/2017	9:09:03	20	22.55	17.6	1.52	6.96	-63	61.7	7.2	2.6	0.402
		9:07:36	25	21.48	13.6	1.2	6.93	-60.9	62.6	4.8	1.7	0.400
1.30 M		9:05:57	30	20.97	9.3	0.83	6.87	-57.9	63.8	7.3	1.4	0.391
		9:04:38	35	20.51	1.5	0.14	6.8	-53.7	68.2	6.1	1.8	0.386
		9:03:42	40	19.91	1.6	0.14	6.75	-51	70.9	5.6	1.7	0.389
		9:02:19	45	18.97	1.8	0.16	6.71	-48.6	75.1	6.4	2.7	0.395
		9:00:45	50	17.76	2.2	0.21	6.71	-48.9	75	9.5	1.4	0.394
		9:15:21	0.5	24.69	142.3	11.82	8.69	-161.3	4	34.0	8.5	0.280
		9:14:09	5	24.67	137.3	11.41	8.55	-153.5	2.7	25.7	9.5	0.280
BM-6		9:12:44	10	23.36	45.7	3.89	7.51	-94.1	26.9	7.5	3.4	0.322
		9:10:11	15	22.03	36.6	3.2	7.32	-82.9	29.5	7.1	0	0.351
Secchi		9:08:31	20	21.21	38.1	3.38	7.27	-80.3	30.5	7.4	0	0.366
	8/15/2017	9:07:06	25	20.51	46.5	4.18	7.27	-80.2	29.9	18.1	0	0.360
0.85 M		9:05:16	30	20.16	39.8	3.6	7.21	-76.9	29	25.7	0	0.368
		9:03:08	35	20.09	38.1	3.45	7.19	-75.5	25.7	26.1	0	0.395
		9:00:58	40	19.77	23.4	2.13	7.11	-71.1	20.9	16.4	1.3	0.395
		8:59:45	45	19.4	15.1	1.39	7.07	-69.1	17	16.2	0	0.403
		8:58:20	50	18.6	1.8	0.17	7.05	-67.6	9	22.0	5.1	0.401
BM-6		11:28:41	0.5	23.03	144.1	12.35	8.57	-154.2	25.5	23.20	6.2	0.290
		11:27:08	5	22.29	136.3	11.84	8.43	-145.8	26.4	26.70	9.3	0.286
		11:25:49	10	21.56	106.5	9.38	8.12	-128.4	33	15.30	5.9	0.288
		11:24:15	15	20.64	26.7	2.39	7.07	-68.9	67.8	6.00	2.3	0.348
Secchi	9/5/2017	11:23:17	20	20.12	24.9	2.26	7.03	-66.7	70.4	4.90	1.3	0.372
		11:22:19	25	19.45	30.1	2.77	7.03	-66.4	71.5	6.30	1	0.398
0.85 M		11:21:28	30	18.87	35.6	3.31	7.04	-67.4	71.4	8.40	1.4	0.408
		11:20:16	35	18.49	39.8	3.73	7.05	-67.9	71.5	16.20	1.3	0.419
		11:19:07	40	18.28	34.8	3.27	7.03	-66.9	72.5	18.50	1.8	0.424
		11:18:15	45	17.99	17.4	1.65	6.97	-63.4	78	18.30	1.3	0.423
		11:17:22	50	18.01	18.2	1.72	7.02	-66	76.1	11.30	2.7	0.424
		9:59:33	0.5	16.1	122	12	8.48	-147.1	128	7.5	8	0.339
		9:57:46	5.0	16.07	121.7	11.98	8.46	-145.7	129.6	8.2	15.9	0.339
BM-7		9:55:36	10.0	15.96	120.1	11.85	8.41	-143.2	131.5	7.1	18.9	0.340
	5/9/2017	9:52:26	15.0	15.88	113.8	11.25	8.28	-136.2	136.2	10.7	18.8	0.341
		9:50:57	20.0	15.86	106.8	10.56	8.21	-131.9	139.2	8.10	17.6	0.342
		9:49:50	25.0	14.94	75.7	7.64	7.89	-114.2	153.1	10.3	8.2	0.362
		9:47:29	30.0	13.69	49.8	5.16	7.82	-110	160.6	28.5	6.5	0.358

2017 Blue Marsh Stratification/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
		10:15:48	0.5	26.17	109.1	8.81	8.11	-128.7	75.3	5.3	2.6	0.400
		10:14:28	5	26.07	107.7	8.72	8.06	-125.9	77	6.3	3.6	0.399
BM-7		10:13:18	10	23.9	84.4	7.11	7.78	-109.2	88.2	6.6	5.4	0.409
	6/20/2017	10:11:38	15	21.54	71.2	6.28	7.6	-99.1	96.1	7.8	4.5	0.441
		10:07:03	20	18.26	29.2	2.75	7.44	-89.4	105.7	5.8	3.4	0.389
		10:05:22	25	16.42	10.6	1.04	7.44	-89.2	108.4	8.3	2.9	0.381
		10:03:29	28	15.81	3.9	0.38	7.47	-91.2	109	10.7	2.9	0.371
		10:15:09	0.5	27.88	156.6	12.28	8.72	-164.3	38.3	17.2	8.1	0.332
		10:14:16	5	27.08	145.8	11.59	8.61	-157.5	40.9	17	10.8	0.326
		10:13:17	10	25.75	90.7	7.39	7.87	-115	65.8	11.7	4.4	0.338
BM-7	7/18/2017	10:12:26	15	23.01	61.3	5.25	7.56	-97	77.1	10.4	3.1	0.321
		10:11:32	20	21.92	49.8	4.36	7.53	-95.2	79.4	14.6	3.6	0.317
		10:10:42	25	21.37	54.7	4.84	7.57	-97.1	79.4	19.6	3.9	0.311
		10:09:46	30	20.8	55.6	4.97	7.6	-99.1	79.9	28	3.5	0.304
		10:08:01	32	20.43	51.3	4.62	7.64	-101.1	83.8	46.3	3.4	0.318
		10:14:35	0.5	24.43	145.6	12.15	9.01	-179.8	12	32.1	10.4	0.286
		10:12:55	5	24.44	144.2	12.04	8.93	-175.4	11.9	33.3	10.9	0.286
BM-7		10:11:44	10	24.26	112.8	9.44	8.68	-160.7	16.7	22.6	6.9	0.294
	8/15/2017	10:10:30	15	22.02	92	8.04	8.17	-131.1	31.9	23.7	4.6	0.316
		10:09:22	20	21.32	80.4	7.12	7.97	-119.8	38.6	31.7	3.7	0.316
		10:07:45	25	20.58	80.8	7.26	7.92	-116.6	42.3	45.8	3.4	0.316
		10:06:11	30	19.77	69.7	6.36	7.83	-111.8	47.7	66.9	3.5	0.323
		12:15:44	0.5	22.22	144	12.53	8.88	-171.4	23.2	38.10	9.4	0.284
		12:14:49	5	21.82	121.3	10.64	8.72	-162.3	27.2	21.50	5.4	0.284
BM-7	9/5/2017	12:14:02	10	21.06	101.4	9.03	8.5	-149.6	34.1	13.80	4.2	0.296
		12:13:30	15	20.37	96.5	8.7	8.38	-142.8	38.4	14.30	2.7	0.310
		12:12:47	20	20.05	90.8	8.24	8.29	-137.5	42.2	15.00	2	0.321
		12:11:51	25	19.19	83.8	7.73	8.14	-128.7	49	32.50	2.8	0.341
		12:08:48	30	18.81	80.3	7.47	8.09	-126.1	54.6	30.60	1.7	0.356
		11:22:03	0.5	16.31	123.4	12.09	8.45	-145.4	190.9	7.5	10.7	0.347
		11:21:10	5.0	16.02	122.9	12.11	8.43	-144.6	193	8.3	18.4	0.345
		11:19:58	10.0	15.82	118.7	11.75	8.4	-142.6	196.4	8.4	19	0.344
BM-8	5/9/2017	11:18:47	15.0	15.74	113.6	11.26	8.35	-139.7	200.6	12.2	18.7	0.343
		11:17:33	20.0	14.15	99.6	10.22	8.16	-128.7	210.9	34.4	8.6	0.330
		11:16:33	22.0	14.01	104.4	10.74	8.2	-131	211.9	52.1	8.9	0.330
		11:44:29	0.5	26.24	112.1	9.05	8.21	-134.4	69.5	6.1	2.7	0.398
		11:43:38	5	26.06	108.8	8.81	8.14	-130.7	70.8	7.4	4.5	0.399
BM-8	6/20/2017	11:42:25	10	23.2	71.4	6.1	7.7	-104.8	86.2	20.7	8.7	0.414
		11:40:27	15	20.1	36.6	3.32	7.58	-97.6	85.3	8.7	3.7	0.390
		11:39:19	20	17.8	7.3	0.69	7.53	-94.5	86.7	26.1	3.6	0.384

2017 Blue Marsh Stratification/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
		11:31:40	0.5	27.68	201.1	15.82	9.06	-184.1	36.8	31.7	9.7	0.329
		11:30:47	5	27.09	174.6	13.88	8.89	-173.7	41.1	22.1	11.5	0.327
BM-8	7/18/2017	11:29:18	10	25.2	125.1	10.29	8.3	-139.6	59.4	15	2.8	0.351
		11:27:50	15	23.34	67.1	5.71	7.77	-108.9	79.5	21.3	2.5	0.390
		11:26:19	20	21.77	42.2	3.7	7.72	-106	82.4	17.9	2.6	0.337
		11:25:08	21	21.53	20.2	1.78	7.72	-106	86.5	22.8	2.1	0.340
		11:31:15	0.5	24.47	180.7	15.07	9.26	-194.1	11.2	31.7	11.2	0.276
		11:30:00	5	24.41	167.4	13.97	9.15	-187.7	12.5	34.3	8.4	0.276
BM-8	8/15/2017	11:28:57	10	23.55	134.3	11.39	8.85	-170.5	19	23.2	7.6	0.291
		11:27:56	15	22.19	114	9.93	8.6	-155.5	26.5	30.3	6.7	0.310
		11:26:34	20	20.32	103.1	9.3	8.32	-139	37.2	44.3	4.8	0.355
		11:25:04	22	20.16	102.7	9.3	8.33	-140	37.8	90	5.2	0.363
		13:21:09	0.5	23.35	167.4	14.25	9.11	-185.1	33.5	39.3	6.6	0.289
BM-8	9/5/2017	13:20:36	5	22.01	143.5	12.54	9.01	-178.8	37.7	35.8	8	0.282
		13:20:00	10	21.33	119.7	10.6	8.85	-169.7	43.5	21.8	5	0.282
		13:19:00	15	20.53	117.7	10.58	8.81	-167	47.8	14.6	3.4	0.282
		13:18:13	20	19.71	118.1	10.79	8.74	-162.5	53.4	23.1	2.3	0.295
		10:28:09	0.5	16.11	121.9	11.99	8.37	-141	152.6	8.2	7.6	0.360
		10:27:19	5	16.04	121.4	11.96	8.36	-140.2	153.7	6.8	16.2	0.359
		10:25:33	10	15.96	118.5	11.7	8.31	-137.4	156.5	8.5	18.6	0.357
BM-9	5/9/2017	10:24:35	15	15.82	113.8	11.26	8.26	-134.8	158.6	6.9	17.5	0.354
		10:22:21	20	14.9	79	7.97	7.89	-114.2	173.7	10.7	7.4	0.373
		10:20:12	25	14.12	72.7	7.46	7.88	-113.4	178.7	33.1	7.1	0.355
		10:18:31	30	13.24	35.9	3.75	7.81	-109.7	186.3	46	5.7	0.360
		10:16:51	32	12.95	28.2	2.97	7.85	-111.6	189.1	55.3	6.3	0.351
		10:35:46	0.5	26.24	110.5	8.92	8.04	-124.8	71	4.7	1.8	0.404
		10:34:57	5	26.22	108.8	8.79	8.03	-123.9	70.4	5.6	3.1	0.403
		10:34:05	10	25.84	89.7	7.29	7.91	-117.3	73.4	9.3	4.2	0.413
BM-9	6/20/2017	10:33:16	15	20.75	42	3.76	7.52	-94.4	87.8	7.7	4.9	0.434
		10:32:21	20	18.34	27.5	2.59	7.5	-93	88.6	6.4	3.1	0.396
		10:30:47	25	17.01	11.4	1.1	7.49	-92.4	89.8	9.9	3	0.391
		10:29:23	30	16.08	3.4	0.33	7.51	-93.5	88.1	16.9	2.1	0.380
		10:28:39	32	15.7	4	0.4	7.54	-94.9	85.3	18.8	2.7	0.376
		10:37:12	0.5	27.55	176.3	13.9	8.9	-174.5	28.9	18.8	15.9	0.330
		10:35:52	5	27.06	151.6	12.06	8.7	-162.9	31.5	18.1	9.6	0.328
BM-9	7/18/2017	10:34:26	10	25.27	130.9	10.76	8.35	-142.4	40.3	12.3	3.3	0.319
		10:33:29	15	23.27	92.7	7.9	7.9	-116.2	54.5	16.8	2.7	0.313
		10:32:08	20	21.79	58.7	5.15	7.64	-101	63.2	18.2	3.1	0.316
		10:30:20	25	21.04	79.2	7.05	7.82	-111.5	57	50.3	2.5	0.340
		10:27:41	30	20.49	61.3	5.52	7.78	-108.8	53.9	61.4	1.7	0.330

2017 Blue Marsh Stratification/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
		10:36:54	0.5	24.39	164.7	13.76	9.12	-185.7	10.8	44.6	11.5	0.282
		10:35:58	5	24.43	160.6	13.4	9.06	-182.5	10.7	36.3	11.1	0.283
		10:34:16	10	23.43	106	9.01	8.51	-151	22.1	17.3	6.2	0.307
		10:32:52	15	22.09	107	9.33	8.35	-141.2	27	30.4	5.8	0.297
BM-9	8/15/2017	10:31:44	20	20.85	103.4	9.24	8.16	-130.5	33.3	36.1	3.8	0.319
		10:30:34	25	19.03	81.9	7.58	7.87	-113.7	43	61.3	2.9	0.358
		10:29:15	30	18.98	81.1	7.52	7.89	-115.1	40.5	92.7	3.9	0.360
		10:27:55	32	19	80.6	7.47	7.93	-117.2	42.6	118	3.2	0.359
		12:36:16	0.5	22.52	161	13.93	9.03	-180.1	18.6	41.7	13.6	0.284
		12:35:26	5	21.69	123.1	10.82	8.81	-167.4	23.7	24.9	6.6	0.283
BM-9		12:34:57	10	21.17	116.8	10.37	8.74	-163.2	25.6	16.6	5.8	0.283
	9/5/2017	12:33:53	15	20.51	113.5	10.21	8.62	-156.3	29.6	13.6	5.7	0.292
		12:33:06	20	19.95	117.4	10.68	8.59	-154.2	31.4	16.7	5.5	0.298
		12:31:05	25	17.5	97.8	9.34	8.12	-127.3	48.1	53.2	3.8	0.395
		12:28:07	30	17.22	86.6	8.32	8.13	-127.7	49.2	91.9	5.1	0.388
		10:52:59	0.5	15.7	121.2	12.03	8.32	-137.9	182.8	9.4	15.1	0.379
		10:52:00	5	15.6	119.6	11.89	8.29	-136.6	185.2	10.5	19.1	0.378
BM-10	5/9/2017	10:50:48	10	15.14	110.6	11.1	8.22	-132.7	190.1	11.4	13.2	0.374
		10:49:27	15	13.41	98.4	10.26	8.1	-125.2	198.3	17.7	5.7	0.355
		10:47:40	20	13.18	97.8	10.25	8.1	-125.3	203.8	41	4.6	0.355
		11:09:33	0.5	26.53	123.4	9.91	8.29	-139.3	87.7	9.2	3.6	0.411
BM-10	6/20/2017	11:08:30	5	26.52	121.4	9.75	8.23	-135.9	89.7	8.7	3.5	0.412
		11:07:01	10	24.88	90	7.45	7.82	-111.9	105	15.5	5.7	0.442
		11:05:52	15	19.69	21.8	1.99	7.5	-92.9	119	34.8	4	0.468
		11:03:16	20	17.73	14.2	1.35	7.53	-94.3	123	52.6	3.7	0.421
		11:00:57	0.5	27.75	230.5	18.11	9.21	-192.5	27.4	27.6	9.2	0.316
BM-10		11:00:04	5	26.9	190.7	15.22	8.93	-176	34.6	32.1	6.6	0.314
	7/18/2017	10:59:10	10	25.46	177.3	14.52	8.82	-169.1	37	18	4.8	0.315
		10:58:22	15	21.38	100.8	8.91	8.08	-126.2	59.2	55.7	3.2	0.347
		10:57:23	20	20.85	94.6	8.45	8.04	-123.5	60.3	125.9	3.4	0.365
		11:05:26	0.5	24.53	178.5	14.87	9.22	-192	14.3	40.4	10.2	0.276
BM-10		11:04:01	5	24.03	176.1	14.81	9.12	-185.8	17	36.4	8.1	0.283
	8/15/2017	11:02:12	10	22.84	166.2	14.29	8.95	-175.8	20.1	37.6	7.4	0.289
		11:01:02	15	18.19	96	9.05	8.03	-122.6	45.8	81.1	2.9	0.387
		10:56:25	20	18.07	93.5	8.82	8.07	-125	43.8	118.2	1.4	0.390
		13:00:05	0.5	23.05	187.7	16.07	9.08	-183.1	16.5	55.6	11.6	0.292
BM-10		12:59:17	5	21.54	142.7	12.58	8.82	-168	22.2	27	4.7	0.287
	9/5/2017	12:58:37	10	21	136.8	12.19	8.7	-160.9	25	23.4	6.1	0.295
		12:58:02	15	19.05	117.6	10.89	8.33	-139.3	36.6	29.1	1.6	0.385
		12:57:04	20	17.52	97.3	9.29	8.09	-125.7	44.6	94.2	2.9	0.467

2017 Blue Marsh Stratification/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
BM-11	5/9/2017	12:19:19	0.5	11.17	107.3	11.78	8.27	-134.4	177	6.4	1.8	0.115
	6/20/2017	12:32:57	0.5	21.01	87	7.75	7.89	-115.4	105.8	45.4	1.8	0.408
	7/18/2017	12:21:46	1.0	19.14	105.1	9.72	7.95	-118.1	76.5	57.1	2.8	0.170
	8/15/2017	12:23:15	1.0	17.64	98.2	9.36	8.07	-124.7	46.1	10.4	0	0.161
	9/5/2017	14:06:58	1.0	17.71	108.8	10.35	8.21	-132.5	47.5	7.5	0.4	0.282

APPENDIX B

BACTERIA SAMPLING DATA TABLES

BLUE MARSH RESERVOIR SWIMMING BEACH MONITORING PROGRAM RESULTS
Fecal/e-coli Coliform 2017

		FECAL COLIFORM				E-COLI			
DAY	DATE	SB1	SB2	SB3	Arith. AVG.&LOG	SB1	SB2	SB3	Ave./LOG
Mon.	8-May	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00
Thur.	11-May	2.00	6.00	2.00	3.33	1.00	2.00	1.00	1.33
Mon.	16-May	36.00	8.00	8.00	17.33	24.00	3.00	6.00	11.00
Thur.	18-May	2.00	2.00	8.00	4.00	1.00	1.00	8.00	3.33
Mon.	22-May	5.00	2.00	2.00	3.00	3.00	1.00	1.00	1.67
5 smpl. Log Value		0.63	0.52	0.54	0.63	0.37	0.16	0.34	0.38
5 smpl. Geo. Mean		4.28	3.29	3.48	4.25	2.35	1.43	2.17	2.41
Thur.	25-May	2.00	10.00	2.00	4.67	1.00	4.00	2.00	2.33
5 smpl. Log Value		0.63	0.66	0.54	0.70	0.37	0.28	0.40	0.46
5 smpl. Geo. Mean		4.28	4.54	3.48	5.03	2.35	1.89	2.49	2.86
Teus.	30-May	3.00	10.00	10.00	7.67	1.00	4.00	7.00	4.00
5 smpl. Log Value		0.67	0.70	0.68	0.77	0.37	0.34	0.57	0.55
5 smpl. Geo. Mean		4.64	5.02	4.80	5.95	2.35	2.17	3.68	3.56
Thur.	1-Jun	3.00	5.00	2.00	3.33	1.00	3.00	2.00	2.00
5 smpl. Log Value		0.45	0.66	0.56	0.63	0.10	0.34	0.47	0.40
5 smpl. Geo. Mean		2.83	4.57	3.64	4.28	1.25	2.17	2.95	2.53
Mon.	5-Jun	8.00	3.00	2.00	4.33	4.00	3.00	2.00	3.00
5 smpl. Log Value		0.57	0.70	0.44	0.64	0.22	0.43	0.35	0.39
5 smpl. Geo. Mean		3.73	4.96	2.76	4.35	1.64	2.70	2.24	2.48
Thur.	8-Jun	16.00	8.00	13.00	12.33	9.00	4.00	6.00	6.33
5 smpl. Log Value		0.67	0.82	0.60	0.76	0.31	0.55	0.51	0.51
5 smpl. Geo. Mean		4.70	6.54	4.01	5.77	2.05	3.57	3.20	3.24
Mon.	12-Jun	30.00	31.00	28.00	29.67	5.00	8.00	13.00	8.67
5 smpl. Log Value		0.91	0.91	0.83	0.92	0.45	0.61	0.67	0.62
5 smpl. Geo. Mean		8.09	8.21	6.80	8.35	2.83	4.10	4.65	4.21
Thur.	15-Jun	38.00	28.00	21.00	29.00	38.00	28.00	30.00	32.00

5 smpl. Log Value		1.13	1.00	0.90	1.04	0.77	0.78	0.79	0.80
5 smpl. Geo. Mean		13.44	10.08	7.89	10.89	5.85	6.04	6.23	6.38
Mon.	19-Jun	11.00	24.00	16.00	17.00	10.00	19.00	16.00	15.00
5 smpl. Log Value		1.24	1.14	1.08	1.18	0.97	0.94	0.97	0.98
5 smpl. Geo. Mean		17.42	13.80	11.96	15.09	9.27	8.74	9.44	9.54
Thur.	22-Jun	5.00	6.00	8.00	6.33	3.00	5.00	5.00	4.33
5 smpl. Log Value		1.20	1.20	1.20	1.21	0.94	0.99	1.05	1.01
5 smpl. Geo. Mean		15.86	15.85	15.78	16.28	8.75	9.68	11.34	10.27
Mon.	26-Jun	15.00	23.00	11.00	16.33	11.00	17.00	5.00	11.00
5 smpl. Log Value		1.19	1.29	1.18	1.24	0.96	1.11	1.04	1.06
5 smpl. Geo. Mean		15.66	19.58	15.26	17.22	9.11	12.93	10.93	11.47
Thur.	29-Jun	6.00	10.00	11.00	9.00	4.00	4.00	5.00	4.33
5 smpl. Log Value		1.05	1.19	1.10	1.13	0.94	1.05	0.96	1.00
5 smpl. Geo. Mean		11.35	15.61	12.66	13.56	8.71	11.26	9.03	9.98
Mon.	3-Jul	6.00	15.00	3.00	8.00	3.00	11.00	3.00	5.67
5 smpl. Log Value		0.89	1.14	0.93	1.02	0.72	0.97	0.76	0.85
5 smpl. Geo. Mean		7.84	13.78	8.58	10.48	5.24	9.34	5.70	7.06
Thur.	6-Jul	5.00	28.00	30.00	21.00	3.00	17.00	25.00	15.00
5 smpl. Log Value		0.83	1.15	0.99	1.04	0.61	0.96	0.79	0.85
5 smpl. Geo. Mean		6.70	14.21	9.73	10.94	4.12	9.13	6.23	7.06
Mon.	10-Jul	5.00	110.00	5.00	40.00	2.00	91.00	4.00	32.33
5 smpl. Log Value		0.83	1.41	0.95	1.20	0.58	1.21	0.78	1.02
5 smpl. Geo. Mean		6.70	25.43	8.86	15.81	3.80	16.32	5.96	10.55
Thur.	13-Jul	3.00	10.00	6.00	6.33	2.00	8.00	1.00	3.67
5 smpl. Log Value		0.69	1.33	0.89	1.12	0.43	1.15	0.64	0.93
5 smpl. Geo. Mean		4.86	21.52	7.84	13.08	2.70	14.03	4.32	8.47
Mon.	17-Jul	23.00	11.00	11.00	15.00	19.00	7.00	8.00	11.33
5 smpl. Log Value		0.80	1.34	0.89	1.16	0.57	1.20	0.68	1.01
5 smpl. Geo. Mean		6.35	21.94	7.84	14.49	3.69	15.70	4.74	10.27
Thur.	20-Jul	21.00	21.00	34.00	25.33	19.00	16.00	22.00	19.00
5 smpl. Log Value		0.91	1.37	1.11	1.26	0.73	1.23	0.85	1.12
5 smpl. Geo. Mean		8.16	23.47	12.75	18.24	5.34	16.92	7.06	13.08
Mon.	24-Jul	100.00	130.00	230.00	153.33	75.00	110.00	110.00	98.33
5 smpl. Log Value		1.17	1.50	1.28	1.43	1.01	1.39	0.98	1.28

BLUE MARSH BEACH BACTERIA DATA

5 smpl. Geo. Mean		14.86	31.90	19.16	27.15	10.16	24.58	9.50	19.05
Thur.	27-Jul	5.00	6.00	13.00	8.00	4.00	4.00	12.00	6.67
5 smpl. Log Value		1.17	1.25	1.37	1.29	1.07	1.12	1.07	1.14
5 smpl. Geo. Mean		14.86	17.83	23.19	19.68	11.67	13.16	11.84	13.89
Mon.	31-Jul	6.00	13.00	10.00	9.67	6.00	11.00	3.00	6.67
5 smpl. Log Value		1.23	1.27	1.41	1.33	1.16	1.15	1.17	1.19
5 smpl. Geo. Mean		17.07	18.79	25.69	21.42	14.54	14.02	14.74	15.66
Thur.	3-Aug	21.00	86.00	120.00	75.67	20.00	57.00	59.00	45.33
5 smpl. Log Value		1.22	1.45	1.62	1.47	1.17	1.33	1.34	1.32
5 smpl. Geo. Mean		16.76	28.35	41.43	29.60	14.69	21.33	21.99	20.66
Mon.	7-Aug	8.00	13.00	15.00	12.00	6.00	13.00	12.00	10.33
5 smpl. Log Value		1.14	1.41	1.55	1.41	1.07	1.31	1.29	1.26
5 smpl. Geo. Mean		13.82	25.76	35.17	25.49	11.67	20.46	19.48	18.29
Thur.	10-Aug	8.00	5.00	11.00	8.00	2.00	2.00	3.00	2.33
5 smpl. Log Value		0.92	1.13	1.28	1.15	0.75	0.96	0.98	0.94
5 smpl. Geo. Mean		8.34	13.42	19.15	14.12	5.65	9.18	9.48	8.66
Mon.	14-Aug	10.00	3.00	13.00	8.67	5.00	1.00	4.00	3.33
5 smpl. Log Value		0.98	1.07	1.28	1.16	0.77	0.84	0.88	0.88
5 smpl. Geo. Mean		9.58	11.69	19.15	14.35	5.91	6.96	7.61	7.54
Thur.	17-Aug	24.00	110.00	18.00	50.67	16.00	80.00	16.00	37.33
5 smpl. Log Value		1.10	1.25	1.33	1.30	0.86	1.01	1.03	1.03
5 smpl. Geo. Mean		12.64	17.91	21.54	19.99	7.19	10.35	10.63	10.63
Mon.	21-Aug	15.00	13.00	40.00	22.67	13.00	7.00	26.00	15.33
5 smpl. Log Value		1.07	1.09	1.24	1.20	0.82	0.83	0.96	0.93
5 smpl. Geo. Mean		11.82	12.28	17.29	15.71	6.60	6.80	9.03	8.56
Thur.	24-Aug	10.00	8.00	20.00	12.67	7.00	3.00	9.00	6.33
5 smpl. Log Value		1.09	1.05	1.26	1.20	0.83	0.71	0.93	0.89
5 smpl. Geo. Mean		12.36	11.14	18.31	15.88	6.80	5.07	8.52	7.76
Mon.	28-Aug	6.00	20.00	8.00	11.33	4.00	14.00	5.00	7.67
5 smpl. Log Value		1.07	1.17	1.24	1.23	0.89	0.87	0.97	0.99
5 smpl. Geo. Mean		11.67	14.70	17.18	17.02	7.81	7.49	9.44	9.85
Thur.	31-Aug	3.00	2.00	3.00	2.67	3.00	1.00	3.00	2.33
5 smpl. Log Value		0.96	1.13	1.11	1.13	0.85	0.87	0.95	0.96
5 smpl. Geo. Mean		9.17	13.55	12.81	13.45	7.05	7.49	8.91	9.17

BLUE MARSH BEACH BACTERIA DATA

APPENDIX C

LABORATORY CUSTODY SHEETS

Certificate of Analysis

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

Laboratory No.: 7007295
Report: 05/22/17
Lab Contact: Richard Wheeler

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

Project Info: 6223 - Seasonal Monthly Blue Marsh Reservoir

Lab ID: 7007295-01 **Collected By:** Client **Sampled:** 05/09/17 12:55 **Received:** 05/09/17 13:58
Sample Desc: BM-1 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	05/10/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	119	mg/l	2	SM 2320 B	05/18/17		AEH
Nitrogen, Ammonia	0.16	mg/l	0.05	ASTM D6919-03	05/09/17		JCL
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	05/09/17	C-05	KAL
Nitrogen, Nitrate	4.53	mg/l	0.10	EPA 353.2	05/10/17 11:02		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	05/10/17 9:07		JLARESE
Nitrogen, Total Kjeldahl (TKN)	0.62	mg/l	0.25	EPA 351.2	05/12/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	05/10/17 17:00		AEH
Phosphorus as P, Total	<0.01	mg/l	0.01	SM 4500-P E	05/10/17		AEH
Solids, Total Dissolved	176	mg/l	5	SM 2540 C	05/11/17		TMH
Total Organic Carbon	2.2	mg/l	0.5	SM 5310 C	05/10/17		ALD
Solids, Total Suspended	5	mg/l	1	SM 2540 D	05/11/17		TMH

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	<2	/100ml	2	SM 9222 D	05/09/17 14:15		TNS
Total Coliform	200	mpn/100ml	1	SM 9223 B	05/09/17 16:20		PLW

Lab ID: 7007295-02 **Collected By:** Client **Sampled:** 05/09/17 09:20 **Received:** 05/09/17 13:58
Sample Desc: BM-2 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	05/10/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	118	mg/l	2	SM 2320 B	05/18/17		AEH
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	05/09/17		JCL
Biochemical Oxygen Demand	3	mg/l	2	SM 5210 B	05/09/17		KAL
Nitrogen, Nitrate	4.77	mg/l	0.10	EPA 353.2	05/10/17 11:03		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	05/10/17 9:10		JLARESE
Nitrogen, Total Kjeldahl (TKN)	0.64	mg/l	0.25	EPA 351.2	05/12/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	05/10/17 17:00		AEH
Phosphorus as P, Total	0.01	mg/l	0.01	SM 4500-P E	05/10/17		AEH
Solids, Total Dissolved	240	mg/l	5	SM 2540 C	05/11/17		TMH
Total Organic Carbon	2.7	mg/l	0.5	SM 5310 C	05/10/17		ALD
Solids, Total Suspended	6	mg/l	1	SM 2540 D	05/11/17		TMH

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	<2	/100ml	2	SM 9222 D	05/09/17 14:45		TNS
Total Coliform	26	mpn/100ml	1	SM 9223 B	05/09/17 16:20		PLW

Lab ID: 7007295-03 **Collected By:** Client **Sampled:** 05/09/17 09:20 **Received:** 05/09/17 13:58
Sample Desc: BM-2 Mid-Depth **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	05/10/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	115	mg/l	2	SM 2320 B	05/18/17		AEH
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	05/09/17		JCL
Biochemical Oxygen Demand	2	mg/l	2	SM 5210 B	05/09/17	C-05	KAL
Nitrogen, Nitrate	4.81	mg/l	0.10	EPA 353.2	05/10/17 11:07		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	05/10/17 9:11		JLARESE
Nitrogen, Total Kjeldahl (TKN)	0.58	mg/l	0.25	EPA 351.2	05/12/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	05/10/17 17:00		AEH
Phosphorus as P, Total	0.03	mg/l	0.01	SM 4500-P E	05/10/17		AEH
Solids, Total Dissolved	256	mg/l	5	SM 2540 C	05/11/17		TMH
Total Organic Carbon	2.2	mg/l	0.5	SM 5310 C	05/10/17		ALD
Solids, Total Suspended	6	mg/l	1	SM 2540 D	05/11/17		TMH

Lab ID: 7007295-04 **Collected By:** Client **Sampled:** 05/09/17 09:20 **Received:** 05/09/17 13:58
Sample Desc: BM-2 Deep **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	05/10/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	120	mg/l	2	SM 2320 B	05/18/17		AEH
Nitrogen, Ammonia	0.44	mg/l	0.05	ASTM D6919-03	05/09/17		JCL
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	05/09/17	C-05	KAL
Nitrogen, Nitrate	3.10	mg/l	0.05	EPA 353.2	05/10/17 10:33		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	05/10/17 9:12		JLARESE
Nitrogen, Total Kjeldahl (TKN)	0.34	mg/l	0.25	EPA 351.2	05/12/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	05/10/17 17:00		AEH
Phosphorus as P, Total	0.02	mg/l	0.01	SM 4500-P E	05/10/17		AEH
Solids, Total Dissolved	122	mg/l	5	SM 2540 C	05/11/17		TMH
Total Organic Carbon	2.3	mg/l	0.5	SM 5310 C	05/10/17		ALD
Solids, Total Suspended	8	mg/l	1	SM 2540 D	05/11/17		TMH

Lab ID: 7007295-05 **Collected By:** Client **Sampled:** 05/09/17 12:20 **Received:** 05/09/17 13:58
Sample Desc: BM-5 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	0.05	mg/l	0.05	SM 4500-P E	05/10/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	210	mg/l	2	SM 2320 B	05/18/17		AEH
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	05/09/17		JCL
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	05/09/17	C-05	KAL
Nitrogen, Nitrate	7.73	mg/l	0.25	EPA 353.2	05/10/17 11:08		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	05/10/17 9:13		JLARESE
Nitrogen, Total Kjeldahl (TKN)	<0.25	mg/l	0.25	EPA 351.2	05/12/17		RES
Phosphate as P, Ortho	0.01	mg/l	0.01	SM 4500-P E	05/10/17 17:00		AEH
Phosphorus as P, Total	0.06	mg/l	0.01	SM 4500-P E	05/10/17		AEH
Solids, Total Dissolved	313	mg/l	5	SM 2540 C	05/11/17		TMH
Total Organic Carbon	1.5	mg/l	0.5	SM 5310 C	05/10/17		ALD
Solids, Total Suspended	<3	mg/l	3	SM 2540 D	05/11/17		TMH

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	82	/100ml	2	SM 9222 D	05/09/17 14:45		TNS
Total Coliform	>2400	mpn/100ml	1	SM 9223 B	05/09/17 16:20		PLW

Lab ID: 7007295-06 **Collected By:** Client **Sampled:** 05/09/17 08:20 **Received:** 05/09/17 13:58
Sample Desc: BM-6 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	05/10/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	114	mg/l	2	SM 2320 B	05/18/17		AEH
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	05/09/17		JCL
Biochemical Oxygen Demand	3	mg/l	2	SM 5210 B	05/09/17		KAL
Nitrogen, Nitrate	4.76	mg/l	0.10	EPA 353.2	05/10/17 11:09		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	05/10/17 9:14		JLARESE
Nitrogen, Total Kjeldahl (TKN)	0.65	mg/l	0.25	EPA 351.2	05/12/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	05/10/17 17:00		AEH
Phosphorus as P, Total	0.02	mg/l	0.01	SM 4500-P E	05/10/17		AEH
Solids, Total Dissolved	213	mg/l	5	SM 2540 C	05/11/17		TMH
Total Organic Carbon	2.5	mg/l	0.5	SM 5310 C	05/10/17		ALD
Solids, Total Suspended	6	mg/l	1	SM 2540 D	05/11/17		TMH

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	<2	/100ml	2	SM 9222 D	05/09/17 14:45		TNS
Total Coliform	19	mpn/100ml	1	SM 9223 B	05/09/17 16:20		PLW

Lab ID: 7007295-07 **Collected By:** Client **Sampled:** 05/09/17 08:20 **Received:** 05/09/17 13:58
Sample Desc: BM-6 Mid-Depth **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	05/10/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	123	mg/l	2	SM 2320 B	05/18/17		AEH
Nitrogen, Ammonia	0.14	mg/l	0.05	ASTM D6919-03	05/09/17		JCL
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	05/09/17	C-05	KAL
Nitrogen, Nitrate	4.99	mg/l	0.10	EPA 353.2	05/10/17 11:10		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	05/10/17 9:15		JLARESE
Nitrogen, Total Kjeldahl (TKN)	0.52	mg/l	0.25	EPA 351.2	05/12/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	05/10/17 17:00		AEH
Phosphorus as P, Total	0.04	mg/l	0.01	SM 4500-P E	05/10/17		AEH
Solids, Total Dissolved	251	mg/l	5	SM 2540 C	05/11/17		TMH
Total Organic Carbon	1.9	mg/l	0.5	SM 5310 C	05/10/17		ALD
Solids, Total Suspended	<3	mg/l	3	SM 2540 D	05/11/17		TMH

Lab ID: 7007295-08 **Collected By:** Client **Sampled:** 05/09/17 08:20 **Received:** 05/09/17 13:58
Sample Desc: BM-6 Deep **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	05/10/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	122	mg/l	2	SM 2320 B	05/18/17		AEH
Nitrogen, Ammonia	0.39	mg/l	0.05	ASTM D6919-03	05/09/17		JCL
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	05/09/17	C-05	KAL
Nitrogen, Nitrate	3.48	mg/l	0.05	EPA 353.2	05/10/17 10:37		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	05/10/17 9:16		JLARESE
Nitrogen, Total Kjeldahl (TKN)	0.87	mg/l	0.25	EPA 351.2	05/12/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	05/10/17 17:00		AEH
Phosphorus as P, Total	0.03	mg/l	0.01	SM 4500-P E	05/10/17		AEH
Solids, Total Dissolved	220	mg/l	5	SM 2540 C	05/11/17		TMH
Total Organic Carbon	2.4	mg/l	0.5	SM 5310 C	05/10/17		ALD
Solids, Total Suspended	3	mg/l	1	SM 2540 D	05/11/17		TMH

Lab ID: 7007295-09 **Collected By:** Client **Sampled:** 05/09/17 09:45 **Received:** 05/09/17 13:58
Sample Desc: BM-7 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	05/10/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	133	mg/l	2	SM 2320 B	05/18/17		AEH
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	05/09/17		JCL
Biochemical Oxygen Demand	3	mg/l	2	SM 5210 B	05/09/17		KAL
Nitrogen, Nitrate	4.94	mg/l	0.10	EPA 353.2	05/10/17 11:11		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	05/10/17 9:19		JLARESE
Nitrogen, Total Kjeldahl (TKN)	0.65	mg/l	0.25	EPA 351.2	05/12/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	05/10/17 17:00		AEH
Phosphorus as P, Total	0.01	mg/l	0.01	SM 4500-P E	05/10/17		AEH
Solids, Total Dissolved	203	mg/l	5	SM 2540 C	05/11/17		TMH
Total Organic Carbon	2.6	mg/l	0.5	SM 5310 C	05/10/17		ALD
Solids, Total Suspended	5	mg/l	1	SM 2540 D	05/11/17		TMH

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	<2	/100ml	2	SM 9222 D	05/09/17 14:45		TNS
Total Coliform	66	mpn/100ml	1	SM 9223 B	05/09/17 16:20		PLW

Lab ID: 7007295-10 **Collected By:** Client **Sampled:** 05/09/17 09:45 **Received:** 05/09/17 13:58
Sample Desc: BM-7 Mid-Depth **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	05/10/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	124	mg/l	2	SM 2320 B	05/18/17		AEH
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	05/09/17		JCL
Biochemical Oxygen Demand	2	mg/l	2	SM 5210 B	05/09/17	C-05	KAL
Nitrogen, Nitrate	4.86	mg/l	0.10	EPA 353.2	05/10/17 11:12		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	05/10/17 9:20		JLARESE
Nitrogen, Total Kjeldahl (TKN)	0.72	mg/l	0.25	EPA 351.2	05/12/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	05/10/17 17:00		AEH
Phosphorus as P, Total	0.03	mg/l	0.01	SM 4500-P E	05/10/17		AEH
Solids, Total Dissolved	203	mg/l	5	SM 2540 C	05/11/17		TMH
Total Organic Carbon	2.4	mg/l	0.5	SM 5310 C	05/10/17		ALD
Solids, Total Suspended	5	mg/l	1	SM 2540 D	05/11/17		TMH

Lab ID: 7007295-11 **Collected By:** Client **Sampled:** 05/09/17 09:45 **Received:** 05/09/17 13:58
Sample Desc: BM-7 Deep **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	0.06	mg/l	0.05	SM 4500-P E	05/10/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	126	mg/l	2	SM 2320 B	05/18/17		AEH
Nitrogen, Ammonia	0.14	mg/l	0.05	ASTM D6919-03	05/09/17		JCL
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	05/09/17	C-05	KAL
Nitrogen, Nitrate	4.75	mg/l	0.10	EPA 353.2	05/10/17 11:13		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	05/10/17 9:21		JLARESE
Nitrogen, Total Kjeldahl (TKN)	0.48	mg/l	0.25	EPA 351.2	05/12/17		RES
Phosphate as P, Ortho	0.02	mg/l	0.01	SM 4500-P E	05/10/17 17:00		AEH
Phosphorus as P, Total	0.07	mg/l	0.01	SM 4500-P E	05/10/17		AEH
Solids, Total Dissolved	261	mg/l	5	SM 2540 C	05/11/17		TMH
Total Organic Carbon	2.2	mg/l	0.5	SM 5310 C	05/10/17		ALD
Solids, Total Suspended	9	mg/l	1	SM 2540 D	05/11/17		TMH

Lab ID: 7007295-12 **Collected By:** Client **Sampled:** 05/09/17 11:10 **Received:** 05/09/17 13:58
Sample Desc: BM-8 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	05/10/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	119	mg/l	2	SM 2320 B	05/18/17		AEH
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	05/09/17		JCL
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	05/09/17	C-05	KAL
Nitrogen, Nitrate	4.71	mg/l	2.00	EPA 353.2	05/10/17 11:14		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	05/10/17 9:23		JLARESE
Nitrogen, Total Kjeldahl (TKN)	0.53	mg/l	0.25	EPA 351.2	05/12/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	05/10/17 17:10		AEH
Phosphorus as P, Total	0.02	mg/l	0.01	SM 4500-P E	05/10/17		AEH
Solids, Total Dissolved	193	mg/l	5	SM 2540 C	05/11/17		TMH
Total Organic Carbon	2.5	mg/l	0.5	SM 5310 C	05/10/17		ALD
Solids, Total Suspended	3	mg/l	1	SM 2540 D	05/11/17		TMH

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	10	/100ml	2	SM 9222 D	05/09/17 14:45		TNS
Total Coliform	290	mpn/100ml	1	SM 9223 B	05/09/17 16:20		PLW

Lab ID: 7007295-13 **Collected By:** Client **Sampled:** 05/09/17 11:10 **Received:** 05/09/17 13:58
Sample Desc: BM-8 Mid-Depth **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	05/10/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	119	mg/l	2	SM 2320 B	05/18/17		AEH
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	05/09/17		JCL
Biochemical Oxygen Demand	2	mg/l	2	SM 5210 B	05/09/17	C-05	KAL
Nitrogen, Nitrate	4.73	mg/l	0.10	EPA 353.2	05/10/17 11:19		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	05/10/17 9:24		JLARESE
Nitrogen, Total Kjeldahl (TKN)	0.61	mg/l	0.25	EPA 351.2	05/12/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	05/10/17 17:10		AEH
Phosphorus as P, Total	0.02	mg/l	0.01	SM 4500-P E	05/10/17		AEH
Solids, Total Dissolved	220	mg/l	5	SM 2540 C	05/11/17		TMH
Total Organic Carbon	2.1	mg/l	0.5	SM 5310 C	05/11/17		ALD
Solids, Total Suspended	3	mg/l	1	SM 2540 D	05/11/17		TMH

Lab ID: 7007295-14 **Collected By:** Client **Sampled:** 05/09/17 11:10 **Received:** 05/09/17 13:58
Sample Desc: BM-8 Deep **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	05/10/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	99	mg/l	2	SM 2320 B	05/18/17		AEH
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	05/09/17		JCL
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	05/09/17	C-05	KAL
Nitrogen, Nitrate	3.83	mg/l	0.05	EPA 353.2	05/10/17 10:48		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	05/10/17 9:25		JLARESE
Nitrogen, Total Kjeldahl (TKN)	0.41	mg/l	0.25	EPA 351.2	05/12/17		RES
Phosphate as P, Ortho	0.01	mg/l	0.01	SM 4500-P E	05/10/17 17:10		AEH
Phosphorus as P, Total	0.05	mg/l	0.01	SM 4500-P E	05/10/17		AEH
Solids, Total Dissolved	230	mg/l	5	SM 2540 C	05/11/17		TMH
Total Organic Carbon	2.2	mg/l	0.5	SM 5310 C	05/11/17		ALD
Solids, Total Suspended	11	mg/l	1	SM 2540 D	05/11/17		TMH

Lab ID: 7007295-15 **Collected By:** Client **Sampled:** 05/09/17 10:10 **Received:** 05/09/17 13:58
Sample Desc: BM-9 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	05/10/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	137	mg/l	2	SM 2320 B	05/18/17		AEH
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	05/09/17		JCL
Biochemical Oxygen Demand	2	mg/l	2	SM 5210 B	05/09/17	C-05	KAL
Nitrogen, Nitrate	5.10	mg/l	0.10	EPA 353.2	05/10/17 11:21		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	05/10/17 9:26		JLARESE
Nitrogen, Total Kjeldahl (TKN)	0.55	mg/l	0.25	EPA 351.2	05/12/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	05/10/17 17:10		AEH
Phosphorus as P, Total	0.02	mg/l	0.01	SM 4500-P E	05/10/17		AEH
Solids, Total Dissolved	188	mg/l	5	SM 2540 C	05/11/17		TMH
Total Organic Carbon	2.3	mg/l	0.5	SM 5310 C	05/11/17		ALD
Solids, Total Suspended	5	mg/l	1	SM 2540 D	05/11/17		TMH

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	10	/100ml	2	SM 9222 D	05/09/17 14:45		TNS
Total Coliform	230	mpn/100ml	1	SM 9223 B	05/09/17 16:20		PLW

Lab ID: 7007295-16 **Collected By:** Client **Sampled:** 05/09/17 10:10 **Received:** 05/09/17 13:58
Sample Desc: BM-9 Mid-Depth **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	05/10/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	131	mg/l	2	SM 2320 B	05/18/17		AEH
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	05/09/17		JCL
Biochemical Oxygen Demand	4	mg/l	2	SM 5210 B	05/09/17		KAL
Nitrogen, Nitrate	4.95	mg/l	0.10	EPA 353.2	05/10/17 11:22		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	05/10/17 9:27		JLARESE
Nitrogen, Total Kjeldahl (TKN)	0.54	mg/l	0.25	EPA 351.2	05/12/17		RES
Phosphate as P, Ortho	0.01	mg/l	0.01	SM 4500-P E	05/10/17 17:10		AEH
Phosphorus as P, Total	0.04	mg/l	0.01	SM 4500-P E	05/10/17		AEH
Solids, Total Dissolved	216	mg/l	5	SM 2540 C	05/11/17		TMH
Total Organic Carbon	2.2	mg/l	0.5	SM 5310 C	05/11/17		ALD
Solids, Total Suspended	4	mg/l	1	SM 2540 D	05/11/17		TMH

Lab ID: 7007295-17 **Collected By:** Client **Sampled:** 05/09/17 10:10 **Received:** 05/09/17 13:58
Sample Desc: BM-9 Deep **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	05/10/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	145	mg/l	2	SM 2320 B	05/18/17		AEH
Nitrogen, Ammonia	0.20	mg/l	0.05	ASTM D6919-03	05/09/17		JCL
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	05/09/17	C-05	KAL
Nitrogen, Nitrate	4.22	mg/l	0.10	EPA 353.2	05/10/17 11:23		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	05/10/17 9:30		JLARESE
Nitrogen, Total Kjeldahl (TKN)	0.59	mg/l	0.25	EPA 351.2	05/12/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	05/10/17 17:10		AEH
Phosphorus as P, Total	0.07	mg/l	0.01	SM 4500-P E	05/10/17		AEH
Solids, Total Dissolved	227	mg/l	5	SM 2540 C	05/11/17		TMH
Total Organic Carbon	2.0	mg/l	0.5	SM 5310 C	05/11/17		ALD
Solids, Total Suspended	22	mg/l	1	SM 2540 D	05/11/17		TMH

Lab ID: 7007295-18 **Collected By:** Client **Sampled:** 05/09/17 10:40 **Received:** 05/09/17 13:58
Sample Desc: BM-10 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	05/10/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	147	mg/l	2	SM 2320 B	05/18/17		AEH
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	05/09/17		JCL
Biochemical Oxygen Demand	2	mg/l	2	SM 5210 B	05/09/17	C-05	KAL
Nitrogen, Nitrate	5.24	mg/l	0.10	EPA 353.2	05/10/17 11:24		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	05/10/17 9:31		JLARESE
Nitrogen, Total Kjeldahl (TKN)	1.04	mg/l	0.25	EPA 351.2	05/12/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	05/10/17 17:10		AEH
Phosphorus as P, Total	0.05	mg/l	0.01	SM 4500-P E	05/10/17		AEH
Solids, Total Dissolved	235	mg/l	5	SM 2540 C	05/11/17		TMH
Total Organic Carbon	2.3	mg/l	0.5	SM 5310 C	05/11/17		ALD
Solids, Total Suspended	5	mg/l	1	SM 2540 D	05/11/17		TMH

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	42	/100ml	2	SM 9222 D	05/09/17 14:45		TNS
Total Coliform	610	mpn/100ml	1	SM 9223 B	05/09/17 16:20		PLW

Lab ID: 7007295-19 **Collected By:** Client **Sampled:** 05/09/17 10:40 **Received:** 05/09/17 13:58
Sample Desc: BM-10 Mid-Depth **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	0.05	mg/l	0.05	SM 4500-P E	05/10/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	149	mg/l	2	SM 2320 B	05/18/17		AEH
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	05/09/17		JCL
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	05/09/17	C-05	KAL
Nitrogen, Nitrate	5.27	mg/l	0.10	EPA 353.2	05/10/17 11:25		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	05/10/17 9:32		JLARESE
Nitrogen, Total Kjeldahl (TKN)	0.55	mg/l	0.25	EPA 351.2	05/12/17		RES
Phosphate as P, Ortho	0.01	mg/l	0.01	SM 4500-P E	05/10/17 17:10		AEH
Phosphorus as P, Total	0.06	mg/l	0.01	SM 4500-P E	05/10/17		AEH
Solids, Total Dissolved	221	mg/l	5	SM 2540 C	05/11/17		TMH
Total Organic Carbon	2.3	mg/l	0.5	SM 5310 C	05/11/17		ALD
Solids, Total Suspended	10	mg/l	1	SM 2540 D	05/11/17		TMH

Lab ID: 7007295-20 **Collected By:** Client **Sampled:** 05/09/17 10:40 **Received:** 05/09/17 13:58
Sample Desc: BM-10 Deep **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	0.05	mg/l	0.05	SM 4500-P E	05/10/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	139	mg/l	2	SM 2320 B	05/18/17		AEH
Nitrogen, Ammonia	0.11	mg/l	0.05	ASTM D6919-03	05/09/17		JCL
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	05/09/17	C-05	KAL
Nitrogen, Nitrate	5.37	mg/l	0.10	EPA 353.2	05/10/17 11:26		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	05/10/17 9:33		JLARESE
Nitrogen, Total Kjeldahl (TKN)	0.63	mg/l	0.25	EPA 351.2	05/12/17		RES
Phosphate as P, Ortho	0.02	mg/l	0.01	SM 4500-P E	05/10/17 17:10		AEH
Phosphorus as P, Total	0.08	mg/l	0.01	SM 4500-P E	05/10/17		AEH
Solids, Total Dissolved	211	mg/l	5	SM 2540 C	05/11/17		TMH
Total Organic Carbon	2.1	mg/l	0.5	SM 5310 C	05/11/17		ALD
Solids, Total Suspended	38	mg/l	1	SM 2540 D	05/11/17		TMH

M.J. Reider Associates, Inc.

Lab ID: 7007295-21 **Collected By:** Client **Sampled:** 05/09/17 12:25 **Received:** 05/09/17 13:58
Sample Desc: BM-11 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	05/10/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	37	mg/l	2	SM 2320 B	05/18/17		AEH
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	05/09/17		JCL
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	05/09/17	C-05	KAL
Nitrogen, Nitrate	2.16	mg/l	1.00	EPA 353.2	05/10/17 10:57		JLARESE
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	05/10/17 9:36		JLARESE
Nitrogen, Total Kjeldahl (TKN)	<0.25	mg/l	0.25	EPA 351.2	05/12/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	05/10/17 17:10		AEH
Phosphorus as P, Total	0.02	mg/l	0.01	SM 4500-P E	05/10/17		AEH
Solids, Total Dissolved	94	mg/l	5	SM 2540 C	05/11/17		TMH
Total Organic Carbon	1.8	mg/l	0.5	SM 5310 C	05/11/17		ALD
Solids, Total Suspended	<3	mg/l	3	SM 2540 D	05/11/17		TMH

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	28	/100ml	2	SM 9222 D	05/09/17 14:45		TNS
Total Coliform	>2400	mpn/100ml	1	SM 9223 B	05/09/17 16:20		PLW

Notes and Definitions

C-05 The sample did not meet the minimum DO depletion of at least 2 mg/L.

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

WORK ORDER
Chain of Custody

7007295

Client Code: 3157
Project Manager: Richard Wheeler
Client: Tetra Tech
Project: 6223 - Seasonal Monthly Blue Marsh Reservoir
Report To: Tetra Tech - Gregory Wacik - USACE, Phila Dist. Env.Resources Branch 100 Penn Square E., Philadelphia, PA 19107
Invoice To: Tetra Tech - David Wertz - USACE, Phila Dist. Env.Resources Branch 100 Penn Square E., Arlington, VA 22201

Comments:

Collected By : (Full Name) G. WACIK

7007295-01 BM-1 Surface
BOD, FC, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H), TC#s
Alk 2320B, NH3-N, PO4-P H, TDS, TKN, TOC, TSS TNS

Matrix: Non-Potable Water Date: 5/9/17
Type: Grab Time: 1255

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc

7007295-02 BM-2 Surface
BOD, FC, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H), TC#s
Alk 2320B, NH3-N, PO4-P H, TDS, TKN, TOC, TSS TNS

Matrix: Non-Potable Water Date: 5/9/17
Type: Grab Time: 0920

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc

7007295-03 BM-2 Mid-Depth
BOD, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H)
Alk 2320B, NH3-N, PO4-P H, TDS, TKN, TOC, TSS

Matrix: Non-Potable Water Date: 5/9/17
Type: Grab Time: 0920

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Vial Amber 40ml H3PO4, zero hdspc
F - Vial Amber 40ml H3PO4, zero hdspc

Relinquished By	5/9/17 1640 Date/Time	Received By	5/9/17 1316 Date/Time
Relinquished By	Date/Time	Received at Laboratory By	5/9/17 1358 Date/Time

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

Printed: 05/01/17 12:41:48PM

Report Template:

M.J. Reider Associates, Inc.

Client Code: 3157
Project Manager: Richard Wheeler

Client: Tetra Tech
Project: 6223 - Seasonal Monthly Blue Marsh Reservoir

Comments:

Collected By : (Full Name) G. WACIK

7007295-04 BM-2 Deep

BOD, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H)
Alk 2320B, NH3-N, TDS, TKN, TOC, TSS, PO4-P H

Matrix: Non-Potable Water
Type: Grab
Date: 5/9/17
Time: 0920

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Vial Amber 40ml H3PO4, zero hdspc
F - Vial Amber 40ml H3PO4, zero hdspc

7007295-05 BM-5 Surface

NO2 353.2, NO3 353.2, O-PO4 H, BOD, FC, PO4-D(H), TC#s TNTC
PO4-P H, TOC, TSS, Alk 2320B, NH3-N, TDS, TKN

Matrix: Non-Potable Water
Type: Grab
Date: 5/9/17
Time: 1220

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc

7007295-06 BM-6 Surface

BOD, O-PO4 H, PO4-D(H), TC#s, FC, NO2 353.2, NO3 353.2 TNTC
Alk 2320B, PO4-P H, NH3-N, TDS, TKN, TOC, TSS

Matrix: Non-Potable Water
Type: Grab
Date: 5/9/17
Time: 0820

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc

	Date/Time		Date/Time
Relinquished By	5/9/17 1:10	Received By	5/9/17 1316
Relinquished By		Received at Laboratory By	5/9/17 1358

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

Printed: 05/01/17 12:41:48PM

Report Template: wkd workload COC is

M.J. Reider Associates, Inc.

Client Code: 3157
Project Manager: Richard Wheeler

Client: Tetra Tech
Project: 6223 - Seasonal Monthly Blue Marsh Reservoir
Comments:

Collected By : G. WACIK
(Full Name)

7007295-07 BM-6 Mid-Depth

BOD, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H)
Alk 2320B, NH3-N, TDS, TKN, TOC, TSS, PO4-P H

Matrix: Non-Potable Water **Date:** 5/9/17
Type: Grab **Time:** 0820

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Vial Amber 40ml H3PO4, zero hdspc
F - Vial Amber 40ml H3PO4, zero hdspc

7007295-08 BM-6 Deep

BOD, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H)
Alk 2320B, NH3-N, PO4-P H, TDS, TKN, TOC, TSS

Matrix: Non-Potable Water **Date:** 5/9/17
Type: Grab **Time:** 0820

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Vial Amber 40ml H3PO4, zero hdspc
F - Vial Amber 40ml H3PO4, zero hdspc

7007295-09 BM-7 Surface

BOD, FC, PO4-D(H), TC#s, NO2 353.2, NO3 353.2, O-PO4 H
Alk 2320B, NH3-N, TDS, TKN, PO4-P H, TOC, TSS

Matrix: Non-Potable Water **Date:** 5/9/17
Type: Grab **Time:** 0945

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc

Relinquished By	5/9/17 1110 Date/Time	Received By	5/9/17 1316 Date/Time
Relinquished By	Date/Time	Received at Laboratory By	5/9/17 1358 Date/Time

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

Printed: 05/01/17 12:41:48PM

Report Template: WKO_WorkOrder_COC_15

M.J. Reider Associates, Inc.

Client Code: 3157
Project Manager: Richard Wheeler

Client: Tetra Tech
Project: 6223 - Seasonal Monthly Blue Marsh Reservoir
Comments:

Collected By : G. WACIK
(Full Name)

7007295-10 BM-7 Mid-Depth

NO2 353.2, NO3 353.2, O-PO4 H, BOD, PO4-D(H)
NH3-N, TOC, TSS, Alk 2320B, PO4-P H, TDS, TKN

Matrix: Non-Potable Water Date: 5/9/17
Type: Grab Time: 0945

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Vial Amber 40ml H3PO4, zero hdspc
F - Vial Amber 40ml H3PO4, zero hdspc

7007295-11 BM-7 Deep

BOD, PO4-D(H), NO2 353.2, NO3 353.2, O-PO4 H
Alk 2320B, PO4-P H, TDS, TKN, NH3-N, TOC, TSS

Matrix: Non-Potable Water Date: 5/9/17
Type: Grab Time: 0945

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Vial Amber 40ml H3PO4, zero hdspc
F - Vial Amber 40ml H3PO4, zero hdspc

7007295-12 BM-8 Surface

FC, NO2 353.2, NO3 353.2, BOD, O-PO4 H, PO4-D(H), TC#s
NH3-N, TDS, TKN, TOC, TSS, Alk 2320B, PO4-P H

Matrix: Non-Potable Water Date: 5/9/17
Type: Grab Time: 1610

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc

Relinquished By	5/9/17 1710 Date/Time	Received By	5/9/17 1316 Date/Time
Relinquished By	Date/Time	Received at Laboratory By	5/9/17 1358 Date/Time

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

Printed: 05/01/17 12:41:48PM

Report Template: WRD_WorkOrder_COC_ls

7007295

M.J. Reider Associates, Inc.

Client Code: 3157
Project Manager: Richard Wheeler

Client: Tetra Tech
Project: 6223 - Seasonal Monthly Blue Marsh Reservoir
Comments:

Collected By : (Full Name) G. WACIK

7007295-13 BM-8 Mid-Depth

BOD, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H)
Alk 2320B, NH3-N, PO4-P H, TDS, TKN, TOC, TSS

Matrix: Non-Potable Water **Date:** 5/9/17
Type: Grab **Time:** 1110

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Vial Amber 40ml H3PO4, zero hdspc
F - Vial Amber 40ml H3PO4, zero hdspc

7007295-14 BM-8 Deep

BOD, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H)
Alk 2320B, NH3-N, TDS, TKN, TOC, TSS, PO4-P H

Matrix: Non-Potable Water **Date:** 5/9/17
Type: Grab **Time:** 1110

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Vial Amber 40ml H3PO4, zero hdspc
F - Vial Amber 40ml H3PO4, zero hdspc

7007295-15 BM-9 Surface

NO2 353.2, NO3 353.2, O-PO4 H, BOD, FC, PO4-D(H), TC#s NS
PO4-P H, TOC, TSS, Alk 2320B, NH3-N, TDS, TKN

Matrix: Non-Potable Water **Date:** 5/9/17
Type: Grab **Time:** 1010

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc

Relinquished By	5/9/17 1:10 Date/Time	Received By	5/9/17 1316 Date/Time
Relinquished By	Date/Time	Received at Laboratory By	5/9/17 1358 Date/Time

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	10°C
Samples on Ice?	(Yes) No NA
Approved By:	CHL
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: 05/01/17 12:41:48PM

Report Template:

7007295

M.J. Reider Associates, Inc.

Client Code: 3157
Project Manager: Richard Wheeler

Client: Tetra Tech
Project: 6223 - Seasonal Monthly Blue Marsh Reservoir
Comments:

Collected By : (Full Name) G. WACIK

7007295-16 BM-9 Mid-Depth

BOD, PO4-D(H), NO2 353.2, NO3 353.2, O-PO4 H
Alk 2320B, PO4-P H, TDS, TKN, NH3-N, TOC, TSS

Matrix: Non-Potable Water **Date:** 5/9/17
Type: Grab **Time:** 1010

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Vial Amber 40ml H3PO4, zero hdspc
F - Vial Amber 40ml H3PO4, zero hdspc

7007295-17 BM-9 Deep

NO2 353.2, NO3 353.2, O-PO4 H, BOD, PO4-D(H)
NH3-N, TOC, TSS, Alk 2320B, PO4-P H, TDS, TKN

Matrix: Non-Potable Water **Date:** 5/9/17
Type: Grab **Time:** 1010

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Vial Amber 40ml H3PO4, zero hdspc
F - Vial Amber 40ml H3PO4, zero hdspc

7007295-18 BM-10 Surface

BOD, FC, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H), TC#s
Alk 2320B, NH3-N, PO4-P H, TDS, TKN, TOC, TSS

Matrix: Non-Potable Water **Date:** 5/9/17
Type: Grab **Time:** 1040

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc

Relinquished By	5/9/17 1110 Date/Time	Received By	5/9/17 1316 Date/Time
Relinquished By	Date/Time	Received at Laboratory By	5/9/17 1358 Date/Time

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

Printed: 05/01/17 12:41:48PM

Report Template:

M.J. Reider Associates, Inc.

Client Code: 3157
Project Manager: Richard Wheeler

Client: Tetra Tech
Project: 6223 - Seasonal Monthly Blue Marsh Reservoir
Comments:

Collected By : G. WACIK
(Full Name)

7007295-19 BM-10 Mid-Depth

BOD, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H)
Alk 2320B, NH3-N, TDS, TKN, TOC, TSS, PO4-P H

Matrix: Non-Potable Water Date: 5/9/17
Type: Grab Time: 1040

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Vial Amber 40ml H3PO4, zero hdspc
F - Vial Amber 40ml H3PO4, zero hdspc

7007295-20 BM-10 Deep

NO3 353.2, O-PO4 H, PO4-D(H), BOD, NO2 353.2
PO4-P H, Alk 2320B, NH3-N, TDS, TKN, TOC, TSS

Matrix: Non-Potable Water Date: 5/9/17
Type: Grab Time: 1040

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Vial Amber 40ml H3PO4, zero hdspc
F - Vial Amber 40ml H3PO4, zero hdspc

7007295-21 BM-11 Surface

BOD, FC, PO4-D(H), TC#s, NO2 353.2, NO3 353.2, O-PO4 H
Alk 2320B, NH3-N, TDS, TKN, PO4-P H, TOC, TSS

Matrix: Non-Potable Water Date: 5/9/17
Type: Grab Time: 1225

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc

Relinquished By	5/9/17 1710 Date/Time	Received By	5/9/17 1316 Date/Time
Relinquished By	Date/Time	Received at Laboratory By	5/9/17 1355 Date/Time

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	10°C
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: 05/01/17 12:41:48PM

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 Wheeler
Project Manager

Certificate of Analysis

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

Laboratory No.: 7009998
Report: 06/29/17
Lab Contact: Richard Wheeler

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

Project Info: 6223 - Seasonal Monthly Blue Marsh Reservoir

Lab ID: 7009998-01 **Collected By:** Client **Sampled:** 06/20/17 13:00 **Received:** 06/20/17 13:55
Sample Desc: BM-1 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	06/22/17	G-11	AEH
General Chemistry							
Alkalinity, Total to pH 4.5	126	mg/l	2	SM 2320 B	06/23/17		MPB
Nitrogen, Ammonia	0.07	mg/l	0.05	ASTM D6919-03	06/20/17		JCL
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	06/20/17	C-05	KAL
Nitrogen, Nitrate	3.87	mg/l	0.05	EPA 353.2	06/21/17 16:19	C-21a	RES
Nitrogen, Nitrite	0.12	mg/l	0.05	EPA 353.2	06/21/17 10:53		RES
Nitrogen, Total Kjeldahl (TKN)	0.50	mg/l	0.25	EPA 351.2	06/22/17		RES
Phosphate as P, Ortho	<0.05	mg/l	0.05	SM 4500-P E	06/21/17 16:40	G-11	AEH
Phosphorus as P, Total	<0.01	mg/l	0.01	SM 4500-P E	06/22/17		AEH
Solids, Total Dissolved	248	mg/l	5	SM 2540 C	06/21/17		AJS
Total Organic Carbon	2.2	mg/l	0.5	SM 5310 C	06/23/17		ALD
Solids, Total Suspended	4	mg/l	1	SM 2540 D	06/21/17		AJS

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	11	/100ml	2	SM 9222 D	06/20/17 14:30		TNS
Total Coliform	920	mpn/100ml	1	SM 9223 B	06/20/17 17:18		BLS

M.J. Reider Associates, Inc.

Lab ID: 7009998-02 **Collected By:** Client **Sampled:** 06/20/17 09:30 **Received:** 06/20/17 13:55
Sample Desc: BM-2 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	06/22/17	G-11	AEH
General Chemistry							
Alkalinity, Total to pH 4.5	105	mg/l	2	SM 2320 B	06/23/17		MPB
Nitrogen, Ammonia	0.06	mg/l	0.05	ASTM D6919-03	06/20/17		JCL
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	06/20/17	C-05	KAL
Nitrogen, Nitrate	4.16	mg/l	0.05	EPA 353.2	06/21/17 16:19		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	06/21/17 10:56		RES
Nitrogen, Total Kjeldahl (TKN)	0.71	mg/l	0.25	EPA 351.2	06/22/17		RES
Phosphate as P, Ortho	<0.05	mg/l	0.05	SM 4500-P E	06/21/17 16:40	G-11	AEH
Phosphorus as P, Total	<0.01	mg/l	0.01	SM 4500-P E	06/22/17		AEH
Solids, Total Dissolved	208	mg/l	5	SM 2540 C	06/21/17		AJS
Total Organic Carbon	2.3	mg/l	0.5	SM 5310 C	06/23/17		ALD
Solids, Total Suspended	2	mg/l	1	SM 2540 D	06/21/17		AJS

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	<2	/100ml	2	SM 9222 D	06/20/17 14:30		TNS
Total Coliform	160	mpn/100ml	1	SM 9223 B	06/20/17 17:18		BLS

Lab ID: 7009998-03 **Collected By:** Client **Sampled:** 06/20/17 09:30 **Received:** 06/20/17 13:55
Sample Desc: BM-2 Mid-Depth **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	06/22/17	G-11	AEH
General Chemistry							
Alkalinity, Total to pH 4.5	127	mg/l	2	SM 2320 B	06/23/17		MPB
Nitrogen, Ammonia	0.05	mg/l	0.05	ASTM D6919-03	06/20/17		JCL
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	06/20/17	C-05	KAL
Nitrogen, Nitrate	2.15	mg/l	0.05	EPA 353.2	06/21/17 16:19		RES
Nitrogen, Nitrite	0.14	mg/l	0.05	EPA 353.2	06/21/17 10:57		RES
Nitrogen, Total Kjeldahl (TKN)	0.58	mg/l	0.25	EPA 351.2	06/22/17		RES
Phosphate as P, Ortho	<0.05	mg/l	0.05	SM 4500-P E	06/21/17 16:40	G-11	AEH
Phosphorus as P, Total	0.02	mg/l	0.01	SM 4500-P E	06/22/17		AEH
Solids, Total Dissolved	238	mg/l	5	SM 2540 C	06/21/17		AJS
Total Organic Carbon	2.1	mg/l	0.5	SM 5310 C	06/23/17		ALD
Solids, Total Suspended	1	mg/l	1	SM 2540 D	06/21/17		AJS

Lab ID: 7009998-04 **Collected By:** Client **Sampled:** 06/20/17 09:30 **Received:** 06/20/17 13:55
Sample Desc: BM-2 Deep **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	06/22/17	G-11	AEH
General Chemistry							
Alkalinity, Total to pH 4.5	158	mg/l	2	SM 2320 B	06/23/17		MPB
Nitrogen, Ammonia	0.54	mg/l	0.05	ASTM D6919-03	06/20/17		JCL
Biochemical Oxygen Demand	4	mg/l	2	SM 5210 B	06/20/17		KAL
Nitrogen, Nitrate	2.13	mg/l	0.05	EPA 353.2	06/21/17 16:19		RES
Nitrogen, Nitrite	0.06	mg/l	0.05	EPA 353.2	06/21/17 10:57		RES
Nitrogen, Total Kjeldahl (TKN)	1.29	mg/l	0.25	EPA 351.2	06/22/17		RES
Phosphate as P, Ortho	<0.05	mg/l	0.05	SM 4500-P E	06/21/17 16:40	G-11	AEH
Phosphorus as P, Total	<0.01	mg/l	0.01	SM 4500-P E	06/22/17		AEH
Solids, Total Dissolved	247	mg/l	5	SM 2540 C	06/21/17		AJS
Total Organic Carbon	2.1	mg/l	0.5	SM 5310 C	06/23/17		ALD
Solids, Total Suspended	4	mg/l	1	SM 2540 D	06/21/17		AJS

Lab ID: 7009998-05 **Collected By:** Client **Sampled:** 06/20/17 12:30 **Received:** 06/20/17 13:55
Sample Desc: BM-5 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	06/22/17	G-11	AEH
General Chemistry							
Alkalinity, Total to pH 4.5	188	mg/l	2	SM 2320 B	06/23/17		MPB
Nitrogen, Ammonia	0.05	mg/l	0.05	ASTM D6919-03	06/20/17		JCL
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	06/20/17	C-05	KAL
Nitrogen, Nitrate	6.73	mg/l	0.05	EPA 353.2	06/21/17 16:19		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	06/21/17 10:58		RES
Nitrogen, Total Kjeldahl (TKN)	0.55	mg/l	0.25	EPA 351.2	06/22/17		RES
Phosphate as P, Ortho	<0.05	mg/l	0.05	SM 4500-P E	06/21/17 16:40	G-11	AEH
Phosphorus as P, Total	0.04	mg/l	0.01	SM 4500-P E	06/22/17		AEH
Solids, Total Dissolved	320	mg/l	5	SM 2540 C	06/21/17		AJS
Total Organic Carbon	2.8	mg/l	0.5	SM 5310 C	06/23/17		ALD
Solids, Total Suspended	15	mg/l	1	SM 2540 D	06/21/17		AJS

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	3100	/100ml	2	SM 9222 D	06/20/17 14:30		TNS
Total Coliform	E>2400	mpn/100ml	1	SM 9223 B	06/20/17 17:18		BLS

Lab ID: 7009998-06 **Collected By:** Client **Sampled:** 06/20/17 09:00 **Received:** 06/20/17 13:55
Sample Desc: BM-6 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	06/22/17	G-11	AEH
General Chemistry							
Alkalinity, Total to pH 4.5	103	mg/l	2	SM 2320 B	06/23/17		MPB
Nitrogen, Ammonia	0.07	mg/l	0.05	ASTM D6919-03	06/20/17		JCL
Biochemical Oxygen Demand	2	mg/l	2	SM 5210 B	06/20/17	C-05	KAL
Nitrogen, Nitrate	3.97	mg/l	0.05	EPA 353.2	06/21/17 16:19		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	06/21/17 10:59		RES
Nitrogen, Total Kjeldahl (TKN)	0.99	mg/l	0.25	EPA 351.2	06/22/17		RES
Phosphate as P, Ortho	<0.05	mg/l	0.05	SM 4500-P E	06/21/17 16:40	G-11	AEH
Phosphorus as P, Total	0.01	mg/l	0.01	SM 4500-P E	06/22/17		AEH
Solids, Total Dissolved	215	mg/l	5	SM 2540 C	06/21/17		AJS
Total Organic Carbon	2.8	mg/l	0.5	SM 5310 C	06/23/17		ALD
Solids, Total Suspended	4	mg/l	1	SM 2540 D	06/21/17		AJS

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	10	/100ml	2	SM 9222 D	06/20/17 14:30		TNS
Total Coliform	160	mpn/100ml	1	SM 9223 B	06/20/17 17:18		BLS

Lab ID: 7009998-07 **Collected By:** Client **Sampled:** 06/20/17 09:00 **Received:** 06/20/17 13:55
Sample Desc: BM-6 Mid-Depth **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	06/22/17	G-11	AEH
General Chemistry							
Alkalinity, Total to pH 4.5	137	mg/l	2	SM 2320 B	06/23/17		MPB
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	06/20/17		JCL
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	06/20/17	C-05	KAL
Nitrogen, Nitrate	4.17	mg/l	0.05	EPA 353.2	06/21/17 16:19		RES
Nitrogen, Nitrite	0.24	mg/l	0.05	EPA 353.2	06/21/17 11:00		RES
Nitrogen, Total Kjeldahl (TKN)	0.38	mg/l	0.25	EPA 351.2	06/22/17		RES
Phosphate as P, Ortho	<0.05	mg/l	0.05	SM 4500-P E	06/21/17 16:40	G-11	AEH
Phosphorus as P, Total	<0.01	mg/l	0.01	SM 4500-P E	06/22/17		AEH
Solids, Total Dissolved	251	mg/l	5	SM 2540 C	06/21/17		AJS
Total Organic Carbon	2.1	mg/l	0.5	SM 5310 C	06/23/17		ALD
Solids, Total Suspended	3	mg/l	1	SM 2540 D	06/21/17		AJS

Lab ID: 7009998-08 **Collected By:** Client **Sampled:** 06/20/17 09:00 **Received:** 06/20/17 13:55
Sample Desc: BM-6 Deep **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	06/22/17	G-11	AEH
General Chemistry							
Alkalinity, Total to pH 4.5	153	mg/l	2	SM 2320 B	06/23/17		MPB
Nitrogen, Ammonia	0.46	mg/l	0.05	ASTM D6919-03	06/20/17		JCL
Biochemical Oxygen Demand	3	mg/l	2	SM 5210 B	06/20/17		KAL
Nitrogen, Nitrate	2.39	mg/l	0.05	EPA 353.2	06/21/17 16:19		RES
Nitrogen, Nitrite	0.06	mg/l	0.05	EPA 353.2	06/21/17 11:01		RES
Nitrogen, Total Kjeldahl (TKN)	1.15	mg/l	0.25	EPA 351.2	06/22/17		RES
Phosphate as P, Ortho	<0.05	mg/l	0.05	SM 4500-P E	06/21/17 16:40	G-11	AEH
Phosphorus as P, Total	0.01	mg/l	0.01	SM 4500-P E	06/22/17		AEH
Solids, Total Dissolved	256	mg/l	5	SM 2540 C	06/21/17		AJS
Total Organic Carbon	2.0	mg/l	0.5	SM 5310 C	06/23/17		ALD
Solids, Total Suspended	12	mg/l	1	SM 2540 D	06/21/17		AJS

Lab ID: 7009998-09 **Collected By:** Client **Sampled:** 06/20/17 10:00 **Received:** 06/20/17 13:55
Sample Desc: BM-7 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	06/22/17	G-11	AEH
General Chemistry							
Alkalinity, Total to pH 4.5	107	mg/l	2	SM 2320 B	06/23/17		MPB
Nitrogen, Ammonia	0.06	mg/l	0.05	ASTM D6919-03	06/20/17		JCL
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	06/20/17	C-05	KAL
Nitrogen, Nitrate	4.23	mg/l	0.05	EPA 353.2	06/21/17 16:19		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	06/21/17 11:04		RES
Nitrogen, Total Kjeldahl (TKN)	0.64	mg/l	0.25	EPA 351.2	06/22/17		RES
Phosphate as P, Ortho	<0.05	mg/l	0.05	SM 4500-P E	06/21/17 16:40	G-11	AEH
Phosphorus as P, Total	<0.01	mg/l	0.01	SM 4500-P E	06/22/17		AEH
Solids, Total Dissolved	223	mg/l	5	SM 2540 C	06/21/17		AJS
Total Organic Carbon	2.5	mg/l	0.5	SM 5310 C	06/23/17		ALD
Solids, Total Suspended	1	mg/l	1	SM 2540 D	06/21/17		AJS

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	8	/100ml	2	SM 9222 D	06/20/17 15:00		TNS
Total Coliform	330	mpn/100ml	1	SM 9223 B	06/20/17 17:18		BLS

Lab ID: 7009998-10 **Collected By:** Client **Sampled:** 06/20/17 10:00 **Received:** 06/20/17 13:55
Sample Desc: BM-7 Mid-Depth **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	06/22/17	G-11	AEH
General Chemistry							
Alkalinity, Total to pH 4.5	132	mg/l	2	SM 2320 B	06/23/17		MPB
Nitrogen, Ammonia	0.07	mg/l	0.05	ASTM D6919-03	06/20/17		JCL
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	06/20/17	C-05	KAL
Nitrogen, Nitrate	4.84	mg/l	0.05	EPA 353.2	06/21/17 16:19		RES
Nitrogen, Nitrite	0.06	mg/l	0.05	EPA 353.2	06/21/17 11:05		RES
Nitrogen, Total Kjeldahl (TKN)	0.54	mg/l	0.25	EPA 351.2	06/22/17		RES
Phosphate as P, Ortho	<0.05	mg/l	0.05	SM 4500-P E	06/21/17 16:40	G-11	AEH
Phosphorus as P, Total	0.03	mg/l	0.01	SM 4500-P E	06/22/17		AEH
Solids, Total Dissolved	267	mg/l	5	SM 2540 C	06/21/17		AJS
Total Organic Carbon	2.0	mg/l	0.5	SM 5310 C	06/23/17		ALD
Solids, Total Suspended	2	mg/l	1	SM 2540 D	06/21/17		AJS

Lab ID: 7009998-11 **Collected By:** Client **Sampled:** 06/20/17 10:00 **Received:** 06/20/17 13:55
Sample Desc: BM-7 Deep **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	06/22/17	G-11	AEH
General Chemistry							
Alkalinity, Total to pH 4.5	156	mg/l	2	SM 2320 B	06/23/17		MPB
Nitrogen, Ammonia	0.08	mg/l	0.05	ASTM D6919-03	06/20/17		JCL
Biochemical Oxygen Demand	2	mg/l	2	SM 5210 B	06/20/17	C-05	KAL
Nitrogen, Nitrate	3.71	mg/l	0.05	EPA 353.2	06/21/17 16:19		RES
Nitrogen, Nitrite	0.24	mg/l	0.05	EPA 353.2	06/21/17 11:06		RES
Nitrogen, Total Kjeldahl (TKN)	0.85	mg/l	0.25	EPA 351.2	06/22/17		RES
Phosphate as P, Ortho	<0.05	mg/l	0.05	SM 4500-P E	06/21/17 16:40	G-11	AEH
Phosphorus as P, Total	0.05	mg/l	0.01	SM 4500-P E	06/22/17		AEH
Solids, Total Dissolved	248	mg/l	5	SM 2540 C	06/21/17		AJS
Total Organic Carbon	2.3	mg/l	0.5	SM 5310 C	06/23/17		ALD
Solids, Total Suspended	133	mg/l	1	SM 2540 D	06/21/17		AJS

Lab ID: 7009998-12 **Collected By:** Client **Sampled:** 06/20/17 11:30 **Received:** 06/20/17 13:55
Sample Desc: BM-8 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	06/22/17	G-11	AEH
General Chemistry							
Alkalinity, Total to pH 4.5	105	mg/l	2	SM 2320 B	06/23/17		MPB
Nitrogen, Ammonia	0.05	mg/l	0.05	ASTM D6919-03	06/20/17		JCL
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	06/20/17	C-05	KAL
Nitrogen, Nitrate	3.94	mg/l	0.05	EPA 353.2	06/21/17 16:19		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	06/21/17 11:09		RES
Nitrogen, Total Kjeldahl (TKN)	0.62	mg/l	0.25	EPA 351.2	06/22/17		RES
Phosphate as P, Ortho	<0.05	mg/l	0.05	SM 4500-P E	06/21/17 17:00	G-11	AEH
Phosphorus as P, Total	<0.01	mg/l	0.01	SM 4500-P E	06/22/17		AEH
Solids, Total Dissolved	226	mg/l	5	SM 2540 C	06/21/17		AJS
Total Organic Carbon	2.5	mg/l	0.5	SM 5310 C	06/23/17		ALD
Solids, Total Suspended	2	mg/l	1	SM 2540 D	06/21/17		AJS

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	2	/100ml	2	SM 9222 D	06/20/17 15:00		TNS
Total Coliform	220	mpn/100ml	1	SM 9223 B	06/20/17 17:18		BLS

Lab ID: 7009998-13 **Collected By:** Client **Sampled:** 06/20/17 11:30 **Received:** 06/20/17 13:55
Sample Desc: BM-8 Mid-Depth **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	06/22/17	G-11	AEH
General Chemistry							
Alkalinity, Total to pH 4.5	110	mg/l	2	SM 2320 B	06/23/17		MPB
Nitrogen, Ammonia	0.10	mg/l	0.05	ASTM D6919-03	06/20/17		JCL
Biochemical Oxygen Demand	2	mg/l	2	SM 5210 B	06/20/17	C-05	KAL
Nitrogen, Nitrate	3.66	mg/l	0.05	EPA 353.2	06/21/17 16:19		RES
Nitrogen, Nitrite	0.06	mg/l	0.05	EPA 353.2	06/21/17 11:10		RES
Nitrogen, Total Kjeldahl (TKN)	<0.25	mg/l	0.25	EPA 351.2	06/22/17		RES
Phosphate as P, Ortho	<0.05	mg/l	0.05	SM 4500-P E	06/21/17 17:00	G-11	AEH
Phosphorus as P, Total	<0.01	mg/l	0.01	SM 4500-P E	06/22/17		AEH
Solids, Total Dissolved	255	mg/l	5	SM 2540 C	06/21/17		AJS
Total Organic Carbon	2.3	mg/l	0.5	SM 5310 C	06/23/17		ALD
Solids, Total Suspended	6	mg/l	1	SM 2540 D	06/21/17		AJS

Lab ID: 7009998-14 **Collected By:** Client **Sampled:** 06/20/17 11:30 **Received:** 06/20/17 13:55
Sample Desc: BM-8 Deep **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	06/22/17	G-11	AEH
General Chemistry							
Alkalinity, Total to pH 4.5	113	mg/l	2	SM 2320 B	06/23/17		MPB
Nitrogen, Ammonia	0.10	mg/l	0.05	ASTM D6919-03	06/20/17		JCL
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	06/20/17	C-05	KAL
Nitrogen, Nitrate	3.64	mg/l	0.05	EPA 353.2	06/21/17 16:19		RES
Nitrogen, Nitrite	0.06	mg/l	0.05	EPA 353.2	06/21/17 11:11		RES
Nitrogen, Total Kjeldahl (TKN)	<0.25	mg/l	0.25	EPA 351.2	06/22/17		RES
Phosphate as P, Ortho	<0.05	mg/l	0.05	SM 4500-P E	06/21/17 17:00	G-11	AEH
Phosphorus as P, Total	0.02	mg/l	0.01	SM 4500-P E	06/22/17		AEH
Solids, Total Dissolved	242	mg/l	5	SM 2540 C	06/21/17		AJS
Total Organic Carbon	2.0	mg/l	0.5	SM 5310 C	06/23/17		ALD
Solids, Total Suspended	4	mg/l	1	SM 2540 D	06/21/17		AJS

Lab ID: 7009998-15 **Collected By:** Client **Sampled:** 06/20/17 10:30 **Received:** 06/20/17 13:55
Sample Desc: BM-9 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	06/22/17	G-11	AEH
General Chemistry							
Alkalinity, Total to pH 4.5	110	mg/l	2	SM 2320 B	06/23/17		MPB
Nitrogen, Ammonia	0.06	mg/l	0.05	ASTM D6919-03	06/20/17		JCL
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	06/20/17	C-05	KAL
Nitrogen, Nitrate	4.28	mg/l	0.05	EPA 353.2	06/21/17 16:19		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	06/21/17 11:12		RES
Nitrogen, Total Kjeldahl (TKN)	0.69	mg/l	0.25	EPA 351.2	06/22/17		RES
Phosphate as P, Ortho	<0.05	mg/l	0.05	SM 4500-P E	06/21/17 17:00	G-11	AEH
Phosphorus as P, Total	<0.01	mg/l	0.01	SM 4500-P E	06/22/17		AEH
Solids, Total Dissolved	223	mg/l	5	SM 2540 C	06/21/17		AJS
Total Organic Carbon	2.4	mg/l	0.5	SM 5310 C	06/23/17		ALD
Solids, Total Suspended	2	mg/l	1	SM 2540 D	06/21/17		AJS

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	6	/100ml	2	SM 9222 D	06/20/17 15:00		TNS
Total Coliform	250	mpn/100ml	1	SM 9223 B	06/20/17 17:18		BLS

Lab ID: 7009998-16 **Collected By:** Client **Sampled:** 06/20/17 10:30 **Received:** 06/20/17 13:55
Sample Desc: BM-9 Mid-Depth **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	06/22/17	G-11	AEH
General Chemistry							
Alkalinity, Total to pH 4.5	141	mg/l	2	SM 2320 B	06/23/17		MPB
Nitrogen, Ammonia	0.08	mg/l	0.05	ASTM D6919-03	06/20/17		JCL
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	06/20/17	C-05	KAL
Nitrogen, Nitrate	4.87	mg/l	0.05	EPA 353.2	06/21/17 16:19		RES
Nitrogen, Nitrite	0.06	mg/l	0.05	EPA 353.2	06/21/17 11:13		RES
Nitrogen, Total Kjeldahl (TKN)	0.45	mg/l	0.25	EPA 351.2	06/22/17		RES
Phosphate as P, Ortho	<0.05	mg/l	0.05	SM 4500-P E	06/21/17 17:00	G-11	AEH
Phosphorus as P, Total	0.01	mg/l	0.01	SM 4500-P E	06/22/17		AEH
Solids, Total Dissolved	250	mg/l	5	SM 2540 C	06/21/17		AJS
Total Organic Carbon	1.9	mg/l	0.5	SM 5310 C	06/23/17		ALD
Solids, Total Suspended	3	mg/l	1	SM 2540 D	06/21/17		AJS

Lab ID: 7009998-17 **Collected By:** Client **Sampled:** 06/20/17 10:30 **Received:** 06/20/17 13:55
Sample Desc: BM-9 Deep **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	06/22/17	G-11	AEH
General Chemistry							
Alkalinity, Total to pH 4.5	164	mg/l	2	SM 2320 B	06/23/17		MPB
Nitrogen, Ammonia	0.21	mg/l	0.05	ASTM D6919-03	06/20/17		JCL
Biochemical Oxygen Demand	3	mg/l	2	SM 5210 B	06/20/17		KAL
Nitrogen, Nitrate	3.33	mg/l	0.05	EPA 353.2	06/21/17 16:19		RES
Nitrogen, Nitrite	0.22	mg/l	0.05	EPA 353.2	06/21/17 11:16		RES
Nitrogen, Total Kjeldahl (TKN)	1.85	mg/l	0.25	EPA 351.2	06/22/17		RES
Phosphate as P, Ortho	<0.05	mg/l	0.05	SM 4500-P E	06/21/17 17:00	G-11	AEH
Phosphorus as P, Total	0.03	mg/l	0.01	SM 4500-P E	06/22/17		AEH
Solids, Total Dissolved	236	mg/l	5	SM 2540 C	06/21/17		AJS
Total Organic Carbon	2.7	mg/l	0.5	SM 5310 C	06/23/17		ALD
Solids, Total Suspended	100	mg/l	1	SM 2540 D	06/21/17		AJS

Lab ID: 7009998-18 **Collected By:** Client **Sampled:** 06/20/17 11:00 **Received:** 06/20/17 13:55
Sample Desc: BM-10 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	06/22/17	G-11	AEH
General Chemistry							
Alkalinity, Total to pH 4.5	113	mg/l	2	SM 2320 B	06/23/17		MPB
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	06/20/17		JCL
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	06/20/17	C-05	KAL
Nitrogen, Nitrate	4.25	mg/l	0.05	EPA 353.2	06/21/17 16:19		RES
Nitrogen, Nitrite	0.05	mg/l	0.05	EPA 353.2	06/21/17 11:17		RES
Nitrogen, Total Kjeldahl (TKN)	0.72	mg/l	0.25	EPA 351.2	06/22/17		RES
Phosphate as P, Ortho	<0.05	mg/l	0.05	SM 4500-P E	06/21/17 17:00	G-11	AEH
Phosphorus as P, Total	0.02	mg/l	0.01	SM 4500-P E	06/22/17		AEH
Solids, Total Dissolved	215	mg/l	5	SM 2540 C	06/21/17		AJS
Total Organic Carbon	2.5	mg/l	0.5	SM 5310 C	06/23/17		ALD
Solids, Total Suspended	5	mg/l	1	SM 2540 D	06/21/17		AJS

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	42	/100ml	2	SM 9222 D	06/20/17 15:00		TNS
Total Coliform	490	mpn/100ml	1	SM 9223 B	06/20/17 17:18		BLS

Lab ID: 7009998-19 **Collected By:** Client **Sampled:** 06/20/17 11:00 **Received:** 06/20/17 13:55
Sample Desc: BM-10 Mid-Depth **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	06/22/17	G-11	AEH
General Chemistry							
Alkalinity, Total to pH 4.5	120	mg/l	2	SM 2320 B	06/23/17		MPB
Nitrogen, Ammonia	0.07	mg/l	0.05	ASTM D6919-03	06/20/17		JCL
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	06/20/17	C-05	KAL
Nitrogen, Nitrate	4.44	mg/l	0.05	EPA 353.2	06/21/17 16:19		RES
Nitrogen, Nitrite	0.05	mg/l	0.05	EPA 353.2	06/21/17 11:18		RES
Nitrogen, Total Kjeldahl (TKN)	0.74	mg/l	0.25	EPA 351.2	06/22/17		RES
Phosphate as P, Ortho	<0.05	mg/l	0.05	SM 4500-P E	06/21/17 17:00	G-11	AEH
Phosphorus as P, Total	0.04	mg/l	0.01	SM 4500-P E	06/22/17		AEH
Solids, Total Dissolved	232	mg/l	5	SM 2540 C	06/21/17		AJS
Total Organic Carbon	2.3	mg/l	0.5	SM 5310 C	06/23/17		ALD
Solids, Total Suspended	3	mg/l	1	SM 2540 D	06/21/17		AJS

Lab ID: 7009998-20 **Collected By:** Client **Sampled:** 06/20/17 11:00 **Received:** 06/20/17 13:55
Sample Desc: BM-10 Deep **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	06/22/17	G-11	AEH
General Chemistry							
Alkalinity, Total to pH 4.5	161	mg/l	2	SM 2320 B	06/23/17		MPB
Nitrogen, Ammonia	0.20	mg/l	0.05	ASTM D6919-03	06/20/17		JCL
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	06/20/17	C-05	KAL
Nitrogen, Nitrate	4.09	mg/l	0.05	EPA 353.2	06/21/17 16:19		RES
Nitrogen, Nitrite	0.12	mg/l	0.05	EPA 353.2	06/21/17 11:18		RES
Nitrogen, Total Kjeldahl (TKN)	0.52	mg/l	0.25	EPA 351.2	06/22/17		RES
Phosphate as P, Ortho	<0.05	mg/l	0.05	SM 4500-P E	06/21/17 17:00	G-11	AEH
Phosphorus as P, Total	0.05	mg/l	0.01	SM 4500-P E	06/22/17		AEH
Solids, Total Dissolved	270	mg/l	5	SM 2540 C	06/21/17		AJS
Total Organic Carbon	1.8	mg/l	0.5	SM 5310 C	06/23/17		ALD
Solids, Total Suspended	17	mg/l	1	SM 2540 D	06/21/17		AJS

M.J. Reider Associates, Inc.

Lab ID: 7009998-21 **Collected By:** Client **Sampled:** 06/20/17 12:30 **Received:** 06/20/17 13:55
Sample Desc: BM-11 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	06/22/17	G-11	AEH
General Chemistry							
Alkalinity, Total to pH 4.5	99	mg/l	2	SM 2320 B	06/23/17		MPB
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	06/20/17		JCL
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	06/20/17	C-05	KAL
Nitrogen, Nitrate	3.75	mg/l	0.05	EPA 353.2	06/21/17 16:19	C-21	RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	06/21/17 11:19		RES
Nitrogen, Total Kjeldahl (TKN)	0.66	mg/l	0.25	EPA 351.2	06/22/17		RES
Phosphate as P, Ortho	<0.05	mg/l	0.05	SM 4500-P E	06/21/17 17:00	G-11	AEH
Phosphorus as P, Total	<0.01	mg/l	0.01	SM 4500-P E	06/22/17		AEH
Solids, Total Dissolved	212	mg/l	5	SM 2540 C	06/21/17		AJS
Total Organic Carbon	2.9	mg/l	0.5	SM 5310 C	06/26/17		ALD
Solids, Total Suspended	15	mg/l	1	SM 2540 D	06/21/17		AJS

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	2100	/100ml	2	SM 9222 D	06/20/17 15:00		TNS
Total Coliform	E>2400	mpn/100ml	1	SM 9223 B	06/20/17 17:18		BLS

Notes and Definitions

C-05 The sample did not meet the minimum DO depletion of at least 2 mg/L.

C-21 The matrix spike and spike dup for nitrite-nitrate was outside the acceptable range of 90-110% at 87.6% and 87.7%

C-21a The matrix spike and spike dup for nitrite-nitrate was outside the acceptable range of 90-110% at 87.6% and 88.9%

G-11 The sample was filtered after it was received at the laboratory.

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

WORK ORDER
Chain of Custody

7009998

Client Code: 3157
Project Manager: Richard Wheeler

Client: Tetra Tech
Project: 6223 - Seasonal Monthly Blue Marsh 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

Comments:

Collected By : (Full Name) Gregory WACIK

7009998-01 BM-1 Surface

Matrix: Non-Potable Water Date: 6/20/17
Type: Grab Time: 1300

BOD, FC, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H), TC#s
Alk 2320B, NH3-N, PO4-P H, TDS, TKN, TOC, TSS

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc
H - Vial Amber 40ml H3PO4, zero hdspc

7009998-02 BM-2 Surface

Matrix: Non-Potable Water Date: 6/20/17
Type: Grab Time: 0930

BOD, FC, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H), TC#s
Alk 2320B, NH3-N, PO4-P H, TDS, TKN, TOC, TSS

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc
H - Vial Amber 40ml H3PO4, zero hdspc

Relinquished By	6/20/17 1300 Date/Time	Received By	6-20-17 1325 Date/Time
Relinquished By	Date/Time	Received at Laboratory By	6-20-17 1355 Date/Time

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	12
Samples on Ice?	Yes No NA
Approved By:	BSW
Entered By:	

Report Template

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: 06/06/17 12:20:59PM

M.J. Reider Associates, Inc.

Client Code: 3157
Project Manager: Richard Wheeler

Client: Tetra Tech
Project: 6223 - Seasonal Monthly Blue Marsh Reservoir
Comments:

Collected By : (Full Name) Gregory WACIK

7009998-03 BM-2 Mid-Depth

Matrix: Non-Potable Water **Date:** 6/20/17
Type: Grab **Time:** 0930

BOD, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H)
Alk 2320B, NH3-N, PO4-P H, TDS, TKN, TOC, TSS

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

7009998-04 BM-2 Deep

Matrix: Non-Potable Water **Date:** 6/20/17
Type: Grab **Time:** 0930

BOD, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H)
Alk 2320B, NH3-N, TDS, TKN, TOC, TSS, PO4-P H

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

7009998-05 BM-5 Surface

Matrix: Non-Potable Water **Date:** 6/20/17
Type: Grab **Time:** 1230

NO2 353.2, NO3 353.2, O-PO4 H, BOD, FC, PO4-D(H), TC#s
PO4-P H, TOC, TSS, Alk 2320B, NH3-N, TDS, TKN

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc
H - Vial Amber 40ml H3PO4, zero hdspc

Relinquished By	6/20/17 1300	Received By	6-20-17 1325
Relinquished By		Received at Laboratory By	6-20-17 1355

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	12
Samples on Ice?	Yes No NA
Approved By:	BSW
Entered By:	

Printed: 06/06/17 12:20:59PM

7009998

M.J. Reider Associates, Inc.

Client Code: 3157
Project Manager: Richard Wheeler

Client: Tetra Tech
Project: 6223 - Seasonal Monthly Blue Marsh Reservoir
Comments:

Collected By : Gregory Wacik
(Full Name)

7009998-06 BM-6 Surface

BOD, O-PO4 H, PO4-D(H), TC#s, FC, NO2 353.2, NO3 353.2
Alk 2320B, PO4-P H, NH3-N, TDS, TKN, TOC, TSS

Matrix: Non-Potable Water
Type: Grab
Date: 6/20/17
Time: 0900

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc
H - Vial Amber 40ml H3PO4, zero hdspc

7009998-07 BM-6 Mid-Depth

BOD, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H)
Alk 2320B, NH3-N, TDS, TKN, TOC, TSS, PO4-P H

Matrix: Non-Potable Water
Type: Grab
Date: 6/20/17
Time: 0900

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

7009998-08 BM-6 Deep

BOD, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H)
Alk 2320B, NH3-N, PO4-P H, TDS, TKN, TOC, TSS

Matrix: Non-Potable Water
Type: Grab
Date: 6/20/17
Time: 0900

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

Relinquished By	6/20/17 1300 Date/Time	Received By	6-20-17 1325 Date/Time
Relinquished By	Date/Time	Received at Laboratory By	6-20-17 1355 Date/Time

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	12
Samples on Ice?	Yes No NA
Approved By:	BSW
Entered By:	

Printed: 06/06/17 12:20:59PM

Report Template

7009998

M.J. Reider Associates, Inc.

Client Code: 3157
Project Manager: Richard Wheeler

Client: Tetra Tech
Project: 6223 - Seasonal Monthly Blue Marsh Reservoir

Comments:

Collected By : (Full Name) Gregory Mack

7009998-09 BM-7 Surface

BOD, FC, PO4-D(H), TC#s, NO2 353.2, NO3 353.2, O-PO4 H
Alk 2320B, NH3-N, TDS, TKN, PO4-P H, TOC, TSS

Matrix: Non-Potable Water
Type: Grab
Date: 6/20/17
Time: 1000

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc
H - Vial Amber 40ml H3PO4, zero hdspc

7009998-10 BM-7 Mid-Depth

NO2 353.2, NO3 353.2, O-PO4 H, BOD, PO4-D(H)
NH3-N, TOC, TSS, Alk 2320B, PO4-P H, TDS, TKN

Matrix: Non-Potable Water
Type: Grab
Date: 6/20/17
Time: 1000

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

7009998-11 BM-7 Deep

BOD, PO4-D(H), NO2 353.2, NO3 353.2, O-PO4 H
Alk 2320B, PO4-P H, TDS, TKN, NH3-N, TOC, TSS

Matrix: Non-Potable Water
Type: Grab
Date: 6/20/17
Time: 1000

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

Relinquished By	6/20/17 1300 Date/Time	Received By	6-20-17 1325 Date/Time
Relinquished By	Date/Time	Received at Laboratory By	6-20-17 1355 Date/Time

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	12
Samples on Ice?	(Yes) No NA
Approved By:	BSW
Entered By:	

M.J. Reider Associates, Inc.

Client Code: 3157
Project Manager: Richard Wheeler

Client: Tetra Tech
Project: 6223 - Seasonal Monthly Blue Marsh Reservoir

Comments:

Collected By : (Full Name) Gregory WACIK

7009998-12 BM-8 Surface

TN? **FC, NO2 353.2, NO3 353.2, BOD, O-PO4 H, PO4-D(H), TC#s**
NH3-N, TDS, TKN, TOC, TSS, Alk 2320B, PO4-P H

Matrix: Non-Potable Water Date: 6/20/17
Type: Grab Time: 1130

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc
H - Vial Amber 40ml H3PO4, zero hdspc

7009998-13 BM-8 Mid-Depth

BOD, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H)
Alk 2320B, NH3-N, PO4-P H, TDS, TKN, TOC, TSS

Matrix: Non-Potable Water Date: 6/20/17
Type: Grab Time: 1130

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

7009998-14 BM-8 Deep

BOD, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H)
Alk 2320B, NH3-N, TDS, TKN, TOC, TSS, PO4-P H

Matrix: Non-Potable Water Date: 6/20/17
Type: Grab Time: 1130

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

Relinquished By	6/20/17 1300	Received By	6-20-17 1325
Relinquished By	Date/Time	Received at Laboratory By	6-20-17 1355

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	12
Samples on Ice?	Yes / No / NA
Approved By:	BSW
Entered By:	

Printed: 06/06/17 12:20:59PM

Report Template: WKO_WorkOrder_COC_ls

7009998

M.J. Reider Associates, Inc.

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

Project Manager: Richard Wheeler **Project:** 6223 - Seasonal Monthly Blue Marsh Reservoir

Comments:

Collected By : (Full Name) Gregory Waek

7009998-15 BM-9 Surface

NO2 353.2, NO3 353.2, O-PO4 H, BOD, FC, PO4-D(H), TC#s
PO4-P H, TOC, TSS, Alk 2320B, NH3-N, TDS, TKN

Matrix: Non-Potable Water **Date:** 6/20/17
Type: Grab **Time:** 1030

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc
H - Vial Amber 40ml H3PO4, zero hdspc

7009998-16 BM-9 Mid-Depth

BOD, PO4-D(H), NO2 353.2, NO3 353.2, O-PO4 H
Alk 2320B, PO4-P H, TDS, TKN, NH3-N, TOC, TSS

Matrix: Non-Potable Water **Date:** 6/20/17
Type: Grab **Time:** 1030

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

7009998-17 BM-9 Deep

NO2 353.2, NO3 353.2, O-PO4 H, BOD, PO4-D(H)
NH3-N, TOC, TSS, Alk 2320B, PO4-P H, TDS, TKN

Matrix: Non-Potable Water **Date:** 6/20/17
Type: Grab **Time:** 1036

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

Relinquished By	6/20/17 1300 Date/Time	Received By	6-20-17 1325 Date/Time
Relinquished By	Date/Time	Received at Laboratory By	6-20-17 1355 Date/Time

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	12
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: 06/06/17 12:20:59PM

Report Template: WKO WorkOrder COC 15

M.J. Reider Associates, Inc.

7009998

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

Project Manager: Richard Wheeler **Project:** 6223 - Seasonal Monthly Blue Marsh Reservoir

Comments:

Collected By : (Full Name) Gregory WACIK

7009998-18 BM-10 Surface

BOD, FC, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H), TC#s
Alk 2320B, NH3-N, PO4-P H, TDS, TKN, TOC, TSS

Matrix: Non-Potable Water Date: 6/20/17
Type: Grab Time: 1100

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc
H - Vial Amber 40ml H3PO4, zero hdspc

7009998-19 BM-10 Mid-Depth

BOD, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H)
Alk 2320B, NH3-N, TDS, TKN, TOC, TSS, PO4-P H

Matrix: Non-Potable Water Date: 6/20/17
Type: Grab Time: 1100

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

7009998-20 BM-10 Deep

NO3 353.2, O-PO4 H, PO4-D(H), BOD, NO2 353.2
PO4-P H, Alk 2320B, NH3-N, TDS, TKN, TOC, TSS

Matrix: Non-Potable Water Date: 6/20/17
Type: Grab Time: 1100

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

Relinquished By	6/20/17 1300 Date/Time	Received By	6-20-17 1325 Date/Time
Relinquished By	Date/Time	Received at Laboratory By	6-20-17 1355 Date/Time

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	12
Samples on Ice?	Yes No NA
Approved By:	BW
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: 06/06/17 12:20:59PM

Report Template: wko WorkOrder COC ls

M.J. Reider Associates, Inc.

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

Project Manager: Richard Wheeler **Project:** 6223 - Seasonal Monthly Blue Marsh Reservoir

Comments:

Collected By : (Full Name) Gregory WACIK

7009998-21 BM-11 Surface

Matrix: Non-Potable Water Date: 6/20/17

Type: Grab Time: 1230

BOD, FC, PO4-D(H), TC#s, NO2 353.2, NO3 353.2, O-PO4 H

Alk 2320B, NH3-N, TDS, TKN, PO4-P H, TOC, TSS

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc
H - Vial Amber 40ml H3PO4, zero hdspc

Relinquished By	6/20/17 1300 Date/Time	Received By	6-20-17 1325 Date/Time
Relinquished By	Date/Time	Received at Laboratory By	6-20-17 1355 Date/Time

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	12
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: 06/06/17 12:20:59PM

Report Template: wko WorkOrder COC 1s

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 Wheeler
Project Manager

Certificate of Analysis

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

Laboratory No.: 7011015
Report: 07/25/17
Lab Contact: Richard Wheeler

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

Project Info: 6223 - Seasonal Monthly Blue Marsh Reservoir

Lab ID: 7011015-01 **Collected By:** Client **Sampled:** 07/18/17 13:00 **Received:** 07/18/17 13:30
Sample Desc: BM-1 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	07/19/17	G-11	AEH
General Chemistry							
Alkalinity, Total to pH 4.5	129	mg/l	2	SM 2320 B	07/19/17		MPB
Nitrogen, Ammonia	0.22	mg/l	0.05	ASTM D6919-03	07/19/17		REB
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	07/18/17	C-05	AEH
Nitrogen, Nitrate	4.70	mg/l	0.05	EPA 353.2	07/18/17 15:38		RES
Nitrogen, Nitrite	0.11	mg/l	0.05	EPA 353.2	07/18/17 14:41		RES
Nitrogen, Total Kjeldahl (TKN)	0.73	mg/l	0.25	EPA 351.2	07/20/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	07/19/17 12:10	G-11	AEH
Phosphorus as P, Total	<0.01	mg/l	0.01	SM 4500-P E	07/19/17		AEH
Solids, Total Dissolved	208	mg/l	5	SM 2540 C	07/19/17		TMH
Total Organic Carbon	2.6	mg/l	0.5	SM 5310 C	07/19/17		ALD
Solids, Total Suspended	<3	mg/l	3	SM 2540 D	07/19/17		TMH

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	56	/100ml	2	SM 9222 D	07/18/17 14:15		TNS
Total Coliform	>2400	mpn/100ml	1	SM 9223 B	07/18/17 17:10		BLS

Lab ID: 7011015-02 **Collected By:** Client **Sampled:** 07/18/17 09:40 **Received:** 07/18/17 13:30
Sample Desc: BM-2 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	07/19/17	G-11	AEH
General Chemistry							
Alkalinity, Total to pH 4.5	87	mg/l	2	SM 2320 B	07/19/17		MPB
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	07/19/17		REB
Biochemical Oxygen Demand	4	mg/l	2	SM 5210 B	07/18/17		AEH
Nitrogen, Nitrate	3.00	mg/l	0.10	EPA 353.2	07/18/17 15:41		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	07/18/17 14:44		RES
Nitrogen, Total Kjeldahl (TKN)	1.05	mg/l	0.25	EPA 351.2	07/20/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	07/19/17 12:10	G-11	AEH
Phosphorus as P, Total	<0.01	mg/l	0.01	SM 4500-P E	07/19/17		AEH
Solids, Total Dissolved	150	mg/l	5	SM 2540 C	07/19/17		TMH
Total Organic Carbon	3.0	mg/l	0.5	SM 5310 C	07/19/17		ALD
Solids, Total Suspended	6	mg/l	3	SM 2540 D	07/19/17		TMH

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	2	/100ml	2	SM 9222 D	07/18/17 14:45		TNS
Total Coliform	1400	mpn/100ml	1	SM 9223 B	07/18/17 17:10		BLS

Lab ID: 7011015-03 **Collected By:** Client **Sampled:** 07/18/17 09:40 **Received:** 07/18/17 13:30
Sample Desc: BM-2 Mid-Depth **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	07/19/17	G-11	AEH
General Chemistry							
Alkalinity, Total to pH 4.5	126	mg/l	2	SM 2320 B	07/19/17		MPB
Nitrogen, Ammonia	0.23	mg/l	0.05	ASTM D6919-03	07/19/17		REB
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	07/18/17	C-05	AEH
Nitrogen, Nitrate	4.62	mg/l	0.05	EPA 353.2	07/18/17 15:42		RES
Nitrogen, Nitrite	0.11	mg/l	0.05	EPA 353.2	07/18/17 14:45		RES
Nitrogen, Total Kjeldahl (TKN)	1.40	mg/l	0.25	EPA 351.2	07/20/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	07/19/17 12:10	G-11	AEH
Phosphorus as P, Total	0.02	mg/l	0.01	SM 4500-P E	07/19/17		AEH
Solids, Total Dissolved	204	mg/l	5	SM 2540 C	07/19/17		TMH
Total Organic Carbon	2.9	mg/l	0.5	SM 5310 C	07/19/17		ALD
Solids, Total Suspended	3	mg/l	3	SM 2540 D	07/19/17		TMH

Lab ID: 7011015-04 **Collected By:** Client **Sampled:** 07/18/17 09:40 **Received:** 07/18/17 13:30
Sample Desc: BM-2 Deep **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	07/19/17	G-11	AEH
General Chemistry							
Alkalinity, Total to pH 4.5	141	mg/l	2	SM 2320 B	07/19/17		MPB
Nitrogen, Ammonia	0.47	mg/l	0.05	ASTM D6919-03	07/19/17		REB
Biochemical Oxygen Demand	4	mg/l	2	SM 5210 B	07/18/17		AEH
Nitrogen, Nitrate	4.14	mg/l	0.05	EPA 353.2	07/18/17 15:43		RES
Nitrogen, Nitrite	0.21	mg/l	0.05	EPA 353.2	07/18/17 14:46		RES
Nitrogen, Total Kjeldahl (TKN)	1.10	mg/l	0.25	EPA 351.2	07/20/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	07/19/17 12:10	G-11	AEH
Phosphorus as P, Total	0.01	mg/l	0.01	SM 4500-P E	07/19/17		AEH
Solids, Total Dissolved	215	mg/l	5	SM 2540 C	07/19/17		TMH
Total Organic Carbon	2.6	mg/l	0.5	SM 5310 C	07/19/17		ALD
Solids, Total Suspended	13	mg/l	3	SM 2540 D	07/19/17		TMH

Lab ID: 7011015-05 **Collected By:** Client **Sampled:** 07/18/17 12:20 **Received:** 07/18/17 13:30
Sample Desc: BM-5 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	07/19/17	G-11	AEH
General Chemistry							
Alkalinity, Total to pH 4.5	205	mg/l	2	SM 2320 B	07/19/17		MPB
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	07/19/17		REB
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	07/18/17	C-05	AEH
Nitrogen, Nitrate	7.78	mg/l	0.10	EPA 353.2	07/18/17 15:44		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	07/18/17 14:47		RES
Nitrogen, Total Kjeldahl (TKN)	<0.25	mg/l	0.25	EPA 351.2	07/20/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	07/19/17 12:10	G-11	AEH
Phosphorus as P, Total	0.05	mg/l	0.01	SM 4500-P E	07/19/17		AEH
Solids, Total Dissolved	298	mg/l	5	SM 2540 C	07/19/17		TMH
Total Organic Carbon	1.6	mg/l	0.5	SM 5310 C	07/19/17		ALD
Solids, Total Suspended	8	mg/l	3	SM 2540 D	07/19/17		TMH

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	3000	/100ml	2	SM 9222 D	07/18/17 14:45		TNS
Total Coliform	>2400	mpn/100ml	1	SM 9223 B	07/18/17 17:10		BLS

Lab ID: 7011015-06 **Collected By:** Client **Sampled:** 07/18/17 09:00 **Received:** 07/18/17 13:30
Sample Desc: BM-6 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	07/19/17	G-11	AEH
General Chemistry							
Alkalinity, Total to pH 4.5	79	mg/l	2	SM 2320 B	07/19/17		MPB
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	07/19/17		REB
Biochemical Oxygen Demand	4	mg/l	2	SM 5210 B	07/18/17		AEH
Nitrogen, Nitrate	3.02	mg/l	0.10	EPA 353.2	07/18/17 15:45		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	07/18/17 14:48		RES
Nitrogen, Total Kjeldahl (TKN)	0.91	mg/l	0.25	EPA 351.2	07/20/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	07/19/17 12:10	G-11	AEH
Phosphorus as P, Total	0.02	mg/l	0.01	SM 4500-P E	07/19/17		AEH
Solids, Total Dissolved	146	mg/l	5	SM 2540 C	07/19/17		TMH
Total Organic Carbon	3.0	mg/l	0.5	SM 5310 C	07/19/17		ALD
Solids, Total Suspended	10	mg/l	3	SM 2540 D	07/19/17		TMH

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	10	/100ml	2	SM 9222 D	07/18/17 14:45		TNS
Total Coliform	2400	mpn/100ml	1	SM 9223 B	07/18/17 17:10		BLS

Lab ID: 7011015-07 **Collected By:** Client **Sampled:** 07/18/17 09:00 **Received:** 07/18/17 13:30
Sample Desc: BM-6 Deep **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	07/19/17	G-11	AEH
General Chemistry							
Alkalinity, Total to pH 4.5	141	mg/l	2	SM 2320 B	07/19/17		MPB
Nitrogen, Ammonia	0.43	mg/l	0.05	ASTM D6919-03	07/19/17		REB
Biochemical Oxygen Demand	5	mg/l	2	SM 5210 B	07/18/17		AEH
Nitrogen, Nitrate	4.06	mg/l	0.05	EPA 353.2	07/18/17 15:48		RES
Nitrogen, Nitrite	0.25	mg/l	0.05	EPA 353.2	07/18/17 14:49		RES
Nitrogen, Total Kjeldahl (TKN)	0.94	mg/l	0.25	EPA 351.2	07/20/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	07/19/17 12:10	G-11	AEH
Phosphorus as P, Total	0.02	mg/l	0.01	SM 4500-P E	07/19/17		AEH
Solids, Total Dissolved	221	mg/l	5	SM 2540 C	07/19/17		TMH
Total Organic Carbon	2.3	mg/l	0.5	SM 5310 C	07/19/17		ALD
Solids, Total Suspended	3	mg/l	3	SM 2540 D	07/19/17		TMH

Lab ID: 7011015-08 **Collected By:** Client **Sampled:** 07/18/17 09:00 **Received:** 07/18/17 13:30
Sample Desc: BM-6 Mid-Depth **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	07/19/17	G-11	AEH
General Chemistry							
Alkalinity, Total to pH 4.5	133	mg/l	2	SM 2320 B	07/19/17		MPB
Nitrogen, Ammonia	0.16	mg/l	0.05	ASTM D6919-03	07/19/17		REB
Biochemical Oxygen Demand	3	mg/l	2	SM 5210 B	07/18/17		AEH
Nitrogen, Nitrate	4.75	mg/l	0.05	EPA 353.2	07/18/17 15:49		RES
Nitrogen, Nitrite	0.26	mg/l	0.05	EPA 353.2	07/18/17 14:50		RES
Nitrogen, Total Kjeldahl (TKN)	0.68	mg/l	0.25	EPA 351.2	07/20/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	07/19/17 12:10	G-11	AEH
Phosphorus as P, Total	0.01	mg/l	0.01	SM 4500-P E	07/19/17		AEH
Solids, Total Dissolved	220	mg/l	5	SM 2540 C	07/19/17		TMH
Total Organic Carbon	2.7	mg/l	0.5	SM 5310 C	07/19/17		ALD
Solids, Total Suspended	<3	mg/l	3	SM 2540 D	07/19/17		TMH

Lab ID: 7011015-09 **Collected By:** Client **Sampled:** 07/18/17 10:05 **Received:** 07/18/17 13:30
Sample Desc: BM-7 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	07/19/17	G-11	AEH
General Chemistry							
Alkalinity, Total to pH 4.5	91	mg/l	2	SM 2320 B	07/19/17		MPB
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	07/19/17		REB
Biochemical Oxygen Demand	4	mg/l	2	SM 5210 B	07/18/17		AEH
Nitrogen, Nitrate	3.05	mg/l	0.10	EPA 353.2	07/18/17 15:50		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	07/18/17 14:53		RES
Nitrogen, Total Kjeldahl (TKN)	1.17	mg/l	0.25	EPA 351.2	07/20/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	07/19/17 12:10	G-11	AEH
Phosphorus as P, Total	<0.01	mg/l	0.01	SM 4500-P E	07/19/17		AEH
Solids, Total Dissolved	147	mg/l	5	SM 2540 C	07/19/17		TMH
Total Organic Carbon	3.0	mg/l	0.5	SM 5310 C	07/19/17		ALD
Solids, Total Suspended	6	mg/l	3	SM 2540 D	07/19/17		TMH

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	3	/100ml	2	SM 9222 D	07/18/17 14:45		TNS
Total Coliform	>2400	mpn/100ml	1	SM 9223 B	07/18/17 17:10		BLS

Lab ID: 7011015-10 **Collected By:** Client **Sampled:** 07/18/17 10:05 **Received:** 07/18/17 13:30
Sample Desc: BM-7 Mid-Depth **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	07/19/17	G-11	AEH
General Chemistry							
Alkalinity, Total to pH 4.5	100	mg/l	2	SM 2320 B	07/19/17		MPB
Nitrogen, Ammonia	0.20	mg/l	0.05	ASTM D6919-03	07/19/17		REB
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	07/18/17	C-05	AEH
Nitrogen, Nitrate	4.08	mg/l	0.10	EPA 353.2	07/18/17 15:51		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	07/18/17 14:54		RES
Nitrogen, Total Kjeldahl (TKN)	0.83	mg/l	0.25	EPA 351.2	07/20/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	07/19/17 12:10	G-11	AEH
Phosphorus as P, Total	0.03	mg/l	0.01	SM 4500-P E	07/19/17		AEH
Solids, Total Dissolved	165	mg/l	5	SM 2540 C	07/19/17		TMH
Total Organic Carbon	3.3	mg/l	0.5	SM 5310 C	07/19/17		ALD
Solids, Total Suspended	3	mg/l	3	SM 2540 D	07/19/17		TMH

Lab ID: 7011015-11 **Collected By:** Client **Sampled:** 07/18/17 10:05 **Received:** 07/18/17 13:30
Sample Desc: BM-7 Deep **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	07/19/17	G-11	AEH
General Chemistry							
Alkalinity, Total to pH 4.5	97	mg/l	2	SM 2320 B	07/19/17		MPB
Nitrogen, Ammonia	0.23	mg/l	0.05	ASTM D6919-03	07/19/17		REB
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	07/18/17	C-05	AEH
Nitrogen, Nitrate	4.86	mg/l	0.10	EPA 353.2	07/18/17 15:52		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	07/18/17 14:55		RES
Nitrogen, Total Kjeldahl (TKN)	0.82	mg/l	0.25	EPA 351.2	07/20/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	07/19/17 12:10	G-11	AEH
Phosphorus as P, Total	0.06	mg/l	0.01	SM 4500-P E	07/19/17		AEH
Solids, Total Dissolved	173	mg/l	5	SM 2540 C	07/19/17		TMH
Total Organic Carbon	3.3	mg/l	0.5	SM 5310 C	07/19/17		ALD
Solids, Total Suspended	9	mg/l	3	SM 2540 D	07/19/17		TMH

Lab ID: 7011015-12 **Collected By:** Client **Sampled:** 07/18/17 11:25 **Received:** 07/18/17 13:30
Sample Desc: BM-8 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	07/19/17	G-11	AEH
General Chemistry							
Alkalinity, Total to pH 4.5	90	mg/l	2	SM 2320 B	07/19/17		MPB
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	07/19/17		REB
Biochemical Oxygen Demand	4	mg/l	2	SM 5210 B	07/18/17		AEH
Nitrogen, Nitrate	2.94	mg/l	0.10	EPA 353.2	07/18/17 15:54		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	07/18/17 14:58		RES
Nitrogen, Total Kjeldahl (TKN)	1.52	mg/l	0.25	EPA 351.2	07/20/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	07/19/17 12:10	G-11	AEH
Phosphorus as P, Total	<0.01	mg/l	0.01	SM 4500-P E	07/19/17		AEH
Solids, Total Dissolved	162	mg/l	5	SM 2540 C	07/19/17		TMH
Total Organic Carbon	3.2	mg/l	0.5	SM 5310 C	07/19/17		ALD
Solids, Total Suspended	10	mg/l	3	SM 2540 D	07/19/17		TMH

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	2	/100ml	2	SM 9222 D	07/18/17 14:45		TNS
Total Coliform	2400	mpn/100ml	1	SM 9223 B	07/18/17 17:10		BLS

Lab ID: 7011015-13 **Collected By:** Client **Sampled:** 07/18/17 11:25 **Received:** 07/18/17 13:30
Sample Desc: BM-8 Mid-Depth **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	07/19/17	G-11	AEH
General Chemistry							
Alkalinity, Total to pH 4.5	93	mg/l	2	SM 2320 B	07/19/17		MPB
Nitrogen, Ammonia	0.16	mg/l	0.05	ASTM D6919-03	07/19/17		REB
Biochemical Oxygen Demand	2	mg/l	2	SM 5210 B	07/18/17		AEH
Nitrogen, Nitrate	3.07	mg/l	0.10	EPA 353.2	07/18/17 15:55		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	07/18/17 14:58		RES
Nitrogen, Total Kjeldahl (TKN)	0.99	mg/l	0.25	EPA 351.2	07/20/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	07/19/17 12:10	G-11	AEH
Phosphorus as P, Total	0.02	mg/l	0.01	SM 4500-P E	07/19/17		AEH
Solids, Total Dissolved	178	mg/l	5	SM 2540 C	07/19/17		TMH
Total Organic Carbon	2.7	mg/l	0.5	SM 5310 C	07/19/17		ALD
Solids, Total Suspended	4	mg/l	3	SM 2540 D	07/19/17		TMH

Lab ID: 7011015-14 **Collected By:** Client **Sampled:** 07/18/17 11:25 **Received:** 07/18/17 13:30
Sample Desc: BM-8 Deep **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	07/19/17	G-11	AEH
General Chemistry							
Alkalinity, Total to pH 4.5	105	mg/l	2	SM 2320 B	07/19/17		MPB
Nitrogen, Ammonia	0.36	mg/l	0.05	ASTM D6919-03	07/19/17		REB
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	07/18/17	C-05	AEH
Nitrogen, Nitrate	2.94	mg/l	0.05	EPA 353.2	07/18/17 15:56		RES
Nitrogen, Nitrite	0.05	mg/l	0.05	EPA 353.2	07/18/17 14:59		RES
Nitrogen, Total Kjeldahl (TKN)	0.92	mg/l	0.25	EPA 351.2	07/20/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	07/19/17 12:10	G-11	AEH
Phosphorus as P, Total	0.03	mg/l	0.01	SM 4500-P E	07/19/17		AEH
Solids, Total Dissolved	212	mg/l	5	SM 2540 C	07/19/17		TMH
Total Organic Carbon	2.7	mg/l	0.5	SM 5310 C	07/19/17		ALD
Solids, Total Suspended	8	mg/l	3	SM 2540 D	07/19/17		TMH

Lab ID: 7011015-15 **Collected By:** Client **Sampled:** 07/18/17 10:30 **Received:** 07/18/17 13:30
Sample Desc: BM-9 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	07/19/17	G-11	AEH
General Chemistry							
Alkalinity, Total to pH 4.5	90	mg/l	2	SM 2320 B	07/19/17		MPB
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	07/19/17		REB
Biochemical Oxygen Demand	5	mg/l	2	SM 5210 B	07/18/17		AEH
Nitrogen, Nitrate	2.98	mg/l	0.10	EPA 353.2	07/18/17 15:59		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	07/18/17 15:00		RES
Nitrogen, Total Kjeldahl (TKN)	1.67	mg/l	0.25	EPA 351.2	07/20/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	07/19/17 12:10	G-11	AEH
Phosphorus as P, Total	0.01	mg/l	0.01	SM 4500-P E	07/19/17		AEH
Solids, Total Dissolved	173	mg/l	5	SM 2540 C	07/19/17		TMH
Total Organic Carbon	3.3	mg/l	0.5	SM 5310 C	07/19/17		ALD
Solids, Total Suspended	14	mg/l	3	SM 2540 D	07/19/17		TMH

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	2	/100ml	2	SM 9222 D	07/18/17 14:45		TNS
Total Coliform	690	mpn/100ml	1	SM 9223 B	07/18/17 17:10		BLS

Lab ID: 7011015-16 **Collected By:** Client **Sampled:** 07/18/17 10:30 **Received:** 07/18/17 13:30
Sample Desc: BM-9 Mid-Depth **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	07/19/17	G-11	AEH
General Chemistry							
Alkalinity, Total to pH 4.5	95	mg/l	2	SM 2320 B	07/19/17		MPB
Nitrogen, Ammonia	0.18	mg/l	0.05	ASTM D6919-03	07/19/17		REB
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	07/18/17	C-05	AEH
Nitrogen, Nitrate	4.46	mg/l	0.10	EPA 353.2	07/18/17 16:00		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	07/18/17 15:01		RES
Nitrogen, Total Kjeldahl (TKN)	0.79	mg/l	0.25	EPA 351.2	07/20/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	07/19/17 12:10	G-11	AEH
Phosphorus as P, Total	0.02	mg/l	0.01	SM 4500-P E	07/19/17		AEH
Solids, Total Dissolved	182	mg/l	5	SM 2540 C	07/19/17		TMH
Total Organic Carbon	3.2	mg/l	0.5	SM 5310 C	07/19/17		ALD
Solids, Total Suspended	4	mg/l	3	SM 2540 D	07/19/17		TMH

Lab ID: 7011015-17 **Collected By:** Client **Sampled:** 07/18/17 10:30 **Received:** 07/18/17 13:30
Sample Desc: BM-9 Deep **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	07/19/17	G-11	AEH
General Chemistry							
Alkalinity, Total to pH 4.5	108	mg/l	2	SM 2320 B	07/19/17		MPB
Nitrogen, Ammonia	0.24	mg/l	0.05	ASTM D6919-03	07/19/17		REB
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	07/18/17	C-05	AEH
Nitrogen, Nitrate	5.30	mg/l	0.10	EPA 353.2	07/18/17 16:01		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	07/18/17 15:04		RES
Nitrogen, Total Kjeldahl (TKN)	0.85	mg/l	0.25	EPA 351.2	07/20/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	07/19/17 12:10	G-11	AEH
Phosphorus as P, Total	0.05	mg/l	0.01	SM 4500-P E	07/19/17		AEH
Solids, Total Dissolved	216	mg/l	5	SM 2540 C	07/19/17		TMH
Total Organic Carbon	2.5	mg/l	0.5	SM 5310 C	07/19/17		ALD
Solids, Total Suspended	25	mg/l	3	SM 2540 D	07/19/17		TMH

Lab ID: 7011015-18 **Collected By:** Client **Sampled:** 07/18/17 11:00 **Received:** 07/18/17 13:30
Sample Desc: BM-10 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	07/19/17	G-11	AEH
General Chemistry							
Alkalinity, Total to pH 4.5	84	mg/l	2	SM 2320 B	07/19/17		MPB
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	07/19/17		REB
Biochemical Oxygen Demand	4	mg/l	2	SM 5210 B	07/18/17		AEH
Nitrogen, Nitrate	2.82	mg/l	0.10	EPA 353.2	07/18/17 16:02		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	07/18/17 15:05		RES
Nitrogen, Total Kjeldahl (TKN)	1.39	mg/l	0.25	EPA 351.2	07/20/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	07/19/17 12:10	G-11	AEH
Phosphorus as P, Total	0.04	mg/l	0.01	SM 4500-P E	07/19/17		AEH
Solids, Total Dissolved	172	mg/l	5	SM 2540 C	07/19/17		TMH
Total Organic Carbon	3.1	mg/l	0.5	SM 5310 C	07/19/17		ALD
Solids, Total Suspended	8	mg/l	3	SM 2540 D	07/19/17		TMH

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	<2	/100ml	2	SM 9222 D	07/18/17 14:45		TNS
Total Coliform	340	mpn/100ml	1	SM 9223 B	07/18/17 17:10		BLS

Lab ID: 7011015-19 **Collected By:** Client **Sampled:** 07/18/17 11:00 **Received:** 07/18/17 13:30
Sample Desc: BM-10 Mid-Depth **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	07/19/17	G-11	AEH
General Chemistry							
Alkalinity, Total to pH 4.5	83	mg/l	2	SM 2320 B	07/19/17		MPB
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	07/19/17		REB
Biochemical Oxygen Demand	4	mg/l	2	SM 5210 B	07/18/17		AEH
Nitrogen, Nitrate	3.08	mg/l	0.10	EPA 353.2	07/18/17 16:03		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	07/18/17 15:06		RES
Nitrogen, Total Kjeldahl (TKN)	1.34	mg/l	0.25	EPA 351.2	07/20/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	07/19/17 12:10	G-11	AEH
Phosphorus as P, Total	0.04	mg/l	0.01	SM 4500-P E	07/19/17		AEH
Solids, Total Dissolved	177	mg/l	5	SM 2540 C	07/19/17		TMH
Total Organic Carbon	3.2	mg/l	0.5	SM 5310 C	07/19/17		ALD
Solids, Total Suspended	5	mg/l	3	SM 2540 D	07/19/17		TMH

Lab ID: 7011015-20 **Collected By:** Client **Sampled:** 07/18/17 11:00 **Received:** 07/18/17 13:30
Sample Desc: BM-10 Deep **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	07/19/17	G-11	AEH
General Chemistry							
Alkalinity, Total to pH 4.5	119	mg/l	2	SM 2320 B	07/19/17		MPB
Nitrogen, Ammonia	0.16	mg/l	0.05	ASTM D6919-03	07/19/17		REB
Biochemical Oxygen Demand	3	mg/l	2	SM 5210 B	07/18/17		AEH
Nitrogen, Nitrate	6.06	mg/l	0.10	EPA 353.2	07/18/17 16:04		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	07/18/17 15:07		RES
Nitrogen, Total Kjeldahl (TKN)	1.44	mg/l	0.25	EPA 351.2	07/20/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	07/19/17 12:10	G-11	AEH
Phosphorus as P, Total	0.05	mg/l	0.01	SM 4500-P E	07/19/17		AEH
Solids, Total Dissolved	221	mg/l	5	SM 2540 C	07/19/17		TMH
Total Organic Carbon	2.2	mg/l	0.5	SM 5310 C	07/19/17		ALD
Solids, Total Suspended	416	mg/l	3	SM 2540 D	07/19/17		TMH

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Lab ID: 7011015-21 **Collected By:** Client **Sampled:** 07/18/17 12:20 **Received:** 07/18/17 13:30
Sample Desc: BM-11 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	07/19/17	G-11	AEH
General Chemistry							
Alkalinity, Total to pH 4.5	41	mg/l	2	SM 2320 B	07/19/17		MPB
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	07/19/17		REB
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	07/18/17	C-05	AEH
Nitrogen, Nitrate	5.20	mg/l	0.10	EPA 353.2	07/18/17 16:05		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	07/18/17 15:08		RES
Nitrogen, Total Kjeldahl (TKN)	0.48	mg/l	0.25	EPA 351.2	07/20/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	07/19/17 12:10	G-11	AEH
Phosphorus as P, Total	<0.01	mg/l	0.01	SM 4500-P E	07/19/17		AEH
Solids, Total Dissolved	123	mg/l	5	SM 2540 C	07/19/17		TMH
Total Organic Carbon	2.3	mg/l	0.5	SM 5310 C	07/19/17		ALD
Solids, Total Suspended	4	mg/l	3	SM 2540 D	07/19/17		TMH

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	550	/100ml	2	SM 9222 D	07/18/17 14:45		TNS
Total Coliform	>2400	mpn/100ml	1	SM 9223 B	07/18/17 17:10		BLS

Notes and Definitions

C-05 The sample did not meet the minimum DO depletion of at least 2 mg/L.

G-11 The sample was filtered after it was received at the laboratory.

M.J. Reider Associates, Inc.

107 Angelica St, Reading PA, 19611
610-374-5129 www.mjreider.com

WORK ORDER
Chain of Custody

7011015

Client Code: 3157 **Client:** Tetra Tech
Project Manager: Richard Wheeler **Project:** 6223 - Seasonal Monthly Blue Marsh 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:

7011015-01 BM-1 Surface

Matrix: Non-Potable Water Date: 7/18/17
Type: Grab Time: 1300

BOD, FC, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H), TC#s
Alk 2320B, NH3-N, PO4-P H, TDS, TKN, TOC, TSS

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc
H - Vial Amber 40ml H3PO4, zero hdspc

7011015-02 BM-2 Surface

Matrix: Non-Potable Water Date: 7/18/17
Type: Grab Time: 0940

BOD, FC, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H), TC#s
Alk 2320B, NH3-N, PO4-P H, TDS, TKN, TOC, TSS

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc
H - Vial Amber 40ml H3PO4, zero hdspc

Relinquished By: Gregory Wacik	Date/Time: 1300 7/18/17	Received By:	Date/Time: 7-18-17 1315
Relinquished By	Date/Time	Received at Laboratory By	Date/Time: 7-18-17 1330

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	12
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.

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M.J. Reider Associates, Inc.

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

Project Manager: Richard Wheeler **Project:** 6223 - Seasonal Monthly Blue Marsh Reservoir

Comments:

Collected By : (Full Name) Gregory Wacik

7011015-03 BM-2 Mid-Depth

BOD, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H)
Alk 2320B, NH3-N, PO4-P H, TDS, TKN, TOC, TSS

Matrix: Non-Potable Water **Date:** 7/18/17
Type: Grab **Time:** 0940

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

7011015-04 BM-2 Deep

BOD, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H)
Alk 2320B, NH3-N, TDS, TKN, TOC, TSS, PO4-P H

Matrix: Non-Potable Water **Date:** 7/18/17
Type: Grab **Time:** 0940

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

7011015-05 BM-5 Surface

NO2 353.2, NO3 353.2, O-PO4 H, BOD, FC, PO4-D(H), TC#s
PO4-P H, TOC, TSS, Alk 2320B, NH3-N, TDS, TKN

Matrix: Non-Potable Water **Date:** 7/18/17
Type: Grab **Time:** 1220

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc
H - Vial Amber 40ml H3PO4, zero hdspc

Relinquished By	7/18/17 1300 Date/Time	Received By	7-18-17 1315 Date/Time
Relinquished By	Date/Time	Received at Laboratory By	7-18-17 1330 Date/Time

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	12
Samples on Ice?	Yes No NA
Approved By:	
Entered By:	

Report Template: WKO WorkOrder COC 15

M.J. Reider Associates, Inc.

7011015

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

Project Manager: Richard Wheeler **Project:** 6223 - Seasonal Monthly Blue Marsh Reservoir

Comments:

Collected By : (Full Name) Gregory Wacik

7011015-06 BM-6 Surface

BOD, O-PO4 H, PO4-D(H), TC#s, FC, NO2 353.2, NO3 353.2
Alk 2320B, PO4-P H, NH3-N, TDS, TKN, TOC, TSS

Matrix: Non-Potable Water **Date:** 7/18/17
Type: Grab **Time:** 0900

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc
H - Vial Amber 40ml H3PO4, zero hdspc

7011015-07 BM-6 ~~Mid-Depth~~ DEEP

BOD, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H)
Alk 2320B, NH3-N, TDS, TKN, TOC, TSS, PO4-P H

Matrix: Non-Potable Water **Date:** 7/18/17
Type: Grab **Time:** 0900

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

7011015-08 BM-6 ~~Deep~~ Mid-Depth

BOD, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H)
Alk 2320B, NH3-N, PO4-P H, TDS, TKN, TOC, TSS

Matrix: Non-Potable Water **Date:** 7/18/17
Type: Grab **Time:** 0900

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

Relinquished By	Date/Time	Received By	Date/Time
Gregory Wack	7/18/17 1300		7/18/17 1315
Relinquished By	Date/Time	Received at Laboratory By	Date/Time
			7/18/17 1330

Sample Kit Prepared By:	Date/Time

Sample Temp (°C): 12
Samples on Ice? Yes No NA
Approved By:
Entered By:

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M.J. Reider Associates, Inc.

7011015

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

Project Manager: Richard Wheeler **Project:** 6223 - Seasonal Monthly Blue Marsh Reservoir

Comments:

Collected By : (Full Name) Gregory Wacik

7011015-09 BM-7 Surface

BOD, FC, PO4-D(H), TC#s, NO2 353.2, NO3 353.2, O-PO4 H
Alk 2320B, NH3-N, TDS, TKN, PO4-P H, TOC, TSS

Matrix: Non-Potable Water **Date:** 7/18/17
Type: Grab **Time:** 1005

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc
H - Vial Amber 40ml H3PO4, zero hdspc

7011015-10 BM-7 Mid-Depth

NO2 353.2, NO3 353.2, O-PO4 H, BOD, PO4-D(H)
NH3-N, TOC, TSS, Alk 2320B, PO4-P H, TDS, TKN

Matrix: Non-Potable Water **Date:** 7/18/17
Type: Grab **Time:** 1005

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

7011015-11 BM-7 Deep

BOD, PO4-D(H), NO2 353.2, NO3 353.2, O-PO4 H
Alk 2320B, PO4-P H, TDS, TKN, NH3-N, TOC, TSS

Matrix: Non-Potable Water **Date:** 7/18/17
Type: Grab **Time:** 1005

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

Relinquished By	Date/Time	Received By	Date/Time
Mary Wack	7/18/17 1300		7-18-17 1315
Relinquished By	Date/Time	Received at Laboratory By	Date/Time
			7-18-17 1330

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	12
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.

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Report Template: wko WorkOrder COC ls

M.J. Reider Associates, Inc.

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

Project Manager: Richard Wheeler **Project:** 6223 - Seasonal Monthly Blue Marsh Reservoir

Comments:

Collected By : (Full Name) Gregory Wack

7011015-12 BM-8 Surface

TNB RES SW

FC, NO2 353.2, NO3 353.2, BOD, O-PO4 H, PO4-D(H), TC#s
NH3-N, TDS, TKN, TOC, TSS, Alk 2320B, PO4-P H

AH

Matrix: Non-Potable Water Date: 7/18/17
Type: Grab Time: 1125

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc
H - Vial Amber 40ml H3PO4, zero hdspc

7011015-13 BM-8 Mid-Depth

SW RES

BOD, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H)
Alk 2320B, NH3-N, PO4-P H, TDS, TKN, TOC, TSS

Matrix: Non-Potable Water Date: 7/18/17
Type: Grab Time: 1125

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

7011015-14 BM-8 Deep

SW RES

BOD, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H)
Alk 2320B, NH3-N, TDS, TKN, TOC, TSS, PO4-P H

Matrix: Non-Potable Water Date: 7/18/17
Type: Grab Time: 1125

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

Relinquished By: Gregory Wack	Date/Time: 7/18/17 1300	Received By:	Date/Time: 7/18/17 1315
Relinquished By:	Date/Time:	Received at Laboratory By:	Date/Time: 7/18/17 1330

Sample Kit Prepared By:	Date/Time
Sample Temp (°C): 2	
Samples on Ice? Yes No NA	
Approved By: JB	
Entered By:	

M.J. Reider Associates, Inc.

7011015

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

Project Manager: Richard Wheeler **Project:** 6223 - Seasonal Monthly Blue Marsh Reservoir

Comments:

Collected By : (Full Name) Gregory Wacik

7011015-15 BM-9 Surface

NO2 353.2, NO3 353.2, O-PO4 H, BOD, FC, PO4-D(H), TC#s
PO4-P H, TOC, TSS, Alk 2320B, NH3-N, TDS, TKN

Matrix: Non-Potable Water Date: 7/18/17
Type: Grab Time: 1030

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc
H - Vial Amber 40ml H3PO4, zero hdspc

7011015-16 BM-9 Mid-Depth

BOD, PO4-D(H), NO2 353.2, NO3 353.2, O-PO4 H
Alk 2320B, PO4-P H, TDS, TKN, NH3-N, TOC, TSS

Matrix: Non-Potable Water Date: 7/18/17
Type: Grab Time: 1030

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

7011015-17 BM-9 Deep

NO2 353.2, NO3 353.2, O-PO4 H, BOD, PO4-D(H)
NH3-N, TOC, TSS, Alk 2320B, PO4-P H, TDS, TKN

Matrix: Non-Potable Water Date: 7/18/17
Type: Grab Time: 1030

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

Relinquished By	Date/Time	Received By	Date/Time
	7/18/17 1300		7/18/17 1315
Relinquished By	Date/Time	Received at Laboratory By	Date/Time
			7/18/17 1330

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	12
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.

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Report Template: wko WorkOrder COC ls

M.J. Reider Associates, Inc.

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

Project Manager: Richard Wheeler **Project:** 6223 - Seasonal Monthly Blue Marsh Reservoir

Comments:

Collected By : (Full Name) Gregory Wacik

7011015-18 BM-10 Surface

Matrix: Non-Potable Water **Date:** 7/18/17
Type: Grab **Time:** 1100

BOD, FC, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H), TC#s
Alk 2320B, NH3-N, PO4-P H, TDS, TKN, TOC, TSS

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc
H - Vial Amber 40ml H3PO4, zero hdspc

7011015-19 BM-10 Mid-Depth

Matrix: Non-Potable Water **Date:** 7/18/17
Type: Grab **Time:** 1100

BOD, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H)
Alk 2320B, NH3-N, TDS, TKN, TOC, TSS, PO4-P H

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

7011015-20 BM-10 Deep

Matrix: Non-Potable Water **Date:** 7/18/17
Type: Grab **Time:** 1100

NO3 353.2, O-PO4 H, PO4-D(H), BOD, NO2 353.2
PO4-P H, Alk 2320B, NH3-N, TDS, TKN, TOC, TSS

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

Relinquished By	Date/Time 7/18/17 1300	Received By	Date/Time 7/18/17 1315
Relinquished By	Date/Time	Received at Laboratory By	Date/Time 7/18/17 1330

Sample Kit Prepared By:	Date/Time

Sample Temp (°C): 12
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: 6/15/2017 7:50:24AM

Report Template: wko WorkOrder COC ls

7011015

M.J. Reider Associates, Inc.

Client Code: 3157
Project Manager: Richard Wheeler

Client: Tetra Tech
Project: 6223 - Seasonal Monthly Blue Marsh Reservoir
Comments:

Collected By : (Full Name) Gregory Wacik

7011015-21 BM-11 Surface

Matrix: Non-Potable Water
Type: Grab

Date: 7/18/17
Time: 1220

BOD, FC, PO4-D(H), TC#s, NO2 353.2, NO3 353.2, O-PO4 H
Alk 2320B, NH3-N, TDS, TKN, PO4-P H, TOC, TSS

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc
H - Vial Amber 40ml H3PO4, zero hdspc

Relinquished By	7/18/17 1300 Date/Time	Received By	7/18/17 1715 Date/Time
Relinquished By	Date/Time	Received at Laboratory By	7/18/17 1330 Date/Time

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	12
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: 6/15/2017 7:50:24AM

Report Template: WKO WorkOrder COC 15

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 Wheeler
Project Manager

Certificate of Analysis

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

Laboratory No.: 7013226
Report: 08/22/17
Lab Contact: Richard Wheeler

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

Project Info: 6223 - Seasonal Monthly Blue Marsh Reservoir

Lab ID: 7013226-01 **Collected By:** Anthony A Paolucci **Sampled:** 08/15/17 13:00 **Received:** 08/15/17 13:45
Sample Desc: BM-1 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	08/16/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	121	mg/l	2	SM 2320 B	08/17/17		MPB
Nitrogen, Ammonia	0.09	mg/l	0.05	ASTM D6919-03	08/16/17		JCL
Biochemical Oxygen Demand	3	mg/l	2	SM 5210 B	08/15/17	C-13	RES
Nitrogen, Nitrate	4.35	mg/l	1.00	EPA 353.2	08/16/17 10:04		RES
Nitrogen, Nitrite	0.19	mg/l	0.05	EPA 353.2	08/16/17 8:21		RES
Nitrogen, Total Kjeldahl (TKN)	0.66	mg/l	0.25	EPA 351.2	08/18/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	08/16/17 17:40		AEH
Phosphorus as P, Total	<0.01	mg/l	0.01	SM 4500-P E	08/16/17		AEH
Solids, Total Dissolved	197	mg/l	5	SM 2540 C	08/16/17		TMH
Total Organic Carbon	2.8	mg/l	0.5	SM 5310 C	08/16/17		HRG
Solids, Total Suspended	6	mg/l	3	SM 2540 D	08/16/17		TMH

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	300	/100ml	2	SM 9222 D	08/15/17 15:00		TNS
Total Coliform	>2400	mpn/100ml	1	SM 9223 B	08/15/17 15:40		TNS

Lab ID: 7013226-02 **Collected By:** Anthony A Paolucci **Sampled:** 08/15/17 09:30 **Received:** 08/15/17 13:45
Sample Desc: BM-2 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	08/16/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	81	mg/l	2	SM 2320 B	08/17/17		MPB
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	08/16/17		JCL
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	08/15/17	C-05, C-13	RES
Nitrogen, Nitrate	2.25	mg/l	1.00	EPA 353.2	08/16/17 10:07		RES
Nitrogen, Nitrite	0.07	mg/l	0.05	EPA 353.2	08/16/17 8:24		RES
Nitrogen, Total Kjeldahl (TKN)	1.42	mg/l	0.25	EPA 351.2	08/18/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	08/16/17 17:40		AEH
Phosphorus as P, Total	<0.01	mg/l	0.01	SM 4500-P E	08/16/17		AEH
Solids, Total Dissolved	137	mg/l	5	SM 2540 C	08/16/17		TMH
Total Organic Carbon	3.9	mg/l	0.5	SM 5310 C	08/16/17		HRG
Solids, Total Suspended	12	mg/l	3	SM 2540 D	08/16/17		TMH

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	2	/100ml	2	SM 9222 D	08/15/17 15:00		TNS
Total Coliform	140	mpn/100ml	1	SM 9223 B	08/15/17 15:40		TNS

Lab ID: 7013226-03 **Collected By:** Anthony A Paolucci **Sampled:** 08/15/17 09:30 **Received:** 08/15/17 13:45
Sample Desc: BM-2 Mid-Depth **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	08/16/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	104	mg/l	2	SM 2320 B	08/17/17		MPB
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	08/16/17		JCL
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	08/15/17	C-05, C-13	RES
Nitrogen, Nitrate	3.14	mg/l	1.00	EPA 353.2	08/16/17 10:08		RES
Nitrogen, Nitrite	0.13	mg/l	0.05	EPA 353.2	08/16/17 8:25		RES
Nitrogen, Total Kjeldahl (TKN)	0.89	mg/l	0.25	EPA 351.2	08/18/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	08/16/17 17:40		AEH
Phosphorus as P, Total	0.01	mg/l	0.01	SM 4500-P E	08/16/17		AEH
Solids, Total Dissolved	162	mg/l	5	SM 2540 C	08/16/17		TMH
Total Organic Carbon	3.0	mg/l	0.5	SM 5310 C	08/16/17		HRG
Solids, Total Suspended	7	mg/l	3	SM 2540 D	08/16/17		TMH

Lab ID: 7013226-04 **Collected By:** Anthony A Paolucci **Sampled:** 08/15/17 09:30 **Received:** 08/15/17 13:45
Sample Desc: BM-2 Deep **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	08/16/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	138	mg/l	2	SM 2320 B	08/17/17		MPB
Nitrogen, Ammonia	0.33	mg/l	0.05	ASTM D6919-03	08/16/17		JCL
Biochemical Oxygen Demand	5	mg/l	2	SM 5210 B	08/15/17	C-13	RES
Nitrogen, Nitrate	4.10	mg/l	1.00	EPA 353.2	08/16/17 10:10		RES
Nitrogen, Nitrite	0.30	mg/l	0.05	EPA 353.2	08/16/17 8:26		RES
Nitrogen, Total Kjeldahl (TKN)	0.86	mg/l	0.25	EPA 351.2	08/18/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	08/16/17 17:40		AEH
Phosphorus as P, Total	<0.01	mg/l	0.01	SM 4500-P E	08/16/17		AEH
Solids, Total Dissolved	227	mg/l	5	SM 2540 C	08/16/17		TMH
Total Organic Carbon	2.3	mg/l	0.5	SM 5310 C	08/16/17		HRG
Solids, Total Suspended	10	mg/l	3	SM 2540 D	08/16/17		TMH

Lab ID: 7013226-05 **Collected By:** Anthony A Paolucci **Sampled:** 08/15/17 12:20 **Received:** 08/15/17 13:45
Sample Desc: BM-5 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	08/16/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	198	mg/l	2	SM 2320 B	08/17/17		MPB
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	08/16/17		JCL
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	08/15/17	C-05, C-13	RES
Nitrogen, Nitrate	7.85	mg/l	4.00	EPA 353.2	08/16/17 10:41		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	08/16/17 8:27		RES
Nitrogen, Total Kjeldahl (TKN)	0.50	mg/l	0.25	EPA 351.2	08/18/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	08/16/17 17:40		AEH
Phosphorus as P, Total	0.04	mg/l	0.01	SM 4500-P E	08/16/17		AEH
Solids, Total Dissolved	326	mg/l	5	SM 2540 C	08/16/17		TMH
Total Organic Carbon	1.7	mg/l	0.5	SM 5310 C	08/16/17		HRG
Solids, Total Suspended	12	mg/l	3	SM 2540 D	08/16/17		TMH

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	860	/100ml	2	SM 9222 D	08/15/17 15:30		TNS
Total Coliform	>2400	mpn/100ml	1	SM 9223 B	08/15/17 15:40		TNS

Lab ID: 7013226-06 **Collected By:** Anthony A Paolucci **Sampled:** 08/15/17 08:50 **Received:** 08/15/17 13:45
Sample Desc: BM-6 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	08/16/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	86	mg/l	2	SM 2320 B	08/17/17		MPB
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	08/16/17		JCL
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	08/15/17	C-05, C-13	RES
Nitrogen, Nitrate	2.30	mg/l	1.00	EPA 353.2	08/16/17 10:12		RES
Nitrogen, Nitrite	0.07	mg/l	0.05	EPA 353.2	08/16/17 8:28		RES
Nitrogen, Total Kjeldahl (TKN)	1.35	mg/l	0.25	EPA 351.2	08/18/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	08/16/17 17:40		AEH
Phosphorus as P, Total	0.01	mg/l	0.01	SM 4500-P E	08/16/17		AEH
Solids, Total Dissolved	145	mg/l	5	SM 2540 C	08/16/17		TMH
Total Organic Carbon	4.0	mg/l	0.5	SM 5310 C	08/16/17		HRG
Solids, Total Suspended	11	mg/l	3	SM 2540 D	08/16/17		TMH

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	6	/100ml	2	SM 9222 D	08/15/17 15:30		TNS
Total Coliform	1000	mpn/100ml	1	SM 9223 B	08/15/17 15:40		TNS

Lab ID: 7013226-07 **Collected By:** Anthony A Paolucci **Sampled:** 08/15/17 08:50 **Received:** 08/15/17 13:45
Sample Desc: BM-6 Mid-Depth **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	08/16/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	120	mg/l	2	SM 2320 B	08/17/17		MPB
Nitrogen, Ammonia	0.09	mg/l	0.05	ASTM D6919-03	08/16/17		JCL
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	08/15/17	C-13	RES
Nitrogen, Nitrate	4.26	mg/l	1.00	EPA 353.2	08/16/17 10:13		RES
Nitrogen, Nitrite	0.24	mg/l	0.05	EPA 353.2	08/16/17 8:29		RES
Nitrogen, Total Kjeldahl (TKN)	0.68	mg/l	0.25	EPA 351.2	08/18/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	08/16/17 17:40		AEH
Phosphorus as P, Total	0.02	mg/l	0.01	SM 4500-P E	08/16/17		AEH
Solids, Total Dissolved	199	mg/l	5	SM 2540 C	08/16/17		TMH
Total Organic Carbon	3.0	mg/l	0.5	SM 5310 C	08/16/17		HRG
Solids, Total Suspended	8	mg/l	3	SM 2540 D	08/16/17		TMH

Lab ID: 7013226-08 **Collected By:** Anthony A Paolucci **Sampled:** 08/15/17 08:50 **Received:** 08/15/17 13:45
Sample Desc: BM-6 Deep **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	08/16/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	134	mg/l	2	SM 2320 B	08/17/17		MPB
Nitrogen, Ammonia	0.27	mg/l	0.05	ASTM D6919-03	08/16/17		JCL
Biochemical Oxygen Demand	10	mg/l	2	SM 5210 B	08/15/17	C-13	RES
Nitrogen, Nitrate	4.56	mg/l	1.00	EPA 353.2	08/16/17 10:14		RES
Nitrogen, Nitrite	0.46	mg/l	0.05	EPA 353.2	08/16/17 8:30		RES
Nitrogen, Total Kjeldahl (TKN)	1.91	mg/l	0.25	EPA 351.2	08/18/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	08/16/17 17:40		AEH
Phosphorus as P, Total	0.02	mg/l	0.01	SM 4500-P E	08/16/17		AEH
Solids, Total Dissolved	238	mg/l	5	SM 2540 C	08/16/17		TMH
Total Organic Carbon	2.9	mg/l	0.5	SM 5310 C	08/16/17		HRG
Solids, Total Suspended	56	mg/l	3	SM 2540 D	08/16/17		TMH

M.J. Reider Associates, Inc.

Lab ID: 7013226-09 **Collected By:** Anthony A Paolucci **Sampled:** 08/15/17 10:00 **Received:** 08/15/17 13:45
Sample Desc: BM-7 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	08/16/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	84	mg/l	2	SM 2320 B	08/17/17		MPB
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	08/16/17		JCL
Biochemical Oxygen Demand	3	mg/l	2	SM 5210 B	08/15/17	C-05, C-13	RES
Nitrogen, Nitrate	2.40	mg/l	1.00	EPA 353.2	08/16/17 10:15		RES
Nitrogen, Nitrite	0.06	mg/l	0.05	EPA 353.2	08/16/17 8:33		RES
Nitrogen, Total Kjeldahl (TKN)	1.95	mg/l	0.25	EPA 351.2	08/18/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	08/16/17 17:40		AEH
Phosphorus as P, Total	<0.01	mg/l	0.01	SM 4500-P E	08/16/17		AEH
Solids, Total Dissolved	156	mg/l	5	SM 2540 C	08/16/17		TMH
Total Organic Carbon	3.9	mg/l	0.5	SM 5310 C	08/16/17		HRG
Solids, Total Suspended	10	mg/l	3	SM 2540 D	08/16/17		TMH

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	2	/100ml	2	SM 9222 D	08/15/17 15:30		TNS
Total Coliform	610	mpn/100ml	1	SM 9223 B	08/15/17 15:40		TNS

Lab ID: 7013226-10 **Collected By:** Anthony A Paolucci **Sampled:** 08/15/17 10:00 **Received:** 08/15/17 13:45
Sample Desc: BM-7 Mid-Depth **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	08/16/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	86	mg/l	2	SM 2320 B	08/17/17		MPB
Nitrogen, Ammonia	0.06	mg/l	0.05	ASTM D6919-03	08/16/17		JCL
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	08/15/17	C-05, C-13	RES
Nitrogen, Nitrate	2.75	mg/l	1.00	EPA 353.2	08/16/17 10:16		RES
Nitrogen, Nitrite	0.06	mg/l	0.05	EPA 353.2	08/16/17 8:34		RES
Nitrogen, Total Kjeldahl (TKN)	1.27	mg/l	0.25	EPA 351.2	08/18/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	08/16/17 17:40		AEH
Phosphorus as P, Total	0.02	mg/l	0.01	SM 4500-P E	08/16/17		AEH
Solids, Total Dissolved	170	mg/l	5	SM 2540 C	08/16/17		TMH
Total Organic Carbon	3.3	mg/l	0.5	SM 5310 C	08/16/17		HRG
Solids, Total Suspended	8	mg/l	3	SM 2540 D	08/16/17		TMH

Lab ID: 7013226-11 **Collected By:** Anthony A Paolucci **Sampled:** 08/15/17 10:00 **Received:** 08/15/17 13:45
Sample Desc: BM-7 Deep **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	08/16/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	105	mg/l	2	SM 2320 B	08/17/17		MPB
Nitrogen, Ammonia	0.17	mg/l	0.05	ASTM D6919-03	08/16/17		JCL
Biochemical Oxygen Demand	4	mg/l	2	SM 5210 B	08/15/17	C-13	RES
Nitrogen, Nitrate	4.40	mg/l	2.00	EPA 353.2	08/16/17 10:17		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	08/16/17 8:35		RES
Nitrogen, Total Kjeldahl (TKN)	0.85	mg/l	0.25	EPA 351.2	08/18/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	08/16/17 17:40		AEH
Phosphorus as P, Total	0.05	mg/l	0.01	SM 4500-P E	08/16/17		AEH
Solids, Total Dissolved	188	mg/l	5	SM 2540 C	08/16/17		TMH
Total Organic Carbon	3.4	mg/l	0.5	SM 5310 C	08/16/17		HRG
Solids, Total Suspended	16	mg/l	3	SM 2540 D	08/16/17		TMH

Lab ID: 7013226-12 **Collected By:** Anthony A Paolucci **Sampled:** 08/15/17 11:14 **Received:** 08/15/17 13:45
Sample Desc: BM-8 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	08/16/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	82	mg/l	2	SM 2320 B	08/17/17		MPB
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	08/16/17		JCL
Biochemical Oxygen Demand	2	mg/l	2	SM 5210 B	08/15/17	C-05, C-13	RES
Nitrogen, Nitrate	2.31	mg/l	2.00	EPA 353.2	08/16/17 10:22		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	08/16/17 8:38		RES
Nitrogen, Total Kjeldahl (TKN)	1.59	mg/l	0.25	EPA 351.2	08/18/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	08/16/17 17:50		AEH
Phosphorus as P, Total	<0.01	mg/l	0.01	SM 4500-P E	08/16/17		AEH
Solids, Total Dissolved	156	mg/l	5	SM 2540 C	08/16/17		TMH
Total Organic Carbon	3.8	mg/l	0.5	SM 5310 C	08/16/17		HRG
Solids, Total Suspended	11	mg/l	3	SM 2540 D	08/16/17		TMH

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	2	/100ml	2	SM 9222 D	08/15/17 15:30		TNS
Total Coliform	550	mpn/100ml	1	SM 9223 B	08/15/17 15:40		TNS

Lab ID: 7013226-13 **Collected By:** Anthony A Paolucci **Sampled:** 08/15/17 11:14 **Received:** 08/15/17 13:45
Sample Desc: BM-8 Mid-Depth **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	08/16/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	90	mg/l	2	SM 2320 B	08/17/17		MPB
Nitrogen, Ammonia	0.07	mg/l	0.05	ASTM D6919-03	08/16/17		JCL
Biochemical Oxygen Demand	2	mg/l	2	SM 5210 B	08/15/17	C-05, C-13	RES
Nitrogen, Nitrate	2.60	mg/l	2.00	EPA 353.2	08/16/17 10:23		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	08/16/17 8:39		RES
Nitrogen, Total Kjeldahl (TKN)	1.20	mg/l	0.25	EPA 351.2	08/18/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	08/16/17 17:50		AEH
Phosphorus as P, Total	0.01	mg/l	0.01	SM 4500-P E	08/16/17		AEH
Solids, Total Dissolved	171	mg/l	5	SM 2540 C	08/16/17		TMH
Total Organic Carbon	3.2	mg/l	0.5	SM 5310 C	08/16/17		HRG
Solids, Total Suspended	10	mg/l	3	SM 2540 D	08/16/17		TMH

Lab ID: 7013226-14 **Collected By:** Anthony A Paolucci **Sampled:** 08/15/17 11:14 **Received:** 08/15/17 13:45
Sample Desc: BM-8 Deep **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	08/16/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	103	mg/l	2	SM 2320 B	08/17/17		MPB
Nitrogen, Ammonia	0.28	mg/l	0.05	ASTM D6919-03	08/16/17		JCL
Biochemical Oxygen Demand	5	mg/l	2	SM 5210 B	08/15/17	C-13	RES
Nitrogen, Nitrate	2.88	mg/l	2.00	EPA 353.2	08/16/17 10:24		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	08/16/17 8:39		RES
Nitrogen, Total Kjeldahl (TKN)	1.85	mg/l	0.25	EPA 351.2	08/18/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	08/16/17 17:50		AEH
Phosphorus as P, Total	0.03	mg/l	0.01	SM 4500-P E	08/16/17		AEH
Solids, Total Dissolved	202	mg/l	5	SM 2540 C	08/16/17		TMH
Total Organic Carbon	3.0	mg/l	0.5	SM 5310 C	08/16/17		HRG
Solids, Total Suspended	143	mg/l	3	SM 2540 D	08/16/17		TMH

Lab ID: 7013226-15 **Collected By:** Anthony A Paolucci **Sampled:** 08/15/17 10:25 **Received:** 08/15/17 13:45
Sample Desc: BM-9 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	08/16/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	79	mg/l	2	SM 2320 B	08/17/17		MPB
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	08/16/17		JCL
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	08/15/17	C-05, C-13	RES
Nitrogen, Nitrate	2.35	mg/l	1.00	EPA 353.2	08/16/17 10:25		RES
Nitrogen, Nitrite	0.05	mg/l	0.05	EPA 353.2	08/16/17 8:40		RES
Nitrogen, Total Kjeldahl (TKN)	1.93	mg/l	0.25	EPA 351.2	08/18/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	08/16/17 17:50		AEH
Phosphorus as P, Total	0.01	mg/l	0.01	SM 4500-P E	08/16/17		AEH
Solids, Total Dissolved	166	mg/l	5	SM 2540 C	08/16/17		TMH
Total Organic Carbon	4.3	mg/l	0.5	SM 5310 C	08/16/17		HRG
Solids, Total Suspended	14	mg/l	3	SM 2540 D	08/16/17		TMH

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	<2	/100ml	2	SM 9222 D	08/15/17 15:30		TNS
Total Coliform	1000	mpn/100ml	1	SM 9223 B	08/15/17 15:40		TNS

Lab ID: 7013226-16 **Collected By:** Anthony A Paolucci **Sampled:** 08/15/17 10:25 **Received:** 08/15/17 13:45
Sample Desc: BM-9 Mid-Depth **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	08/16/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	94	mg/l	2	SM 2320 B	08/17/17		MPB
Nitrogen, Ammonia	0.08	mg/l	0.05	ASTM D6919-03	08/16/17		JCL
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	08/15/17	C-05, C-13	RES
Nitrogen, Nitrate	3.12	mg/l	2.00	EPA 353.2	08/16/17 10:28		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	08/16/17 8:41		RES
Nitrogen, Total Kjeldahl (TKN)	1.08	mg/l	0.25	EPA 351.2	08/18/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	08/16/17 17:50		AEH
Phosphorus as P, Total	0.03	mg/l	0.01	SM 4500-P E	08/16/17		AEH
Solids, Total Dissolved	165	mg/l	5	SM 2540 C	08/16/17		TMH
Total Organic Carbon	3.2	mg/l	0.5	SM 5310 C	08/16/17		HRG
Solids, Total Suspended	6	mg/l	3	SM 2540 D	08/16/17		TMH

Lab ID: 7013226-17 **Collected By:** Anthony A Paolucci **Sampled:** 08/15/17 10:25 **Received:** 08/15/17 13:45
Sample Desc: BM-9 Deep **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	08/16/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	125	mg/l	2	SM 2320 B	08/17/17		MPB
Nitrogen, Ammonia	0.12	mg/l	0.05	ASTM D6919-03	08/16/17		JCL
Biochemical Oxygen Demand	4	mg/l	2	SM 5210 B	08/15/17	C-13	RES
Nitrogen, Nitrate	5.51	mg/l	2.00	EPA 353.2	08/16/17 10:29		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	08/16/17 8:44		RES
Nitrogen, Total Kjeldahl (TKN)	1.14	mg/l	0.25	EPA 351.2	08/18/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	08/16/17 17:50		AEH
Phosphorus as P, Total	0.05	mg/l	0.01	SM 4500-P E	08/16/17		AEH
Solids, Total Dissolved	230	mg/l	5	SM 2540 C	08/16/17		TMH
Total Organic Carbon	2.7	mg/l	0.5	SM 5310 C	08/16/17		HRG
Solids, Total Suspended	83	mg/l	3	SM 2540 D	08/16/17		TMH

Lab ID: 7013226-18 **Collected By:** Anthony A Paolucci **Sampled:** 08/15/17 10:46 **Received:** 08/15/17 13:45
Sample Desc: BM-10 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	08/16/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	80	mg/l	2	SM 2320 B	08/17/17		MPB
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	08/16/17		JCL
Biochemical Oxygen Demand	3	mg/l	2	SM 5210 B	08/15/17	C-05, C-13	RES
Nitrogen, Nitrate	2.31	mg/l	2.00	EPA 353.2	08/16/17 10:29		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	08/16/17 8:45		RES
Nitrogen, Total Kjeldahl (TKN)	1.50	mg/l	0.25	EPA 351.2	08/18/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	08/16/17 17:50		AEH
Phosphorus as P, Total	0.04	mg/l	0.01	SM 4500-P E	08/16/17		AEH
Solids, Total Dissolved	174	mg/l	5	SM 2540 C	08/16/17		TMH
Total Organic Carbon	3.8	mg/l	0.5	SM 5310 C	08/16/17		HRG
Solids, Total Suspended	10	mg/l	3	SM 2540 D	08/16/17		TMH

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	10	/100ml	2	SM 9222 D	08/15/17 15:30		TNS
Total Coliform	410	mpn/100ml	1	SM 9223 B	08/15/17 15:40		TNS

Lab ID: 7013226-19 **Collected By:** Anthony A Paolucci **Sampled:** 08/15/17 10:46 **Received:** 08/15/17 13:45
Sample Desc: BM-10 Mid-Depth **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	08/16/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	99	mg/l	2	SM 2320 B	08/17/17		MPB
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	08/16/17		JCL
Biochemical Oxygen Demand	3	mg/l	2	SM 5210 B	08/15/17	C-05, C-13	RES
Nitrogen, Nitrate	3.62	mg/l	2.00	EPA 353.2	08/16/17 10:30		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	08/16/17 8:46		RES
Nitrogen, Total Kjeldahl (TKN)	1.27	mg/l	0.25	EPA 351.2	08/18/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	08/16/17 17:50		AEH
Phosphorus as P, Total	0.03	mg/l	0.01	SM 4500-P E	08/16/17		AEH
Solids, Total Dissolved	200	mg/l	5	SM 2540 C	08/16/17		TMH
Total Organic Carbon	3.3	mg/l	0.5	SM 5310 C	08/17/17		HRG
Solids, Total Suspended	9	mg/l	3	SM 2540 D	08/16/17		TMH

Lab ID: 7013226-20 **Collected By:** Anthony A Paolucci **Sampled:** 08/15/17 10:46 **Received:** 08/15/17 13:45
Sample Desc: BM-10 Deep **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	08/16/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	132	mg/l	2	SM 2320 B	08/17/17		MPB
Nitrogen, Ammonia	0.06	mg/l	0.05	ASTM D6919-03	08/16/17		JCL
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	08/15/17	C-05, C-13	RES
Nitrogen, Nitrate	5.54	mg/l	2.00	EPA 353.2	08/16/17 10:33		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	08/16/17 8:47		RES
Nitrogen, Total Kjeldahl (TKN)	1.18	mg/l	0.25	EPA 351.2	08/18/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	08/16/17 17:50		AEH
Phosphorus as P, Total	0.06	mg/l	0.01	SM 4500-P E	08/16/17		AEH
Solids, Total Dissolved	233	mg/l	5	SM 2540 C	08/16/17		TMH
Total Organic Carbon	2.4	mg/l	0.5	SM 5310 C	08/17/17		HRG
Solids, Total Suspended	120	mg/l	3	SM 2540 D	08/16/17		TMH

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Lab ID: 7013226-21 **Collected By:** Anthony A Paolucci **Sampled:** 08/15/17 12:20 **Received:** 08/15/17 13:45
Sample Desc: BM-11 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	08/16/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	41	mg/l	2	SM 2320 B	08/17/17		MPB
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	08/16/17		JCL
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	08/15/17	C-05, C-13	RES
Nitrogen, Nitrate	4.46	mg/l	2.00	EPA 353.2	08/16/17 10:34		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	08/16/17 8:50		RES
Nitrogen, Total Kjeldahl (TKN)	0.49	mg/l	0.25	EPA 351.2	08/18/17		RES
Phosphate as P, Ortho	<0.01	mg/l	0.01	SM 4500-P E	08/16/17 17:50		AEH
Phosphorus as P, Total	<0.01	mg/l	0.01	SM 4500-P E	08/16/17		AEH
Solids, Total Dissolved	132	mg/l	5	SM 2540 C	08/16/17		TMH
Total Organic Carbon	2.4	mg/l	0.5	SM 5310 C	08/17/17		HRG
Solids, Total Suspended	<3	mg/l	3	SM 2540 D	08/16/17		TMH

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	450	/100ml	2	SM 9222 D	08/15/17 15:30		TNS
Total Coliform	>2400	mpn/100ml	1	SM 9223 B	08/15/17 15:40		TNS

Notes and Definitions

C-05 The sample did not meet the minimum DO depletion of at least 2 mg/L.

C-13 The dissolved oxygen depletion of the SM5210B dilution water blank was greater than 0.2 mg/L.

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

WORK ORDER
Chain of Custody

7013226

Client Code: 3157 **Client:** Tetra Tech
Project Manager: Richard Wheeler **Project:** 6223 - Seasonal Monthly Blue Marsh Reservoir
Report To: Tetra Tech - David Wertz - USACE, Phila Dist. Env.Resources Branch 100 Penn Square E., Arlington, VA 22201
Project Notes: Contact Greg Wacik 610-597-9780
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:

7013226-01 BM-1 Surface

Matrix: Non-Potable Water Date: 8/15/17
Type: Grab Time: 1300

TNS AM
BOD, FC, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H), TC#s
Alk 2320B, NH3-N, PO4-P H, TDS, TKN, TOC, TSS

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc
H - Vial Amber 40ml H3PO4, zero hdspc

7013226-02 BM-2 Surface

Matrix: Non-Potable Water Date: 8/15/17
Type: Grab Time: 0930

TNS AM
BOD, FC, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H), TC#s
Alk 2320B, NH3-N, PO4-P H, TDS, TKN, TOC, TSS

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc
H - Vial Amber 40ml H3PO4, zero hdspc

Relinquished By	8/15/17 1315	Received By	8/15/17 1315
Relinquished By	Date/Time	Received at Laboratory By	8/15/17 1345

Date/Time

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	3
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: 7/7/2017 6:38:04AM

Report Template: wko WorkOrder COC ls

7013226

M.J. Reider Associates, Inc.

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

Project Manager: Richard Wheeler **Project:** 6223 - Seasonal Monthly Blue Marsh Reservoir

Comments:

Collected By : (Full Name) Gregory Wack

7013226-03 BM-2 Mid-Depth

BOD, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H)
Alk 2320B, NH3-N, PO4-P H, TDS, TKN, TOC, TSS

Matrix: Non-Potable Water **Date:** 8/15/17
Type: Grab **Time:** 0930

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

7013226-04 BM-2 Deep

BOD, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H)
Alk 2320B, NH3-N, TDS, TKN, TOC, TSS, PO4-P H

Matrix: Non-Potable Water **Date:** 8/15/17
Type: Grab **Time:** 0930

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

7013226-05 BM-5 Surface

NO2 353.2, NO3 353.2, O-PO4 H, BOD, FC, PO4-D(H), TC#s
PO4-P H, TOC, TSS, Alk 2320B, NH3-N, TDS, TKN

Matrix: Non-Potable Water **Date:** 8/15/17
Type: Grab **Time:** 1220

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc
H - Vial Amber 40ml H3PO4, zero hdspc

	Date/Time		Date/Time
Relinquished By	8/15/17 1315	Received By	8/15/17 1335
Relinquished By		Received at Laboratory By	8/15/17 1345

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	3
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.

M.J. Reider Associates, Inc.

7013226

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

Project Manager: Richard Wheeler **Project:** 6223 - Seasonal Monthly Blue Marsh Reservoir

Comments:

Collected By : (Full Name) Gregory Wacik

7013226-06 BM-6 Surface

Matrix: Non-Potable Water **Date:** 8/15/17
Type: Grab **Time:** 0850

BOD, O-PO4 H, PO4-D(H), TC#s, FC, NO2 353.2, NO3 353.2
Alk 2320B, PO4-P H, NH3-N, TDS, TKN, TOC, TSS

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc
H - Vial Amber 40ml H3PO4, zero hdspc

7013226-07 BM-6 Mid-Depth

Matrix: Non-Potable Water **Date:** 8/15/17
Type: Grab **Time:** 0850

BOD, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H)
Alk 2320B, NH3-N, TDS, TKN, TOC, TSS, PO4-P H

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

7013226-08 BM-6 Deep

Matrix: Non-Potable Water **Date:** 8/15/17
Type: Grab **Time:** 0850

BOD, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H)
Alk 2320B, NH3-N, PO4-P H, TDS, TKN, TOC, TSS

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

Relinquished By	8/15/17 1315 Date/Time	Received By	8/15/17 1315 Date/Time
Relinquished By	Date/Time	Received at Laboratory By	8/15/17 1345 Date/Time

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	
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.

M.J. Reider Associates, Inc.

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

Project Manager: Richard Wheeler **Project:** 6223 - Seasonal Monthly Blue Marsh Reservoir

Comments:

Collected By : (Full Name) Gregory Wacik

7013226-09 BM-7 Surface

Matrix: Non-Potable Water Date: 8/15/17
Type: Grab Time: 1000

BOD, FC, PO4-D(H), TC#s, NO2 353.2, NO3 353.2, O-PO4 H
Alk 2320B, NH3-N, TDS, TKN, PO4-P H, TOC, TSS

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc
H - Vial Amber 40ml H3PO4, zero hdspc

7013226-10 BM-7 Mid-Depth

Matrix: Non-Potable Water Date: 8/15/17
Type: Grab Time: 1000

NO2 353.2, NO3 353.2, O-PO4 H, BOD, PO4-D(H)
NH3-N, TOC, TSS, Alk 2320B, PO4-P H, TDS, TKN

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

7013226-11 BM-7 Deep

Matrix: Non-Potable Water Date: 8/15/17
Type: Grab Time: 1000

BOD, PO4-D(H), NO2 353.2, NO3 353.2, O-PO4 H
Alk 2320B, PO4-P H, TDS, TKN, NH3-N, TOC, TSS

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

Relinquished By	8/15/17 1315 Date/Time	Received By	8/15/17 1315 Date/Time
Relinquished By	Date/Time	Received at Laboratory By	8/15/17 1345 Date/Time

Sample Kit Prepared By:	Date/Time
Sample Temp (°C): 3	
Samples on Ice? Yes No NA	
Approved By:	
Entered By:	

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M.J. Reider Associates, Inc.

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

Project Manager: Richard Wheeler **Project:** 6223 - Seasonal Monthly Blue Marsh Reservoir

Comments:

Collected By : (Full Name) Gregory Wacik

7013226-12 BM-8 Surface

FC, NO2 353.2, NO3 353.2, BOD, O-PO4 H, PO4-D(H), TC#s
NH3-N, TDS, TKN, TOC, TSS, Alk 2320B, PO4-P H

Matrix: Non-Potable Water **Date:** 8/15/17
Type: Grab **Time:** 1114

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc
H - Vial Amber 40ml H3PO4, zero hdspc

7013226-13 BM-8 Mid-Depth

BOD, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H)
Alk 2320B, NH3-N, PO4-P H, TDS, TKN, TOC, TSS

Matrix: Non-Potable Water **Date:** 8/15/17
Type: Grab **Time:** 1114

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

7013226-14 BM-8 Deep

BOD, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H)
Alk 2320B, NH3-N, TDS, TKN, TOC, TSS, PO4-P H

Matrix: Non-Potable Water **Date:** 8/15/17
Type: Grab **Time:** 1114

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

Relinquished By	8/15/17 1315 Date/Time	Received By	8/15/17 1315 Date/Time
Relinquished By	Date/Time	Received at Laboratory By	8/15/17 1345 Date/Time

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	
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.

M.J. Reider Associates, Inc.

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

Project Manager: Richard Wheeler **Project:** 6223 - Seasonal Monthly Blue Marsh Reservoir

Comments:

Collected By : (Full Name) Gregory Wack

7013226-15 BM-9 Surface

NO2 353.2, NO3 353.2, O-PO4 H, BOD, FC, PO4-D(H), TC#s
PO4-P H, TOC, TSS, Alk 2320B, NH3-N, TDS, TKN

Matrix: Non-Potable Water Date: 8/15/17
Type: Grab Time: 1025

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc
H - Vial Amber 40ml H3PO4, zero hdspc

7013226-16 BM-9 Mid-Depth

BOD, PO4-D(H), NO2 353.2, NO3 353.2, O-PO4 H
Alk 2320B, PO4-P H, TDS, TKN, NH3-N, TOC, TSS

Matrix: Non-Potable Water Date: 8/15/17
Type: Grab Time: 1025

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

7013226-17 BM-9 Deep

NO2 353.2, NO3 353.2, O-PO4 H, BOD, PO4-D(H)
NH3-N, TOC, TSS, Alk 2320B, PO4-P H, TDS, TKN

Matrix: Non-Potable Water Date: 8/15/17
Type: Grab Time: 1025

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

	Date/Time		Date/Time
Relinquished By	8/15/17 1315	Received By	8/15/17 1315
Relinquished By	Date/Time	Received at Laboratory By	8/15/17 1345 Date/Time

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

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7013226

M.J. Reider Associates, Inc.

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

Project Manager: Richard Wheeler **Project:** 6223 - Seasonal Monthly Blue Marsh Reservoir

Comments:

Collected By : (Full Name) Gregory Mack

7013226-18 BM-10 Surface

BOD, FC, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H), TC#s
Alk 2320B, NH3-N, PO4-P H, TDS, TKN, TOC, TSS

Matrix: Non-Potable Water Date: 8/15/17
Type: Grab Time: 1046

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc
H - Vial Amber 40ml H3PO4, zero hdspc

7013226-19 BM-10 Mid-Depth

BOD, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H)
Alk 2320B, NH3-N, TDS, TKN, TOC, TSS, PO4-P H

Matrix: Non-Potable Water Date: 8/15/17
Type: Grab Time: 1046

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

7013226-20 BM-10 Deep

NO3 353.2, O-PO4 H, PO4-D(H), BOD, NO2 353.2
PO4-P H, Alk 2320B, NH3-N, TDS, TKN, TOC, TSS

Matrix: Non-Potable Water Date: 8/15/17
Type: Grab Time: 1046

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

Relinquished By	8/15/17 1315 Date/Time	Received By	8/15/17 1315 Date/Time
Relinquished By	Date/Time	Received at Laboratory By	8/15/17 1345 Date/Time

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	
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.

M.J. Reider Associates, Inc.

7013226

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

Project Manager: Richard Wheeler **Project:** 6223 - Seasonal Monthly Blue Marsh Reservoir

Comments:

Collected By : (Full Name) Gregory Wacik

7013226-21 BM-11 Surface

Matrix: Non-Potable Water Date: 8/15/17

Type: Grab Time: 1220

BOD, FC, PO4-D(H), TC#s, NO2 353.2, NO3 353.2, O-PO4 H

Alk 2320B, NH3-N, TDS, TKN, PO4-P H, TOC, TSS

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc
H - Vial Amber 40ml H3PO4, zero hdspc

Relinquished By	8/15/17 1315 Date/Time	Received By	8/15/17 1315 Date/Time
Relinquished By	Date/Time	Received at Laboratory By	8/15/17 1345 Date/Time

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	2
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.

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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 Wheeler
Project Manager

Certificate of Analysis

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

Laboratory No.: 7016202
Report: 09/14/17
Lab Contact: Richard Wheeler

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

Project Info: 6223 - Seasonal Monthly Blue Marsh Reservoir

Lab ID: 7016202-01 **Collected By:** Crystal H Leister **Sampled:** 09/05/17 14:45 **Received:** 09/05/17 15:13
Sample Desc: BM-1 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	09/06/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	136	mg/l	2	SM 2320 B	09/13/17		MPB
Nitrogen, Ammonia	0.10	mg/l	0.05	ASTM D6919-03	09/06/17		JCL
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	09/06/17	C-05	ALD
Nitrogen, Nitrate	4.69	mg/l	1.00	EPA 353.2	09/06/17 13:46		RES
Nitrogen, Nitrite	0.21	mg/l	0.05	EPA 353.2	09/06/17 12:48		RES
Nitrogen, Total Kjeldahl (TKN)	0.64	mg/l	0.25	EPA 351.2	09/11/17		RES
Ortho-phosphate as P	<0.01	mg/l	0.01	SM 4500-P E	09/05/17 17:40	G-11	AEH
Phosphorus as P, Total	<0.01	mg/l	0.01	SM 4500-P E	09/06/17		AEH
Solids, Total Dissolved	200	mg/l	5	SM 2540 C	09/06/17		AJS
Total Organic Carbon	2.5	mg/l	0.5	SM 5310 C	09/06/17		ALD
Solids, Total Suspended	10	mg/l	3	SM 2540 D	09/06/17		AJS

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	21	/100ml	2	SM 9222 D	09/05/17 16:00		PLW
Total Coliform	920	mpn/100ml	1	SM 9223 B	09/05/17 16:50		PLW

Lab ID: 7016202-02 **Collected By:** Crystal H Leister **Sampled:** 09/05/17 11:39 **Received:** 09/05/17 15:13
Sample Desc: BM-2 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	09/06/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	93	mg/l	2	SM 2320 B	09/13/17		MPB
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	09/06/17		JCL
Biochemical Oxygen Demand	5	mg/l	2	SM 5210 B	09/06/17		ALD
Nitrogen, Nitrate	2.64	mg/l	1.00	EPA 353.2	09/06/17 13:49		RES
Nitrogen, Nitrite	0.11	mg/l	0.05	EPA 353.2	09/06/17 12:51		RES
Nitrogen, Total Kjeldahl (TKN)	0.84	mg/l	0.25	EPA 351.2	09/11/17		RES
Ortho-phosphate as P	<0.01	mg/l	0.01	SM 4500-P E	09/05/17 17:40	G-11	AEH
Phosphorus as P, Total	<0.01	mg/l	0.01	SM 4500-P E	09/06/17		AEH
Solids, Total Dissolved	141	mg/l	5	SM 2540 C	09/06/17		AJS
Total Organic Carbon	4.0	mg/l	0.5	SM 5310 C	09/06/17		ALD
Solids, Total Suspended	14	mg/l	3	SM 2540 D	09/06/17		AJS

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	<2	/100ml	2	SM 9222 D	09/05/17 16:00		PLW
Total Coliform	240	mpn/100ml	1	SM 9223 B	09/05/17 16:50		PLW

Lab ID: 7016202-03 **Collected By:** Crystal H Leister **Sampled:** 09/05/17 11:39 **Received:** 09/05/17 15:13
Sample Desc: BM-2 Mid-Depth **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	09/06/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	116	mg/l	2	SM 2320 B	09/13/17		MPB
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	09/06/17		JCL
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	09/06/17	C-05	ALD
Nitrogen, Nitrate	3.91	mg/l	1.00	EPA 353.2	09/06/17 13:50		RES
Nitrogen, Nitrite	0.26	mg/l	0.05	EPA 353.2	09/06/17 12:52		RES
Nitrogen, Total Kjeldahl (TKN)	0.53	mg/l	0.25	EPA 351.2	09/11/17		RES
Ortho-phosphate as P	<0.01	mg/l	0.01	SM 4500-P E	09/05/17 17:40	G-11	AEH
Phosphorus as P, Total	0.01	mg/l	0.01	SM 4500-P E	09/06/17		AEH
Solids, Total Dissolved	143	mg/l	5	SM 2540 C	09/06/17		AJS
Total Organic Carbon	2.7	mg/l	0.5	SM 5310 C	09/06/17		ALD
Solids, Total Suspended	<3	mg/l	3	SM 2540 D	09/06/17		AJS

Lab ID: 7016202-04 **Collected By:** Crystal H Leister **Sampled:** 09/05/17 11:39 **Received:** 09/05/17 15:13
Sample Desc: BM-2 Deep **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	09/06/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	141	mg/l	2	SM 2320 B	09/13/17		MPB
Nitrogen, Ammonia	0.14	mg/l	0.05	ASTM D6919-03	09/06/17		JCL
Biochemical Oxygen Demand	2	mg/l	2	SM 5210 B	09/06/17	C-05	ALD
Nitrogen, Nitrate	4.61	mg/l	1.00	EPA 353.2	09/06/17 13:51		RES
Nitrogen, Nitrite	0.07	mg/l	0.05	EPA 353.2	09/06/17 12:53		RES
Nitrogen, Total Kjeldahl (TKN)	0.72	mg/l	0.25	EPA 351.2	09/11/17		RES
Ortho-phosphate as P	<0.01	mg/l	0.01	SM 4500-P E	09/05/17 17:40	G-11	AEH
Phosphorus as P, Total	0.01	mg/l	0.01	SM 4500-P E	09/06/17		AEH
Solids, Total Dissolved	189	mg/l	5	SM 2540 C	09/06/17		AJS
Total Organic Carbon	2.4	mg/l	0.5	SM 5310 C	09/06/17		ALD
Solids, Total Suspended	13	mg/l	3	SM 2540 D	09/06/17		AJS

Lab ID: 7016202-05 **Collected By:** Crystal H Leister **Sampled:** 09/05/17 14:09 **Received:** 09/05/17 15:13
Sample Desc: BM-5 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	09/06/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	222	mg/l	2	SM 2320 B	09/13/17		MPB
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	09/06/17		JCL
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	09/06/17	C-05	ALD
Nitrogen, Nitrate	8.73	mg/l	4.00	EPA 353.2	09/06/17 13:51		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	09/06/17 12:54		RES
Nitrogen, Total Kjeldahl (TKN)	0.37	mg/l	0.25	EPA 351.2	09/11/17		RES
Ortho-phosphate as P	<0.01	mg/l	0.01	SM 4500-P E	09/05/17 17:40	G-11	AEH
Phosphorus as P, Total	0.04	mg/l	0.01	SM 4500-P E	09/06/17		AEH
Solids, Total Dissolved	313	mg/l	5	SM 2540 C	09/06/17		AJS
Total Organic Carbon	1.4	mg/l	0.5	SM 5310 C	09/06/17		ALD
Solids, Total Suspended	<3	mg/l	3	SM 2540 D	09/06/17		AJS

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	220	/100ml	2	SM 9222 D	09/05/17 16:25		PLW
Total Coliform	>2400	mpn/100ml	1	SM 9223 B	09/05/17 16:50		PLW

Lab ID: 7016202-06 **Collected By:** Crystal H Leister **Sampled:** 09/05/17 11:15 **Received:** 09/05/17 15:13
Sample Desc: BM-6 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	09/06/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	95	mg/l	2	SM 2320 B	09/13/17		MPB
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	09/06/17		JCL
Biochemical Oxygen Demand	5	mg/l	2	SM 5210 B	09/06/17		ALD
Nitrogen, Nitrate	2.64	mg/l	1.00	EPA 353.2	09/06/17 13:52		RES
Nitrogen, Nitrite	0.10	mg/l	0.05	EPA 353.2	09/06/17 12:55		RES
Nitrogen, Total Kjeldahl (TKN)	0.94	mg/l	0.25	EPA 351.2	09/11/17		RES
Ortho-phosphate as P	<0.01	mg/l	0.01	SM 4500-P E	09/05/17 17:40	G-11	AEH
Phosphorus as P, Total	0.01	mg/l	0.01	SM 4500-P E	09/06/17		AEH
Solids, Total Dissolved	156	mg/l	5	SM 2540 C	09/06/17		AJS
Total Organic Carbon	4.4	mg/l	0.5	SM 5310 C	09/06/17		ALD
Solids, Total Suspended	18	mg/l	3	SM 2540 D	09/06/17		AJS

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	2	/100ml	2	SM 9222 D	09/05/17 16:25		PLW
Total Coliform	340	mpn/100ml	1	SM 9223 B	09/05/17 16:50		PLW

Lab ID: 7016202-07 **Collected By:** Crystal H Leister **Sampled:** 09/05/17 11:15 **Received:** 09/05/17 15:13
Sample Desc: BM-6 Mid-Depth **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	09/06/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	120	mg/l	2	SM 2320 B	09/13/17		MPB
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	09/06/17		JCL
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	09/06/17	C-05	ALD
Nitrogen, Nitrate	4.21	mg/l	1.00	EPA 353.2	09/06/17 13:53		RES
Nitrogen, Nitrite	0.29	mg/l	0.05	EPA 353.2	09/06/17 12:56		RES
Nitrogen, Total Kjeldahl (TKN)	0.54	mg/l	0.25	EPA 351.2	09/11/17		RES
Ortho-phosphate as P	<0.01	mg/l	0.01	SM 4500-P E	09/05/17 17:40	G-11	AEH
Phosphorus as P, Total	0.02	mg/l	0.01	SM 4500-P E	09/06/17		AEH
Solids, Total Dissolved	185	mg/l	5	SM 2540 C	09/06/17		AJS
Total Organic Carbon	3.0	mg/l	0.5	SM 5310 C	09/07/17		ALD
Solids, Total Suspended	<3	mg/l	3	SM 2540 D	09/06/17		AJS

Lab ID: 7016202-08 **Collected By:** Crystal H Leister **Sampled:** 09/05/17 11:15 **Received:** 09/05/17 15:13
Sample Desc: BM-6 Deep **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	09/06/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	153	mg/l	2	SM 2320 B	09/13/17		MPB
Nitrogen, Ammonia	0.27	mg/l	0.05	ASTM D6919-03	09/06/17		JCL
Biochemical Oxygen Demand	4	mg/l	2	SM 5210 B	09/06/17		ALD
Nitrogen, Nitrate	5.06	mg/l	1.00	EPA 353.2	09/06/17 13:54		RES
Nitrogen, Nitrite	0.20	mg/l	0.05	EPA 353.2	09/06/17 12:57		RES
Nitrogen, Total Kjeldahl (TKN)	0.81	mg/l	0.25	EPA 351.2	09/11/17		RES
Ortho-phosphate as P	<0.01	mg/l	0.01	SM 4500-P E	09/05/17 17:40	G-11	AEH
Phosphorus as P, Total	0.02	mg/l	0.01	SM 4500-P E	09/06/17		AEH
Solids, Total Dissolved	231	mg/l	5	SM 2540 C	09/06/17		AJS
Total Organic Carbon	2.1	mg/l	0.5	SM 5310 C	09/07/17		ALD
Solids, Total Suspended	6	mg/l	3	SM 2540 D	09/06/17		AJS

Lab ID: 7016202-09 **Collected By:** Crystal H Leister **Sampled:** 09/05/17 12:05 **Received:** 09/05/17 15:13
Sample Desc: BM-7 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	09/06/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	95	mg/l	2	SM 2320 B	09/13/17		MPB
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	09/06/17		JCL
Biochemical Oxygen Demand	5	mg/l	2	SM 5210 B	09/06/17		ALD
Nitrogen, Nitrate	2.21	mg/l	1.00	EPA 353.2	09/06/17 13:57		RES
Nitrogen, Nitrite	0.09	mg/l	0.05	EPA 353.2	09/06/17 13:00		RES
Nitrogen, Total Kjeldahl (TKN)	0.71	mg/l	0.25	EPA 351.2	09/11/17		RES
Ortho-phosphate as P	<0.01	mg/l	0.01	SM 4500-P E	09/05/17 17:40	G-11	AEH
Phosphorus as P, Total	<0.01	mg/l	0.01	SM 4500-P E	09/06/17		AEH
Solids, Total Dissolved	119	mg/l	5	SM 2540 C	09/06/17		AJS
Total Organic Carbon	3.8	mg/l	0.5	SM 5310 C	09/07/17		ALD
Solids, Total Suspended	13	mg/l	3	SM 2540 D	09/06/17		AJS

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	6	/100ml	2	SM 9222 D	09/05/17 16:25		PLW
Total Coliform	440	mpn/100ml	1	SM 9223 B	09/05/17 16:50		PLW

Lab ID: 7016202-10 **Collected By:** Crystal H Leister **Sampled:** 09/05/17 12:05 **Received:** 09/05/17 15:13
Sample Desc: BM-7 Mid-Depth **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	09/06/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	97	mg/l	2	SM 2320 B	09/13/17		MPB
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	09/06/17		JCL
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	09/06/17	C-05	ALD
Nitrogen, Nitrate	2.94	mg/l	1.00	EPA 353.2	09/06/17 13:58		RES
Nitrogen, Nitrite	0.09	mg/l	0.05	EPA 353.2	09/06/17 13:01		RES
Nitrogen, Total Kjeldahl (TKN)	0.64	mg/l	0.25	EPA 351.2	09/11/17		RES
Ortho-phosphate as P	<0.01	mg/l	0.01	SM 4500-P E	09/05/17 17:40	G-11	AEH
Phosphorus as P, Total	0.03	mg/l	0.01	SM 4500-P E	09/06/17		AEH
Solids, Total Dissolved	176	mg/l	5	SM 2540 C	09/06/17		AJS
Total Organic Carbon	3.3	mg/l	0.5	SM 5310 C	09/07/17		ALD
Solids, Total Suspended	6	mg/l	3	SM 2540 D	09/06/17		AJS

Lab ID: 7016202-11 **Collected By:** Crystal H Leister **Sampled:** 09/05/17 12:05 **Received:** 09/05/17 15:13
Sample Desc: BM-7 Deep **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	09/06/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	114	mg/l	2	SM 2320 B	09/13/17		MPB
Nitrogen, Ammonia	0.08	mg/l	0.05	ASTM D6919-03	09/06/17		JCL
Biochemical Oxygen Demand	2	mg/l	2	SM 5210 B	09/06/17	C-05	ALD
Nitrogen, Nitrate	3.80	mg/l	1.00	EPA 353.2	09/06/17 13:59		RES
Nitrogen, Nitrite	0.09	mg/l	0.05	EPA 353.2	09/06/17 13:03		RES
Nitrogen, Total Kjeldahl (TKN)	0.65	mg/l	0.25	EPA 351.2	09/11/17		RES
Ortho-phosphate as P	<0.01	mg/l	0.01	SM 4500-P E	09/05/17 17:50	G-11	AEH
Phosphorus as P, Total	0.05	mg/l	0.01	SM 4500-P E	09/06/17		AEH
Solids, Total Dissolved	188	mg/l	5	SM 2540 C	09/06/17		AJS
Total Organic Carbon	2.8	mg/l	0.5	SM 5310 C	09/07/17		ALD
Solids, Total Suspended	11	mg/l	3	SM 2540 D	09/06/17		AJS

Lab ID: 7016202-12 **Collected By:** Crystal H Leister **Sampled:** 09/05/17 13:12 **Received:** 09/05/17 15:13
Sample Desc: BM-8 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	09/06/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	97	mg/l	2	SM 2320 B	09/13/17		MPB
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	09/06/17		JCL
Biochemical Oxygen Demand	3	mg/l	2	SM 5210 B	09/06/17		ALD
Nitrogen, Nitrate	2.50	mg/l	1.00	EPA 353.2	09/06/17 14:02		RES
Nitrogen, Nitrite	0.07	mg/l	0.05	EPA 353.2	09/06/17 13:05		RES
Nitrogen, Total Kjeldahl (TKN)	0.75	mg/l	0.25	EPA 351.2	09/11/17		RES
Ortho-phosphate as P	<0.01	mg/l	0.01	SM 4500-P E	09/05/17 17:50	G-11	AEH
Phosphorus as P, Total	<0.01	mg/l	0.01	SM 4500-P E	09/06/17		AEH
Solids, Total Dissolved	163	mg/l	5	SM 2540 C	09/06/17		AJS
Total Organic Carbon	3.7	mg/l	0.5	SM 5310 C	09/07/17		ALD
Solids, Total Suspended	14	mg/l	3	SM 2540 D	09/06/17		AJS

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	2	/100ml	2	SM 9222 D	09/05/17 16:25		PLW
Total Coliform	440	mpn/100ml	1	SM 9223 B	09/05/17 16:50		PLW

Lab ID: 7016202-13 **Collected By:** Crystal H Leister **Sampled:** 09/05/17 13:12 **Received:** 09/05/17 15:13
Sample Desc: BM-8 Mid-Depth **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	09/06/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	97	mg/l	2	SM 2320 B	09/13/17		MPB
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	09/06/17		JCL
Biochemical Oxygen Demand	3	mg/l	2	SM 5210 B	09/06/17		ALD
Nitrogen, Nitrate	2.56	mg/l	1.00	EPA 353.2	09/06/17 14:03		RES
Nitrogen, Nitrite	0.06	mg/l	0.05	EPA 353.2	09/06/17 13:05		RES
Nitrogen, Total Kjeldahl (TKN)	0.62	mg/l	0.25	EPA 351.2	09/11/17		RES
Ortho-phosphate as P	<0.01	mg/l	0.01	SM 4500-P E	09/05/17 17:50	G-11	AEH
Phosphorus as P, Total	0.01	mg/l	0.01	SM 4500-P E	09/06/17		AEH
Solids, Total Dissolved	174	mg/l	5	SM 2540 C	09/06/17		AJS
Total Organic Carbon	3.4	mg/l	0.5	SM 5310 C	09/07/17		ALD
Solids, Total Suspended	8	mg/l	3	SM 2540 D	09/06/17		AJS

Lab ID: 7016202-14 **Collected By:** Crystal H Leister **Sampled:** 09/05/17 13:12 **Received:** 09/05/17 15:13
Sample Desc: BM-8 Deep **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	09/06/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	99	mg/l	2	SM 2320 B	09/13/17		MPB
Nitrogen, Ammonia	0.06	mg/l	0.05	ASTM D6919-03	09/06/17		JCL
Biochemical Oxygen Demand	3	mg/l	2	SM 5210 B	09/06/17	C-05	ALD
Nitrogen, Nitrate	2.87	mg/l	2.00	EPA 353.2	09/06/17 14:04		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	09/06/17 13:06		RES
Nitrogen, Total Kjeldahl (TKN)	0.68	mg/l	0.25	EPA 351.2	09/11/17		RES
Ortho-phosphate as P	<0.01	mg/l	0.01	SM 4500-P E	09/05/17 17:50	G-11	AEH
Phosphorus as P, Total	0.03	mg/l	0.01	SM 4500-P E	09/06/17		AEH
Solids, Total Dissolved	180	mg/l	5	SM 2540 C	09/06/17		AJS
Total Organic Carbon	2.9	mg/l	0.5	SM 5310 C	09/07/17		ALD
Solids, Total Suspended	66	mg/l	3	SM 2540 D	09/06/17		AJS

Lab ID: 7016202-15 **Collected By:** Crystal H Leister **Sampled:** 09/05/17 12:26 **Received:** 09/05/17 15:13
Sample Desc: BM-9 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	09/06/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	92	mg/l	2	SM 2320 B	09/13/17		MPB
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	09/06/17		JCL
Biochemical Oxygen Demand	6	mg/l	2	SM 5210 B	09/06/17		ALD
Nitrogen, Nitrate	2.56	mg/l	1.00	EPA 353.2	09/06/17 14:05		RES
Nitrogen, Nitrite	0.08	mg/l	0.05	EPA 353.2	09/06/17 13:07		RES
Nitrogen, Total Kjeldahl (TKN)	0.75	mg/l	0.25	EPA 351.2	09/11/17		RES
Ortho-phosphate as P	<0.01	mg/l	0.01	SM 4500-P E	09/05/17 17:50	G-11	AEH
Phosphorus as P, Total	0.01	mg/l	0.01	SM 4500-P E	09/06/17		AEH
Solids, Total Dissolved	595	mg/l	5	SM 2540 C	09/06/17		AJS
Total Organic Carbon	4.0	mg/l	0.5	SM 5310 C	09/07/17		ALD
Solids, Total Suspended	16	mg/l	3	SM 2540 D	09/06/17		AJS

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	<2	/100ml	2	SM 9222 D	09/05/17 16:25		PLW
Total Coliform	440	mpn/100ml	1	SM 9223 B	09/05/17 16:50		PLW

Lab ID: 7016202-16 **Collected By:** Crystal H Leister **Sampled:** 09/05/17 12:26 **Received:** 09/05/17 15:13
Sample Desc: BM-9 Mid-Depth **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	09/06/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	97	mg/l	2	SM 2320 B	09/13/17		MPB
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	09/06/17		JCL
Biochemical Oxygen Demand	3	mg/l	2	SM 5210 B	09/06/17		ALD
Nitrogen, Nitrate	2.80	mg/l	1.00	EPA 353.2	09/06/17 14:06		RES
Nitrogen, Nitrite	0.07	mg/l	0.05	EPA 353.2	09/06/17 13:08		RES
Nitrogen, Total Kjeldahl (TKN)	0.92	mg/l	0.25	EPA 351.2	09/11/17		RES
Ortho-phosphate as P	<0.01	mg/l	0.01	SM 4500-P E	09/05/17 17:50	G-11	AEH
Phosphorus as P, Total	0.02	mg/l	0.01	SM 4500-P E	09/06/17		AEH
Solids, Total Dissolved	166	mg/l	5	SM 2540 C	09/06/17		AJS
Total Organic Carbon	3.3	mg/l	0.5	SM 5310 C	09/07/17		ALD
Solids, Total Suspended	<3	mg/l	3	SM 2540 D	09/06/17		AJS

Lab ID: 7016202-17 **Collected By:** Crystal H Leister **Sampled:** 09/05/17 12:26 **Received:** 09/05/17 15:13
Sample Desc: BM-9 Deep **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	09/06/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	95	mg/l	2	SM 2320 B	09/13/17		MPB
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	09/06/17		JCL
Biochemical Oxygen Demand	2	mg/l	2	SM 5210 B	09/06/17	C-05	ALD
Nitrogen, Nitrate	3.91	mg/l	1.00	EPA 353.2	09/06/17 14:09		RES
Nitrogen, Nitrite	0.05	mg/l	0.05	EPA 353.2	09/06/17 13:11		RES
Nitrogen, Total Kjeldahl (TKN)	0.87	mg/l	0.25	EPA 351.2	09/11/17		RES
Ortho-phosphate as P	<0.01	mg/l	0.01	SM 4500-P E	09/05/17 17:50	G-11	AEH
Phosphorus as P, Total	0.05	mg/l	0.01	SM 4500-P E	09/06/17		AEH
Solids, Total Dissolved	174	mg/l	5	SM 2540 C	09/06/17		AJS
Total Organic Carbon	2.7	mg/l	0.5	SM 5310 C	09/07/17		ALD
Solids, Total Suspended	4	mg/l	3	SM 2540 D	09/06/17		AJS

Lab ID: 7016202-18 **Collected By:** Crystal H Leister **Sampled:** 09/05/17 12:49 **Received:** 09/05/17 15:13
Sample Desc: BM-10 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	09/06/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	97	mg/l	2	SM 2320 B	09/13/17		MPB
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	09/06/17		JCL
Biochemical Oxygen Demand	6	mg/l	2	SM 5210 B	09/06/17		ALD
Nitrogen, Nitrate	2.67	mg/l	1.00	EPA 353.2	09/06/17 14:10		RES
Nitrogen, Nitrite	0.07	mg/l	0.05	EPA 353.2	09/06/17 13:12		RES
Nitrogen, Total Kjeldahl (TKN)	1.87	mg/l	0.25	EPA 351.2	09/11/17		RES
Ortho-phosphate as P	<0.01	mg/l	0.01	SM 4500-P E	09/05/17 17:50	G-11	AEH
Phosphorus as P, Total	0.03	mg/l	0.01	SM 4500-P E	09/06/17		AEH
Solids, Total Dissolved	133	mg/l	5	SM 2540 C	09/06/17		AJS
Total Organic Carbon	4.6	mg/l	0.5	SM 5310 C	09/07/17		ALD
Solids, Total Suspended	25	mg/l	3	SM 2540 D	09/06/17		AJS

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	2	/100ml	2	SM 9222 D	09/05/17 16:25		PLW
Total Coliform	310	mpn/100ml	1	SM 9223 B	09/05/17 16:50		PLW

Lab ID: 7016202-19 **Collected By:** Crystal H Leister **Sampled:** 09/05/17 12:49 **Received:** 09/05/17 15:13
Sample Desc: BM-10 Mid-Depth **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	09/06/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	100	mg/l	2	SM 2320 B	09/13/17		MPB
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	09/06/17		JCL
Biochemical Oxygen Demand	3	mg/l	2	SM 5210 B	09/06/17	C-05	ALD
Nitrogen, Nitrate	3.03	mg/l	1.00	EPA 353.2	09/06/17 14:11		RES
Nitrogen, Nitrite	0.06	mg/l	0.05	EPA 353.2	09/06/17 13:13		RES
Nitrogen, Total Kjeldahl (TKN)	0.99	mg/l	0.25	EPA 351.2	09/11/17		RES
Ortho-phosphate as P	<0.01	mg/l	0.01	SM 4500-P E	09/05/17 17:50	G-11	AEH
Phosphorus as P, Total	0.03	mg/l	0.01	SM 4500-P E	09/06/17		AEH
Solids, Total Dissolved	172	mg/l	5	SM 2540 C	09/06/17		AJS
Total Organic Carbon	3.4	mg/l	0.5	SM 5310 C	09/07/17		ALD
Solids, Total Suspended	12	mg/l	3	SM 2540 D	09/06/17		AJS

Lab ID: 7016202-20 **Collected By:** Crystal H Leister **Sampled:** 09/05/17 12:49 **Received:** 09/05/17 15:13
Sample Desc: BM-10 Deep **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	09/06/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	187	mg/l	2	SM 2320 B	09/13/17		MPB
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	09/06/17		JCL
Biochemical Oxygen Demand	3	mg/l	2	SM 5210 B	09/06/17		ALD
Nitrogen, Nitrate	6.65	mg/l	2.00	EPA 353.2	09/06/17 14:11		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	09/06/17 13:14		RES
Nitrogen, Total Kjeldahl (TKN)	0.62	mg/l	0.25	EPA 351.2	09/11/17		RES
Ortho-phosphate as P	<0.01	mg/l	0.01	SM 4500-P E	09/05/17 17:50	G-11	AEH
Phosphorus as P, Total	0.06	mg/l	0.01	SM 4500-P E	09/06/17		AEH
Solids, Total Dissolved	271	mg/l	5	SM 2540 C	09/06/17		AJS
Total Organic Carbon	2.5	mg/l	0.5	SM 5310 C	09/07/17		ALD
Solids, Total Suspended	244	mg/l	3	SM 2540 D	09/06/17		AJS

M.J. Reider Associates, Inc.

Lab ID: 7016202-21 **Collected By:** Crystal H Leister **Sampled:** 09/05/17 14:15 **Received:** 09/05/17 15:13
Sample Desc: BM-11 Surface **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Analyzed	Analyte Notes	Analyst
Dissolved General Chemistry							
Phosphorus as P, Dissolved	<0.05	mg/l	0.05	SM 4500-P E	09/06/17		AEH
General Chemistry							
Alkalinity, Total to pH 4.5	73	mg/l	2	SM 2320 B	09/13/17		MPB
Nitrogen, Ammonia	<0.05	mg/l	0.05	ASTM D6919-03	09/06/17		JCL
Biochemical Oxygen Demand	<2	mg/l	2	SM 5210 B	09/06/17	C-05	ALD
Nitrogen, Nitrate	3.64	mg/l	2.00	EPA 353.2	09/06/17 14:14		RES
Nitrogen, Nitrite	<0.05	mg/l	0.05	EPA 353.2	09/06/17 13:17		RES
Nitrogen, Total Kjeldahl (TKN)	0.53	mg/l	0.25	EPA 351.2	09/11/17		RES
Ortho-phosphate as P	<0.01	mg/l	0.01	SM 4500-P E	09/05/17 17:50	G-11	AEH
Phosphorus as P, Total	<0.01	mg/l	0.01	SM 4500-P E	09/06/17		AEH
Solids, Total Dissolved	139	mg/l	5	SM 2540 C	09/06/17		AJS
Total Organic Carbon	2.0	mg/l	0.5	SM 5310 C	09/07/17		ALD
Solids, Total Suspended	<3	mg/l	3	SM 2540 D	09/06/17		AJS

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Fecal Coliform	470	/100ml	2	SM 9222 D	09/05/17 16:25		PLW
Total Coliform	>2400	mpn/100ml	1	SM 9223 B	09/05/17 16:50		PLW

Notes and Definitions

C-05 The sample did not meet the minimum DO depletion of at least 2 mg/L.

G-11 The sample was filtered after it was received at the laboratory.

M.J. Reider Associates, Inc.

107 Angelica St, Reading PA, 19611
610-374-5129 www.mjreider.com

WORK ORDER
Chain of Custody

7016202

Client Code: 3157
Client: Tetra Tech
Project Manager: Richard Wheeler
Project: 6223 - Seasonal Monthly Blue Marsh 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

Project Notes: Contact Greg Wacik 610-597-9780

Collected By : (Full Name) Gregory Wacik

Comments:

7016202-01 BM-1 Surface

BOD, FC, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H), TC#s
Alk 2320B, NH3-N, PO4-P H, TDS, TKN, TOC, TSS

Matrix: Non-Potable Water
Type: Grab
Date: 9/5/17
Time: 1445

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc
H - Vial Amber 40ml H3PO4, zero hdspc

7016202-02 BM-2 Surface

BOD, FC, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H), TC#s
Alk 2320B, NH3-N, PO4-P H, TDS, TKN, TOC, TSS

Matrix: Non-Potable Water
Type: Grab
Date: 9/5/17
Time: 1139

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc
H - Vial Amber 40ml H3PO4, zero hdspc

	Date/Time		Date/Time
Relinquished By	9/5/17 2:52	Received By	09/05/17 1500
Relinquished By		Received at Laboratory By	09/05/17 1513

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	18.3°C
Samples on Ice?	(Yes) No NA
Approved By:	CHL
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: 8/7/2017 11:59:38AM

Report Template: wko WorkOrder COC ls

M.J. Reider Associates, Inc.

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

Project Manager: Richard Wheeler **Project:** 6223 - Seasonal Monthly Blue Marsh Reservoir

Comments:

Collected By : (Full Name) Gregory Wack

7016202-03 BM-2 Mid-Depth

BOD, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H)
Alk 2320B, NH3-N, PO4-P H, TDS, TKN, TOC, TSS

Matrix: Non-Potable Water **Date:** 9/5/17
Type: Grab **Time:** 1139

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

7016202-04 BM-2 Deep

BOD, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H)
Alk 2320B, NH3-N, TDS, TKN, TOC, TSS, PO4-P H

Matrix: Non-Potable Water **Date:** 9/5/17
Type: Grab **Time:** 1139

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

7016202-05 BM-5 Surface

NO2 353.2, NO3 353.2, O-PO4 H, BOD, FC, PO4-D(H), TC#s
PO4-P H, TOC, TSS, Alk 2320B, NH3-N, TDS, TKN

Matrix: Non-Potable Water **Date:** 9/5/17
Type: Grab **Time:** 1409

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc
H - Vial Amber 40ml H3PO4, zero hdspc

Relinquished By	9/5/17 2:52 Date/Time	Received By	09/05/17 1500 Date/Time
Relinquished By	Date/Time	Received at Laboratory By	09/05/17 1513 Date/Time

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	18.3°C
Samples on Ice?	Yes No NA
Approved By:	CHL
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: 8/7/2017 11:59:38AM

Report Template: WRO WorkOrder COC IS

M.J. Reider Associates, Inc.

7016202

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

Project Manager: Richard Wheeler **Project:** 6223 - Seasonal Monthly Blue Marsh Reservoir

Comments:

Collected By : (Full Name) Gregory Wadik

7016202-06 BM-6 Surface

BOD, O-PO4 H, PO4-D(H), TC#s, FC, NO2 353.2, NO3 353.2
Alk 2320B, PO4-P H, NH3-N, TDS, TKN, TOC, TSS

Matrix: Non-Potable Water Date: 9/5/17
Type: Grab Time: 1115

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc
H - Vial Amber 40ml H3PO4, zero hdspc

7016202-07 BM-6 Mid-Depth

BOD, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H)
Alk 2320B, NH3-N, TDS, TKN, TOC, TSS, PO4-P H

Matrix: Non-Potable Water Date: 9/5/17
Type: Grab Time: 1115

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

7016202-08 BM-6 Deep

BOD, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H)
Alk 2320B, NH3-N, PO4-P H, TDS, TKN, TOC, TSS

Matrix: Non-Potable Water Date: 9/5/17
Type: Grab Time: 1115

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

Relinquished By	Date/Time	Received By	Date/Time
	9/5/17 2:52		09/05/17 1500
Relinquished By	Date/Time	Received at Laboratory By	Date/Time
			09/05/17 1513

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	18.3°C
Samples on Ice?	(Yes) No NA
Approved By:	CML
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: 8/7/2017 11:59:38AM

Report Template: wko WorkOrder COC is

M.J. Reider Associates, Inc.

7016202

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

Project Manager: Richard Wheeler **Project:** 6223 - Seasonal Monthly Blue Marsh Reservoir

Comments:

Collected By : (Full Name) Gregory Wack

7016202-09 BM-7 Surface

BOD, FC, PO4-D(H), TC#s, NO2 353.2, NO3 353.2, O-PO4 H
Alk 2320B, NH3-N, TDS, TKN, PO4-P H, TOC, TSS

Matrix: Non-Potable Water **Date:** 9/5/17
Type: Grab **Time:** 1205

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc
H - Vial Amber 40ml H3PO4, zero hdspc

7016202-10 BM-7 Mid-Depth

NO2 353.2, NO3 353.2, O-PO4 H, BOD, PO4-D(H)
NH3-N, TOC, TSS, Alk 2320B, PO4-P H, TDS, TKN

Matrix: Non-Potable Water **Date:** 9/5/17
Type: Grab **Time:** 1205

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

7016202-11 BM-7 Deep

BOD, PO4-D(H), NO2 353.2, NO3 353.2, O-PO4 H
Alk 2320B, PO4-P H, TDS, TKN, NH3-N, TOC, TSS

Matrix: Non-Potable Water **Date:** 9/5/17
Type: Grab **Time:** 1205

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

Relinquished By	Date/Time	Received By	Date/Time
	9/5/17 2152		09/05/17 1500
			09/05/17 1513

Sample Kit Prepared By:	Date/Time

Sample Temp (°C): 18.3°C
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.

M.J. Reider Associates, Inc.

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

Project Manager: Richard Wheeler **Project:** 6223 - Seasonal Monthly Blue Marsh Reservoir

Comments:

Collected By : (Full Name) Gregory Wacik

7016202-12 BM-8 Surface

FC, NO2 353.2, NO3 353.2, BOD, O-PO4 H, PO4-D(H), TC#s
NH3-N, TDS, TKN, TOC, TSS, Alk 2320B, PO4-P H

Matrix: Non-Potable Water **Date:** 9/5/17
Type: Grab **Time:** 1312

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc
H - Vial Amber 40ml H3PO4, zero hdspc

7016202-13 BM-8 Mid-Depth

BOD, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H)
Alk 2320B, NH3-N, PO4-P H, TDS, TKN, TOC, TSS

Matrix: Non-Potable Water **Date:** 9/5/17
Type: Grab **Time:** 1312

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

7016202-14 BM-8 Deep

BOD, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H)
Alk 2320B, NH3-N, TDS, TKN, TOC, TSS, PO4-P H

Matrix: Non-Potable Water **Date:** 9/5/17
Type: Grab **Time:** 1312

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

Relinquished By	9/5/17 2:52 Date/Time	Received By	09/05/17 1500 Date/Time
Relinquished By	Date/Time	Received at Laboratory By	09/05/17 1513 Date/Time

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	18.3°C
Samples on Ice?	(Yes) No NA
Approved By:	CHL
Entered By:	

7016202

M.J. Reider Associates, Inc.

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

Project Manager: Richard Wheeler **Project:** 6223 - Seasonal Monthly Blue Marsh Reservoir

Comments:

Collected By : (Full Name) Gregory Wacik

7016202-15 BM-9 Surface

NAP NAP BW pH OV

NO2 353.2, NO3 353.2, O-PO4 H, BOD, FC, PO4-D(H), TC#s

PO4-P H, TOC, TSS, Alk 2320B, NH3-N, TDS, TKN

AH

Matrix: Non-Potable Water Date: 9/5/17

Type: Grab Time: 1226

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc
H - Vial Amber 40ml H3PO4, zero hdspc

7016202-16 BM-9 Mid-Depth NAP

BW

BOD, PO4-D(H), NO2 353.2, NO3 353.2, O-PO4 H

Alk 2320B, PO4-P H, TDS, TKN, NH3-N, TOC, TSS

Matrix: Non-Potable Water Date: 9/5/17

Type: Grab Time: 1226

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

7016202-17 BM-9 Deep

NAP BW

NO2 353.2, NO3 353.2, O-PO4 H, BOD, PO4-D(H)

NH3-N, TOC, TSS, Alk 2320B, PO4-P H, TDS, TKN

Matrix: Non-Potable Water Date: 9/5/17

Type: Grab Time: 1226

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

Relinquished By	9/5/17 2:52 Date/Time	Received By	09/05/17 1500 Date/Time
Relinquished By	Date/Time	Received at Laboratory By	09/05/17 1513 Date/Time

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	18.3°C
Samples on Ice?	(Yes) No NA
Approved By:	CHL
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.

M.J. Reider Associates, Inc.

7016202

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

Project Manager: Richard Wheeler **Project:** 6223 - Seasonal Monthly Blue Marsh Reservoir

Comments:

Collected By : (Full Name) Gregory Wack

7016202-18 BM-10 Surface

BOD, FC, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H), TC#s
Alk 2320B, NH3-N, PO4-P H, TDS, TKN, TOC, TSS

Matrix: Non-Potable Water **Date:** 9/5/17
Type: Grab **Time:** 1249

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc
H - Vial Amber 40ml H3PO4, zero hdspc

7016202-19 BM-10 Mid-Depth

BOD, NO2 353.2, NO3 353.2, O-PO4 H, PO4-D(H)
Alk 2320B, NH3-N, TDS, TKN, TOC, TSS, PO4-P H

Matrix: Non-Potable Water **Date:** 9/5/17
Type: Grab **Time:** 1249

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

7016202-20 BM-10 Deep

NO3 353.2, O-PO4 H, PO4-D(H), BOD, NO2 353.2
PO4-P H, Alk 2320B, NH3-N, TDS, TKN, TOC, TSS

Matrix: Non-Potable Water **Date:** 9/5/17
Type: Grab **Time:** 1249

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

	Date/Time		Date/Time
Relinquished By	9/5/17 2352	Received By	09/15/17 1500
Relinquished By		Received at Laboratory By	09/15/17 1513

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	18.3°C
Samples on Ice?	(Yes) No NA
Approved By:	CHL
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: 8/7/2017 11:59:38AM

Report Template: wko WorkOrder COC ls

M.J. Reider Associates, Inc.

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

Project Manager: Richard Wheeler **Project:** 6223 - Seasonal Monthly Blue Marsh Reservoir

Comments:

Collected By : (Full Name) Gregory Wack

7016202-21 BM-11 Surface NAP

BOD, FC, PO4-D(H), TC#s, NO2 353.2, NO3 353.2, O-PO4 H AH

Alk 2320B, NH3-N, TDS, TKN, PO4-P H, TOC, TSS

Matrix: Non-Potable Water Date: 9/5/17

Type: Grab Time: 1345

A - Pl 250ml NP, zero hdspc
B - Pl 500ml H2SO4
C - Pl 500ml NP
D - Pl Liter NP
E - Sterile_Pl 250ml NaThio
F - Vial Amber 40ml H3PO4, zero hdspc
G - Vial Amber 40ml H3PO4, zero hdspc
H - Vial Amber 40ml H3PO4, zero hdspc

Relinquished By	Date/Time	Received By	Date/Time
	9/5/17 2:52		09/05/17 1500
Relinquished By	Date/Time	Received at Laboratory By	Date/Time
			09/05/17 1513

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	18.3°C
Samples on Ice?	(Yes) No NA
Approved By:	CHL
Entered By:	

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)**.**

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Reviewed and Approved by:

Richard Wheeler
Project Manager

Certificate of Analysis

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

Laboratory No.: 7007738
Report: 05/11/17
Lab Contact: Richard Wheeler

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

Project Info: 6222- Blue Marsh Beach 1,2,3

Lab ID: 7007738-01 **Collected By:** Carolyn M Lessig **Sampled:** 05/08/17 07:57 **Received:** 05/08/17 08:30
Sample Desc: SB-1 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	<1	mpn/100ml	1	SM 9223 B	05/08/17 9:30		TNS
Fecal Coliform	<2	/100ml	2	SM 9222 D	05/08/17 9:38		TNS
Total Coliform	120	mpn/100ml	1	SM 9223 B	05/08/17 9:30		TNS

Lab ID: 7007738-02 **Collected By:** Carolyn M Lessig **Sampled:** 05/08/17 08:00 **Received:** 05/08/17 08:30
Sample Desc: SB-2 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	<1	mpn/100ml	1	SM 9223 B	05/08/17 9:30		TNS
Fecal Coliform	<2	/100ml	2	SM 9222 D	05/08/17 9:38		TNS
Total Coliform	55	mpn/100ml	1	SM 9223 B	05/08/17 9:30		TNS

Lab ID: 7007738-03 **Collected By:** Carolyn M Lessig **Sampled:** 05/08/17 08:02 **Received:** 05/08/17 08:30
Sample Desc: SB-3 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	1	mpn/100ml	1	SM 9223 B	05/08/17 9:30		TNS
Fecal Coliform	2	/100ml	2	SM 9222 D	05/08/17 9:38		TNS
Total Coliform	78	mpn/100ml	1	SM 9223 B	05/08/17 9:30		TNS

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

WORK ORDER
Chain of Custody

7007738

Client Code: 3157
Project Manager: Richard Wheeler

Client: Tetra Tech
Project: 6222- Blue Marsh Beach 1,2,3

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

Comments:

Collected By : (Full Name) CML

7007738-01 SB-1
EC#s, FC, TC#s
INS

Matrix: Non-Potable Water Date: 5/8/17
Type: Grab Time: 757
A - Sterile_Pl 250ml NaThio

7007738-02 SB-2
EC#s, FC, TC#s

Matrix: Non-Potable Water Date: 5/8/17
Type: Grab Time: 800
A - Sterile_Pl 250ml NaThio

7007738-03 SB-3
EC#s, FC, TC#s

Matrix: Non-Potable Water Date: 5/8/17
Type: Grab Time: 802
A - Sterile_Pl 250ml NaThio

Relinquished By	Date/Time	Received By	Date/Time
NP			5/8/17 810
		Received at Laboratory By	5/8/17 830

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	9
Samples on Ice?	(Yes) No NA
Approved By:	
Entered By:	

Printed: 5/8/2017 6:59:27AM

Report Template: WKO WorkOrderCOC_IS

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Reviewed and Approved by:

Richard Wheeler
Project Manager

Certificate of Analysis

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

Laboratory No.: 7008008
Report: 05/17/17
Lab Contact: Richard Wheeler

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

Project Info: 6222- Blue Marsh Beach 1,2,3

Lab ID: 7008008-01 **Collected By:** Crystal H Leister **Sampled:** 05/11/17 07:34 **Received:** 05/11/17 08:06
Sample Desc: SB-1 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	<1	mpn/100ml	1	SM 9223 B	05/11/17 10:45		PLW
Fecal Coliform	<2	/100ml	2	SM 9222 D	05/11/17 10:46		PLW
Total Coliform	130	mpn/100ml	1	SM 9223 B	05/11/17 10:45		PLW

Lab ID: 7008008-02 **Collected By:** Crystal H Leister **Sampled:** 05/11/17 07:37 **Received:** 05/11/17 08:06
Sample Desc: SB-2 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	2	mpn/100ml	1	SM 9223 B	05/11/17 10:45		PLW
Fecal Coliform	6	/100ml	2	SM 9222 D	05/11/17 10:46		PLW
Total Coliform	130	mpn/100ml	1	SM 9223 B	05/11/17 10:45		PLW

Lab ID: 7008008-03 **Collected By:** Crystal H Leister **Sampled:** 05/11/17 07:40 **Received:** 05/11/17 08:06
Sample Desc: SB-3 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	<1	mpn/100ml	1	SM 9223 B	05/11/17 10:45		PLW
Fecal Coliform	<2	/100ml	2	SM 9222 D	05/11/17 10:46		PLW
Total Coliform	120	mpn/100ml	1	SM 9223 B	05/11/17 10:45		PLW

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

WORK ORDER
Chain of Custody

7008008

Client Code: 3157
Project Manager: Richard Wheeler
Client: Tetra Tech
Project: 6222- Blue Marsh Beach 1,2,3
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 : CHL
(Full Name)

Comments:

7008008-01 SB-1 — **Matrix:** Non-Potable Water — **Type:** Grab — Date: 05/11/17 — Time: 0734
TNS EC#s, FC, TC#s — A - Sterile_Pl 250ml NaThio

7008008-02 SB-2 — **Matrix:** Non-Potable Water — **Type:** Grab — Date: 05/11/17 — Time: 0737
EC#s, FC, TC#s — A - Sterile_Pl 250ml NaThio

7008008-03 SB-3 — **Matrix:** Non-Potable Water — **Type:** Grab — Date: 05/11/17 — Time: 0740
EC#s, FC, TC#s — A - Sterile_Pl 250ml NaThio

Relinquished By	Date/Time	Received By	Date/Time
N/P		[signature]	05/11/17 0747
		[signature] (Received at Laboratory By)	05/11/17 0806

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	7°C
Samples on Ice?	Yes (circled) No NA
Approved By:	CHL
Entered By:	

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Reviewed and Approved by:

Richard Wheeler
Project Manager

Certificate of Analysis

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

Laboratory No.: 7008239
Report: 05/17/17
Lab Contact: Richard Wheeler

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

Project Info: 6222- Blue Marsh Beach 1,2,3

Lab ID: 7008239-01 **Collected By:** Crystal H Leister **Sampled:** 05/15/17 07:12 **Received:** 05/15/17 08:00
Sample Desc: SB-1 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	24	mpn/100ml	1	SM 9223 B	05/15/17 16:15		TNS
Fecal Coliform	36	/100ml	2	SM 9222 D	05/15/17 11:48		TNS
Total Coliform	170	mpn/100ml	1	SM 9223 B	05/15/17 16:15		TNS

Lab ID: 7008239-02 **Collected By:** Crystal H Leister **Sampled:** 05/15/17 07:14 **Received:** 05/15/17 08:00
Sample Desc: SB-2 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	3	mpn/100ml	1	SM 9223 B	05/15/17 16:15		TNS
Fecal Coliform	8	/100ml	2	SM 9222 D	05/15/17 11:48		TNS
Total Coliform	130	mpn/100ml	1	SM 9223 B	05/15/17 16:15		TNS

Lab ID: 7008239-03 **Collected By:** Crystal H Leister **Sampled:** 05/15/17 07:16 **Received:** 05/15/17 08:00
Sample Desc: SB-3 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	6	mpn/100ml	1	SM 9223 B	05/15/17 16:15		TNS
Fecal Coliform	8	/100ml	2	SM 9222 D	05/15/17 11:48		TNS
Total Coliform	170	mpn/100ml	1	SM 9223 B	05/15/17 16:15		TNS

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

WORK ORDER
Chain of Custody

7008239

Client Code: 3157 **Client:** Tetra Tech
Project Manager: Richard Wheeler **Project:** 6222- Blue Marsh Beach 1,2,3
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 : CHL (Full Name)

Comments:

7008239-01 SB-1
EC#s, FC, TC#s
NAP

Matrix: Non-Potable Water Date: 5/15/17
Type: Grab Time: 0712
A - Sterile_Pl 250ml NaThio

7008239-02 SB-2
EC#s, FC, TC#s
NAP

Matrix: Non-Potable Water Date: 5/15/17
Type: Grab Time: 0714
A - Sterile_Pl 250ml NaThio

7008239-03 SB-3
EC#s, FC, TC#s
NAP

Matrix: Non-Potable Water Date: 5/15/17
Type: Grab Time: 0716
A - Sterile_Pl 250ml NaThio

N/P		[signature]	05/15/17 0730
Relinquished By	Date/Time	Received By	Date/Time
		[signature]	05/15/17 0800
Relinquished By	Date/Time	Received at Laboratory By	Date/Time

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	7°C
Samples on Ice?	(Yes) No NA
Approved By:	CHL
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: 5/15/2017 8:06:57AM

Report Template: wko WorkOrder COC ls

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Reviewed and Approved by:

Richard Wheeler
Project Manager

Certificate of Analysis

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

Laboratory No.: 7008473
Report: 05/23/17
Lab Contact: Richard Wheeler

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

Project Info: 6222- Blue Marsh Beach 1,2,3

Lab ID: 7008473-01 **Collected By:** Crystal H Leister **Sampled:** 05/18/17 06:34 **Received:** 05/18/17 07:11
Sample Desc: SB-1 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	1	mpn/100ml	1	SM 9223 B	05/18/17 8:25		TNS
Fecal Coliform	<2	/100ml	2	SM 9222 D	05/18/17 8:33		TNS
Total Coliform	140	mpn/100ml	1	SM 9223 B	05/18/17 8:25		TNS

Lab ID: 7008473-02 **Collected By:** Crystal H Leister **Sampled:** 05/18/17 06:37 **Received:** 05/18/17 07:11
Sample Desc: SB-2 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	1	mpn/100ml	1	SM 9223 B	05/18/17 8:25		TNS
Fecal Coliform	<2	/100ml	2	SM 9222 D	05/18/17 8:33		TNS
Total Coliform	460	mpn/100ml	1	SM 9223 B	05/18/17 8:25		TNS

Lab ID: 7008473-03 **Collected By:** Crystal H Leister **Sampled:** 05/18/17 06:40 **Received:** 05/18/17 07:11
Sample Desc: SB-3 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	8	mpn/100ml	1	SM 9223 B	05/18/17 8:25		TNS
Fecal Coliform	8	/100ml	2	SM 9222 D	05/18/17 8:33		TNS
Total Coliform	650	mpn/100ml	1	SM 9223 B	05/18/17 8:25		TNS

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

WORK ORDER
Chain of Custody

7008473

Client Code: 3157 **Client:** Tetra Tech
Project Manager: Richard Wheeler **Project:** 6222- Blue Marsh Beach 1,2,3
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) CHL **Comments:**

7008473-01 SB-1
EC#s, FC, TC#s NAP
Matrix: Non-Potable Water Date: 5/18/17
Type: Grab Time: 0634
A - Sterile_Pl 250ml NaThio

7008473-02 SB-2
EC#s, FC, TC#s NAP
Matrix: Non-Potable Water Date: 5/18/17
Type: Grab Time: 0637
A - Sterile_Pl 250ml NaThio

7008473-03 SB-3
EC#s, FC, TC#s NAP
Matrix: Non-Potable Water Date: 5/18/17
Type: Grab Time: 0640
A - Sterile_Pl 250ml NaThio

Relinquished By: N/P	Date/Time	Received By:	5/18/17 0646
Relinquished By:	Date/Time	Received at Laboratory By:	5/18/17 0711

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	19°C
Samples on Ice?	(Yes) No NA
Approved By:	CHL
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: 5/17/2017 3:59:04PM

Report Template: wko WorkOrder COC 1s

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Sample Submission, Sample Acceptance & Sampling Containers

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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 Wheeler
Project Manager

Certificate of Analysis

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

Laboratory No.: 7010650
Report: 06/22/17
Lab Contact: Richard Wheeler

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

Project Info: 6222- Blue Marsh Beach 1,2,3

Lab ID: 7010650-01 **Collected By:** Crystal H Leister **Sampled:** 06/15/17 06:27 **Received:** 06/15/17 06:54
Sample Desc: SB-1 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	38	mpn/100ml	1	SM 9223 B	06/15/17 8:55		TNS
Fecal Coliform	38	/100ml	2	SM 9222 D	06/15/17 8:53		TNS
Total Coliform	460	mpn/100ml	1	SM 9223 B	06/15/17 8:55		TNS

Lab ID: 7010650-02 **Collected By:** Crystal H Leister **Sampled:** 06/15/17 06:29 **Received:** 06/15/17 06:54
Sample Desc: SB-2 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	28	mpn/100ml	1	SM 9223 B	06/15/17 8:55		TNS
Fecal Coliform	28	/100ml	2	SM 9222 D	06/15/17 8:53		TNS
Total Coliform	340	mpn/100ml	1	SM 9223 B	06/15/17 8:55		TNS

Lab ID: 7010650-03 **Collected By:** Crystal H Leister **Sampled:** 06/15/17 06:31 **Received:** 06/15/17 06:54
Sample Desc: SB-3 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	21	mpn/100ml	1	SM 9223 B	06/15/17 8:55		TNS
Fecal Coliform	30	/100ml	2	SM 9222 D	06/15/17 8:53		TNS
Total Coliform	310	mpn/100ml	1	SM 9223 B	06/15/17 8:55		TNS

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

WORK ORDER
Chain of Custody

7010650

Client Code: 3157
Project Manager: Richard Wheeler

Client: Tetra Tech
Project: 6222- Blue Marsh Beach 1,2,3

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) CHL

Comments:

7010650-01 SB-1
EC#s, FC, TC#s NAP
Matrix: Non-Potable Water Date: 06/15/17
Type: Grab Time: 0627
A - Sterile_Pl 250ml NaThio

7010650-02 SB-2
EC#s, FC, TC#s NAP
Matrix: Non-Potable Water Date: 06/15/17
Type: Grab Time: 0629
A - Sterile_Pl 250ml NaThio

7010650-03 SB-3
EC#s, FC, TC#s NAP
Matrix: Non-Potable Water Date: 06/15/17
Type: Grab Time: 0631
A - Sterile_Pl 250ml NaThio

Relinquished By: NP	Date/Time	Received By:	Date/Time: 06/15/17 0637
Relinquished By:	Date/Time	Received at Laboratory By:	Date/Time: 06/15/17 0654

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	16.3°C
Samples on Ice?	(Yes) No NA
Approved By:	CHL
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: 6/13/2017 6:49:30AM

Report Template: WO WorkOrder COC 15

MJRA Terms & Conditions

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Reviewed and Approved by:

Christina M. Kistler

Christina Kistler For Richard Wheeler
Project Manager

Certificate of Analysis

M.J. Reider Associates, Inc.

ENVIRONMENTAL TESTING LABORATORY
U.S. EPA/PA DEP #06-00003

Laboratory No.: 7011288
Report: 06/22/17
Lab Contact: Richard Wheeler

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

Project Info: 6222- Blue Marsh Beach 1,2,3

Lab ID: 7011288-01 **Collected By:** Carolyn M Lessig **Sampled:** 06/19/17 07:15 **Received:** 06/19/17 07:45
Sample Desc: SB-1 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	10	mpn/100ml	1	SM 9223 B	06/19/17 8:50		TNS
Fecal Coliform	11	/100ml	2	SM 9222 D	06/19/17 8:48		TNS
Total Coliform	410	mpn/100ml	1	SM 9223 B	06/19/17 8:50		TNS

Lab ID: 7011288-02 **Collected By:** Carolyn M Lessig **Sampled:** 06/19/17 07:18 **Received:** 06/19/17 07:45
Sample Desc: SB-2 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	19	mpn/100ml	1	SM 9223 B	06/19/17 8:50		TNS
Fecal Coliform	24	/100ml	2	SM 9222 D	06/19/17 8:48		TNS
Total Coliform	650	mpn/100ml	1	SM 9223 B	06/19/17 8:50		TNS

Lab ID: 7011288-03 **Collected By:** Carolyn M Lessig **Sampled:** 06/19/17 07:20 **Received:** 06/19/17 07:45
Sample Desc: SB-3 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	16	mpn/100ml	1	SM 9223 B	06/19/17 8:50		TNS
Fecal Coliform	16	/100ml	2	SM 9222 D	06/19/17 8:48		TNS
Total Coliform	490	mpn/100ml	1	SM 9223 B	06/19/17 8:50		TNS

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

WORK ORDER
Chain of Custody

7011288

Client Code: 3157
Client: Tetra Tech
Project Manager: Richard Wheeler
Project: 6222- Blue Marsh Beach 1,2,3
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

Comments:

Collected By : (Full Name) CML

7011288-01 SB-1
EC#s, FC, TC#s TNS
Matrix: Non-Potable Water Date: 6/19/17
Type: Grab Time: 715
A - Sterile_Pl 250ml NaThio

7011288-02 SB-2
EC#s, FC, TC#s
Matrix: Non-Potable Water Date: 6/19/17
Type: Grab Time: 718
A - Sterile_Pl 250ml NaThio

7011288-03 SB-3
EC#s, FC, TC#s
Matrix: Non-Potable Water Date: 6/19/17
Type: Grab Time: 720
A - Sterile_Pl 250ml NaThio

NP			6/19/17 726
Relinquished By	Date/Time	Received By	Date/Time
			6/19/17 745
Relinquished By	Date/Time	Received at Laboratory By	Date/Time

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	8
Samples on Ice?	Yes No NA
Approved By:	CML
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: 6/19/2017 6:44:36AM

Report Template: WO WorkOrder COC 15

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Reviewed and Approved by:

Christina M. Kistler

Christina Kistler For Richard Wheeler
Project Manager

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

Certificate of Analysis

Laboratory No.: 7011588
Report: 06/27/17
Lab Contact: Richard Wheeler

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

Project Info: 6222- Blue Marsh Beach 1,2,3

Lab ID: 7011588-01 **Collected By:** Crystal H Leister **Sampled:** 06/22/17 06:13 **Received:** 06/22/17 06:35
Sample Desc: SB-1 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	3	mpn/100ml	1	SM 9223 B	06/22/17 8:10		TNS
Fecal Coliform	5	/100ml	2	SM 9222 D	06/22/17 8:08		TNS
Total Coliform	410	mpn/100ml	1	SM 9223 B	06/22/17 8:10		TNS

Lab ID: 7011588-02 **Collected By:** Crystal H Leister **Sampled:** 06/22/17 06:15 **Received:** 06/22/17 06:35
Sample Desc: SB-2 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	5	mpn/100ml	1	SM 9223 B	06/22/17 8:10		TNS
Fecal Coliform	6	/100ml	2	SM 9222 D	06/22/17 8:08		TNS
Total Coliform	490	mpn/100ml	1	SM 9223 B	06/22/17 8:10		TNS

Lab ID: 7011588-03 **Collected By:** Crystal H Leister **Sampled:** 06/22/17 06:17 **Received:** 06/22/17 06:35
Sample Desc: SB-3 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	5	mpn/100ml	1	SM 9223 B	06/22/17 8:10		TNS
Fecal Coliform	8	/100ml	2	SM 9222 D	06/22/17 8:08		TNS
Total Coliform	390	mpn/100ml	1	SM 9223 B	06/22/17 8:10		TNS

M.J. Reider Associates, Inc.

107 Angelica St, Reading PA, 19611
610-374-5129 www.mjreider.com

WORK ORDER
Chain of Custody

7011588

Client Code: 3157
Project Manager: Richard Wheeler

Client: Tetra Tech
Project: 6222- Blue Marsh Beach 1,2,3

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 : CHL
(Full Name)

Comments:

7011588-01 SB-1
EC#s, FC, TC#s NAP
Matrix: Non-Potable Water Date: 06/22/17
Type: Grab Time: 0613
A - Sterile_Pl 250ml NaThio

7011588-02 SB-2
EC#s, FC, TC#s NAP
Matrix: Non-Potable Water Date: 06/22/17
Type: Grab Time: 0615
A - Sterile_Pl 250ml NaThio

7011588-03 SB-3
EC#s, FC, TC#s NAP
Matrix: Non-Potable Water Date: 06/22/17
Type: Grab Time: 0617
A - Sterile_Pl 250ml NaThio

Relinquished By	Date/Time	Received By	06/22/17 0620
Relinquished By	Date/Time	Received at Laboratory By	06/22/17 0635

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	16.9°C
Samples on Ice?	Yes No NA
Approved By:	CHL
Entered By:	

Printed: 6/21/2017 3:29:07PM

Report Template: WKO WorkOrder COC 1

MJRA Terms & Conditions

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Warranty & Litigation

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Reviewed and Approved by:

Richard Wheeler
Project Manager

Certificate of Analysis

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

Laboratory No.: 7011823
Report: 06/28/17
Lab Contact: Richard Wheeler

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

Project Info: 6222- Blue Marsh Beach 1,2,3

Lab ID: 7011823-01 **Collected By:** Crystal H Leister **Sampled:** 06/26/17 06:29 **Received:** 06/26/17 06:57
Sample Desc: SB-1 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	11	mpn/100ml	1	SM 9223 B	06/26/17 8:35		TNS
Fecal Coliform	15	/100ml	2	SM 9222 D	06/26/17 8:40		TNS
Total Coliform	580	mpn/100ml	1	SM 9223 B	06/26/17 8:35		TNS

Lab ID: 7011823-02 **Collected By:** Crystal H Leister **Sampled:** 06/26/17 06:31 **Received:** 06/26/17 06:57
Sample Desc: SB-2 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	17	mpn/100ml	1	SM 9223 B	06/26/17 8:35		TNS
Fecal Coliform	23	/100ml	2	SM 9222 D	06/26/17 8:40		TNS
Total Coliform	650	mpn/100ml	1	SM 9223 B	06/26/17 8:35		TNS

Lab ID: 7011823-03 **Collected By:** Crystal H Leister **Sampled:** 06/26/17 06:33 **Received:** 06/26/17 06:57
Sample Desc: SB-3 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	5	mpn/100ml	1	SM 9223 B	06/26/17 8:35		TNS
Fecal Coliform	11	/100ml	2	SM 9222 D	06/26/17 8:40		TNS
Total Coliform	580	mpn/100ml	1	SM 9223 B	06/26/17 8:35		TNS

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

WORK ORDER
Chain of Custody

7011823

Client Code: 3157
Project Manager: Richard Wheeler

Client: Tetra Tech
Project: 6222- Blue Marsh Beach 1,2,3

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) CHL

Comments:

7011823-01 SB-1
NO EC#s, FC, TC#s NAP
Matrix: Non-Potable Water
Type: Grab
Date: 06/26/17
Time: 0629
A - Sterile_Pl 250ml NaThio

7011823-02 SB-2
EC#s, FC, TC#s NAP
Matrix: Non-Potable Water
Type: Grab
Date: 06/26/17
Time: 0631
A - Sterile_Pl 250ml NaThio

7011823-03 SB-3
EC#s, FC, TC#s NAP
Matrix: Non-Potable Water
Type: Grab
Date: 06/26/17
Time: 0633
A - Sterile_Pl 250ml NaThio

Relinquished By: N/P	Date/Time	Received By: [signature]	Date/Time: 06/26/17 0638
Relinquished By:	Date/Time	Received at Laboratory By: [signature]	Date/Time: 06/26/17 0657

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	16.2°C
Samples on Ice?	(Yes) No NA
Approved By:	
Entered By:	CHL

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: 6/25/2017 2:09:07PM

Report Template: wko WorkOrder COC ls

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Reviewed and Approved by:

Richard Wheeler
Project Manager

Certificate of Analysis

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

Laboratory No.: 7012231
Report: 07/06/17
Lab Contact: Richard Wheeler

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

Project Info: 6222- Blue Marsh Beach 1,2,3

Lab ID: 7012231-01 **Collected By:** Crystal H Leister **Sampled:** 06/29/17 06:31 **Received:** 06/29/17 06:59
Sample Desc: SB-1 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	4	mpn/100ml	1	SM 9223 B	06/29/17 10:40		PLW
Fecal Coliform	6	/100ml	2	SM 9222 D	06/29/17 10:30		PLW
Total Coliform	490	mpn/100ml	1	SM 9223 B	06/29/17 10:40		PLW

Lab ID: 7012231-02 **Collected By:** Crystal H Leister **Sampled:** 06/29/17 06:33 **Received:** 06/29/17 06:59
Sample Desc: SB-2 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	4	mpn/100ml	1	SM 9223 B	06/29/17 10:40		PLW
Fecal Coliform	10	/100ml	2	SM 9222 D	06/29/17 10:30		PLW
Total Coliform	390	mpn/100ml	1	SM 9223 B	06/29/17 10:40		PLW

Lab ID: 7012231-03 **Collected By:** Crystal H Leister **Sampled:** 06/29/17 06:35 **Received:** 06/29/17 06:59
Sample Desc: SB-3 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	5	mpn/100ml	1	SM 9223 B	06/29/17 10:40		PLW
Fecal Coliform	11	/100ml	2	SM 9222 D	06/29/17 10:30		PLW
Total Coliform	390	mpn/100ml	1	SM 9223 B	06/29/17 10:40		PLW

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

WORK ORDER
Chain of Custody

7012231

Client Code: 3157 **Client:** Tetra Tech
Project Manager: Richard Wheeler **Project:** 6222- Blue Marsh Beach 1,2,3
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 : CHL (Full Name)

Comments:

7012231-01 SB-1
EC#s, FC, TC#s NAP
TNS
Matrix: Non-Potable Water Date: 06/29/17
Type: Grab Time: 0631
A - Sterile_Pl 250ml NaThio

7012231-02 SB-2
EC#s, FC, TC#s NAP
Matrix: Non-Potable Water Date: 06/29/17
Type: Grab Time: 0633
A - Sterile_Pl 250ml NaThio

7012231-03 SB-3
EC#s, FC, TC#s NAP
Matrix: Non-Potable Water Date: 06/29/17
Type: Grab Time: 0635
A - Sterile_Pl 250ml NaThio

N/P		Cindy M. Test	06/29/17 0640
Relinquished By	Date/Time	Received By	Date/Time
		Cindy M. Test	06/29/17 0659
Relinquished By	Date/Time	Received at Laboratory By	Date/Time

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	16.3°C
Samples on Ice?	Yes No NA
Approved By:	CHL
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: 6/28/2017 4:29:08PM

Report Template: wko WorkOrder COC ls

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Reviewed and Approved by:

Richard Wheeler
Project Manager

Certificate of Analysis

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

Laboratory No.: 7012681
Report: 07/06/17
Lab Contact: Richard Wheeler

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

Project Info: 6222- Blue Marsh Beach 1,2,3

Lab ID: 7012681-01 **Collected By:** Matthew C Stricker **Sampled:** 07/03/17 08:50 **Received:** 07/03/17 09:16
Sample Desc: SB-1 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	3	mpn/100ml	1	SM 9223 B	07/03/17 9:40		TNS
Fecal Coliform	6	/100ml	2	SM 9222 D	07/03/17 9:40	M-26	TNS
Total Coliform	520	mpn/100ml	1	SM 9223 B	07/03/17 9:40		TNS

Lab ID: 7012681-02 **Collected By:** Matthew C Stricker **Sampled:** 07/03/17 08:55 **Received:** 07/03/17 09:16
Sample Desc: SB-2 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	11	mpn/100ml	1	SM 9223 B	07/03/17 9:40		TNS
Fecal Coliform	15	/100ml	2	SM 9222 D	07/03/17 9:40		TNS
Total Coliform	480	mpn/100ml	1	SM 9223 B	07/03/17 9:40		TNS

Lab ID: 7012681-03 **Collected By:** Matthew C Stricker **Sampled:** 07/03/17 09:00 **Received:** 07/03/17 09:16
Sample Desc: SB-3 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	3	mpn/100ml	1	SM 9223 B	07/03/17 9:40		TNS
Fecal Coliform	3	/100ml	2	SM 9222 D	07/03/17 9:40		TNS
Total Coliform	730	mpn/100ml	1	SM 9223 B	07/03/17 9:40		TNS

Notes and Definitions

M-26 Duplicate analysis was outside the acceptable limit of 20%RPD at 40%.

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

WORK ORDER
Chain of Custody

7012681

Client Code: 3157
Client: Tetra Tech
Project Manager: Richard Wheeler
Project: 6222- Blue Marsh Beach 1,2,3
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) MCS

Comments:

7012681-01 SB-1	**Matrix:** Non-Potable Water	Date: 7/3/17
ND EC#s, FC, TC#s	**Type:** Grab	Time: 850
	A - Sterile_Pl 250ml NaThio	
7012681-02 SB-2	**Matrix:** Non-Potable Water	Date: 7/3/17
EC#s, FC, TC#s	**Type:** Grab	Time: 855
	A - Sterile_Pl 250ml NaThio	
7012681-03 SB-3	**Matrix:** Non-Potable Water	Date: 7/3/17
EC#s, FC, TC#s	**Type:** Grab	Time: 900
	A - Sterile_Pl 250ml NaThio	

Relinquished By	Date/Time	Received By	Date/Time
N/P		Matt Stein	7/3/17 903
Relinquished By	Date/Time	Received at Laboratory By	Date/Time
		Matt Stein	7/3/17 916

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	9
Samples on Ice?	(Yes) No NA
Approved By:	
Entered By:	MCS

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: 7/3/2017 7:27:00AM

Report Template: WKO Workorder COC 15

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Reviewed and Approved by:

Richard Wheeler
Project Manager

Certificate of Analysis

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

Laboratory No.: 7012967
Report: 07/11/17
Lab Contact: Richard Wheeler

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

Project Info: 6222- Blue Marsh Beach 1,2,3

Lab ID: 7012967-01 **Collected By:** Crystal H Leister **Sampled:** 07/06/17 06:31 **Received:** 07/06/17 06:55
Sample Desc: SB-1 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	3	mpn/100ml	1	SM 9223 B	07/06/17 8:45		TNS
Fecal Coliform	5	/100ml	2	SM 9222 D	07/06/17 8:45	Report	TNS
Total Coliform	290	mpn/100ml	1	SM 9223 B	07/06/17 8:45		TNS

Lab ID: 7012967-02 **Collected By:** Crystal H Leister **Sampled:** 07/06/17 06:33 **Received:** 07/06/17 06:55
Sample Desc: SB-2 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	17	mpn/100ml	1	SM 9223 B	07/06/17 8:45		TNS
Fecal Coliform	28	/100ml	2	SM 9222 D	07/06/17 8:45		TNS
Total Coliform	440	mpn/100ml	1	SM 9223 B	07/06/17 8:45		TNS

Lab ID: 7012967-03 **Collected By:** Crystal H Leister **Sampled:** 07/06/17 06:35 **Received:** 07/06/17 06:55
Sample Desc: SB-3 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	25	mpn/100ml	1	SM 9223 B	07/06/17 8:45		TNS
Fecal Coliform	30	/100ml	2	SM 9222 D	07/06/17 8:45		TNS
Total Coliform	440	mpn/100ml	1	SM 9223 B	07/06/17 8:45		TNS

Notes and Definitions

Report Duplicate analysis was outside the acceptable limit of 20%RPD at 28%.

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

WORK ORDER
Chain of Custody

7012967

Client Code: 3157
Client: Tetra Tech
Project Manager: Richard Wheeler
Project: 6222- Blue Marsh Beach 1,2,3
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 : CHL (Full Name)
Comments:

7012967-01 SB-1
EC#s, FC, TC#s NAD
Matrix: Non-Potable Water Date: 07/06/17
Type: Grab Time: 0631
A - Sterile_Pl 250ml NaThio

7012967-02 SB-2
EC#s, FC, TC#s NAD
Matrix: Non-Potable Water Date: 07/06/17
Type: Grab Time: 0633
A - Sterile_Pl 250ml NaThio

7012967-03 SB-3
EC#s, FC, TC#s NAD
Matrix: Non-Potable Water Date: 07/06/17
Type: Grab Time: 0635
A - Sterile_Pl 250ml NaThio

Relinquished By: NJP	Date/Time	Received By: [illegible]	07/06/17 0642
Relinquished By	Date/Time	Received at Laboratory By: [illegible]	07/06/17 0655

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	15.3°C
Samples on Ice?	Yes No NA
Approved By:	CHL
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: 7/5/2017 4:19:51PM

Report Template

MJRA Terms & Conditions

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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 Wheeler
Project Manager

Certificate of Analysis

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

Laboratory No.: 7013393
Report: 07/17/17
Lab Contact: Richard Wheeler

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

Project Info: 6222- Blue Marsh Beach 1,2,3

Lab ID: 7013393-01 **Collected By:** Crystal H Leister **Sampled:** 07/10/17 06:26 **Received:** 07/10/17 06:50
Sample Desc: SB-1 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	2	mpn/100ml	1	SM 9223 B	07/10/17 9:00		TNS
Fecal Coliform	5	/100ml	2	SM 9222 D	07/10/17 9:00		TNS
Total Coliform	2400	mpn/100ml	1	SM 9223 B	07/10/17 9:00		TNS

Lab ID: 7013393-02 **Collected By:** Crystal H Leister **Sampled:** 07/10/17 06:24 **Received:** 07/10/17 06:50
Sample Desc: SB-2 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	91	mpn/100ml	1	SM 9223 B	07/10/17 9:00		TNS
Fecal Coliform	110	/100ml	2	SM 9222 D	07/10/17 9:00		TNS
Total Coliform	2400	mpn/100ml	1	SM 9223 B	07/10/17 9:00		TNS

Lab ID: 7013393-03 **Collected By:** Crystal H Leister **Sampled:** 07/10/17 06:22 **Received:** 07/10/17 06:50
Sample Desc: SB-3 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	4	mpn/100ml	1	SM 9223 B	07/10/17 9:00		TNS
Fecal Coliform	5	/100ml	2	SM 9222 D	07/10/17 9:00		TNS
Total Coliform	1600	mpn/100ml	1	SM 9223 B	07/10/17 9:00		TNS

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

WORK ORDER
Chain of Custody

7013393

Client Code: 3157 **Client:** Tetra Tech
Project Manager: Richard Wheeler **Project:** 6222- Blue Marsh Beach 1,2,3
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 : CHL (Full Name) **Comments:**

7013393-01 SB-1 NAP
EC#s, FC, TC#s NAP
TNS
Matrix: Non-Potable Water **Date:** 07/10/17
Type: Grab **Time:** 0626
A - Sterile_Pl 250ml NaThio

7013393-02 SB-2 NAP
EC#s, FC, TC#s NAP
Matrix: Non-Potable Water **Date:** 07/10/17
Type: Grab **Time:** 0624
A - Sterile_Pl 250ml NaThio

7013393-03 SB-3 NAP
EC#s, FC, TC#s NAP
Matrix: Non-Potable Water **Date:** 07/10/17
Type: Grab **Time:** 0622
A - Sterile_Pl 250ml NaThio

N/P		[signature]	07/10/17 0630
Relinquished By	Date/Time	Received By	Date/Time
		[signature]	07/10/17 0650
Relinquished By	Date/Time	Received at Laboratory By	Date/Time

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	17.9°C
Samples on Ice?	(Yes) No NA
Approved By:	CHL
Entered By:	

Printed: 7/10/2017 6:59:41AM

Report Template: wko WorkOrder COC ls

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Reviewed and Approved by:

Richard Wheeler
Project Manager

Certificate of Analysis

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

Laboratory No.: 7013757
Report: 07/18/17
Lab Contact: Richard Wheeler

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

Project Info: 6222- Blue Marsh Beach 1,2,3

Lab ID: 7013757-01 **Collected By:** Crystal H Leister **Sampled:** 07/13/17 06:22 **Received:** 07/13/17 06:46
Sample Desc: SB-1 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	2	mpn/100ml	1	SM 9223 B	07/13/17 8:45		TNS
Fecal Coliform	3	/100ml	2	SM 9222 D	07/13/17 8:33		TNS
Total Coliform	2000	mpn/100ml	1	SM 9223 B	07/13/17 8:45		TNS

Lab ID: 7013757-02 **Collected By:** Crystal H Leister **Sampled:** 07/13/17 06:24 **Received:** 07/13/17 06:46
Sample Desc: SB-2 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	8	mpn/100ml	1	SM 9223 B	07/13/17 8:45		TNS
Fecal Coliform	10	/100ml	2	SM 9222 D	07/13/17 8:33		TNS
Total Coliform	1000	mpn/100ml	1	SM 9223 B	07/13/17 8:45		TNS

Lab ID: 7013757-03 **Collected By:** Crystal H Leister **Sampled:** 07/13/17 06:26 **Received:** 07/13/17 06:46
Sample Desc: SB-3 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	1	mpn/100ml	1	SM 9223 B	07/13/17 8:45		TNS
Fecal Coliform	6	/100ml	2	SM 9222 D	07/13/17 8:33		TNS
Total Coliform	1700	mpn/100ml	1	SM 9223 B	07/13/17 8:45		TNS

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

WORK ORDER
Chain of Custody

7013757

Client Code: 3157
Client: Tetra Tech
Project Manager: Richard Wheeler
Project: 6222- Blue Marsh Beach 1,2,3
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 : CHL (Full Name)
Comments:

7013757-01 SB-1
EC#s, FC, TC#s NAP
Matrix: Non-Potable Water Date: 07/13/17
Type: Grab Time: 0622
A - Sterile_Pl 250ml NaThio

7013757-02 SB-2
EC#s, FC, TC#s NAP
Matrix: Non-Potable Water Date: 07/13/17
Type: Grab Time: 0624
A - Sterile_Pl 250ml NaThio

7013757-03 SB-3
EC#s, FC, TC#s NAP
Matrix: Non-Potable Water Date: 07/13/17
Type: Grab Time: 0626
A - Sterile_Pl 250ml NaThio

N/P		[signature]	07/13/17 0629
Relinquished By	Date/Time	Received By	Date/Time
[signature]		[signature]	07/13/17 0646
Relinquished By	Date/Time	Received at Laboratory By	Date/Time

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	22.5°C
Samples on Ice?	(Yes) No NA
Approved By:	CHL
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: 7/12/2017 5:50:35PM

Report Template: wko WorkOrder COC 1s

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Reviewed and Approved by:

Richard Wheeler
Project Manager

Certificate of Analysis

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

Laboratory No.: 7014114
Report: 07/19/17
Lab Contact: Richard Wheeler

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

Project Info: 6222- Blue Marsh Beach 1,2,3

Lab ID: 7014114-01 **Collected By:** Joshua Shartle **Sampled:** 07/17/17 08:00 **Received:** 07/17/17 08:25
Sample Desc: SB-1 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	19	mpn/100ml	1	SM 9223 B	07/17/17 9:10		TNS
Fecal Coliform	23	/100ml	2	SM 9222 D	07/17/17 9:10		TNS
Total Coliform	1700	mpn/100ml	1	SM 9223 B	07/17/17 9:10		TNS

Lab ID: 7014114-02 **Collected By:** Joshua Shartle **Sampled:** 07/17/17 08:02 **Received:** 07/17/17 08:25
Sample Desc: SB-2 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	7	mpn/100ml	1	SM 9223 B	07/17/17 9:10		TNS
Fecal Coliform	11	/100ml	2	SM 9222 D	07/17/17 9:10		TNS
Total Coliform	1700	mpn/100ml	1	SM 9223 B	07/17/17 9:10		TNS

Lab ID: 7014114-03 **Collected By:** Joshua Shartle **Sampled:** 07/17/17 08:04 **Received:** 07/17/17 08:25
Sample Desc: SB-3 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	8	mpn/100ml	1	SM 9223 B	07/17/17 9:10		TNS
Fecal Coliform	11	/100ml	2	SM 9222 D	07/17/17 9:10		TNS
Total Coliform	2000	mpn/100ml	1	SM 9223 B	07/17/17 9:10		TNS

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

WORK ORDER
Chain of Custody

7014114

Client Code: 3157 **Client:** Tetra Tech
Project Manager: Richard Wheeler **Project:** 6222- Blue Marsh Beach 1,2,3
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) JBS

Comments:

7014114-01 SB-1
EC#s, FC, TC#s
Matrix: Non-Potable Water Date: 7-17-17
Type: Grab Time: 0800
A - Sterile_Pl 250ml NaThio

7014114-02 SB-2
EC#s, FC, TC#s
Matrix: Non-Potable Water Date: 7-17-17
Type: Grab Time: 0802
A - Sterile_Pl 250ml NaThio

7014114-03 SB-3
EC#s, FC, TC#s
Matrix: Non-Potable Water Date: 7-17-17
Type: Grab Time: 0804
A - Sterile_Pl 250ml NaThio

Relinquished By: MP	Date/Time: 7-17-17 0810	Received By:	Date/Time: 7-17-17 0810
Relinquished By:	Date/Time:	Received at Laboratory By:	Date/Time: 7-17-17 0825

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	18
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: 7/17/2017 7:20:08AM

Report Template: wko WorkOrder COC ls

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Warranty & Litigation

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Reviewed and Approved by:

Richard Wheeler
Project Manager

Certificate of Analysis

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

Laboratory No.: 7014410
Report: 07/25/17
Lab Contact: Richard Wheeler

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

Project Info: 6222- Blue Marsh Beach 1,2,3

Lab ID: 7014410-01 **Collected By:** Joshua Shartle **Sampled:** 07/20/17 08:07 **Received:** 07/20/17 08:35
Sample Desc: SB-1 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	19	mpn/100ml	1	SM 9223 B	07/20/17 9:20		TNS
Fecal Coliform	21	/100ml	2	SM 9222 D	07/20/17 9:20		TNS
Total Coliform	1400	mpn/100ml	1	SM 9223 B	07/20/17 9:20		TNS

Lab ID: 7014410-02 **Collected By:** Joshua Shartle **Sampled:** 07/20/17 08:10 **Received:** 07/20/17 08:35
Sample Desc: SB-2 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	16	mpn/100ml	1	SM 9223 B	07/20/17 9:20		TNS
Fecal Coliform	21	/100ml	2	SM 9222 D	07/20/17 9:20		TNS
Total Coliform	1200	mpn/100ml	1	SM 9223 B	07/20/17 9:20		TNS

Lab ID: 7014410-03 **Collected By:** Joshua Shartle **Sampled:** 07/20/17 08:13 **Received:** 07/20/17 08:35
Sample Desc: SB-3 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	22	mpn/100ml	1	SM 9223 B	07/20/17 9:20		TNS
Fecal Coliform	34	/100ml	2	SM 9222 D	07/20/17 9:20		TNS
Total Coliform	1200	mpn/100ml	1	SM 9223 B	07/20/17 9:20		TNS

M.J. Reider Associates, Inc.

107 Angelica St, Reading PA, 19611
610-374-5129 www.mjreider.com

WORK ORDER
Chain of Custody

7014410

Client Code: 3157
Project Manager: Richard Wheeler

Client: Tetra Tech
Project: 6222- Blue Marsh Beach 1,2,3

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

Comments:

Collected By : TBS
(Full Name)

7014410-01 SB-1
EC#s, FC, TC#s TNC
Matrix: Non-Potable Water Date: 7.20.17
Type: Grab Time: 0807
A - Sterile_Pl 250ml NaThio

7014410-02 SB-2
EC#s, FC, TC#s
Matrix: Non-Potable Water Date: 7.20.17
Type: Grab Time: 0810
A - Sterile_Pl 250ml NaThio

7014410-03 SB-3
EC#s, FC, TC#s
Matrix: Non-Potable Water Date: 7.20.17
Type: Grab Time: 0813
A - Sterile_Pl 250ml NaThio

Relinquished By: NP	Date/Time: 7.20.17 0815	Received By:	Date/Time: 7.20.17 0815
Relinquished By:	Date/Time:	Received at Laboratory By:	Date/Time: 7.20.17 0835

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	12
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: 7/20/2017 6:57:51AM

Report Template:

MJRA Terms & Conditions

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Reviewed and Approved by:

Richard Wheeler
Project Manager

Certificate of Analysis

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

Laboratory No.: 7014718
Report: 07/26/17
Lab Contact: Richard Wheeler

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

Project Info: 6222- Blue Marsh Beach 1,2,3

Lab ID: 7014718-01 **Collected By:** Crystal H Leister **Sampled:** 07/24/17 06:30 **Received:** 07/24/17 07:20
Sample Desc: SB-1 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	75	mpn/100ml	1	SM 9223 B	07/24/17 9:50		TNS
Fecal Coliform	100	/100ml	2	SM 9222 D	07/24/17 9:55		TNS
Total Coliform	1600	mpn/100ml	1	SM 9223 B	07/24/17 9:50		TNS

Lab ID: 7014718-02 **Collected By:** Crystal H Leister **Sampled:** 07/24/17 06:32 **Received:** 07/24/17 07:20
Sample Desc: SB-2 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	110	mpn/100ml	1	SM 9223 B	07/24/17 9:50		TNS
Fecal Coliform	130	/100ml	2	SM 9222 D	07/24/17 9:55		TNS
Total Coliform	1700	mpn/100ml	1	SM 9223 B	07/24/17 9:50		TNS

Lab ID: 7014718-03 **Collected By:** Crystal H Leister **Sampled:** 07/24/17 06:34 **Received:** 07/24/17 07:20
Sample Desc: SB-3 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	110	mpn/100ml	1	SM 9223 B	07/24/17 9:50		TNS
Fecal Coliform	230	/100ml	2	SM 9222 D	07/24/17 9:55		TNS
Total Coliform	2400	mpn/100ml	1	SM 9223 B	07/24/17 9:50		TNS

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

WORK ORDER
Chain of Custody

7014718

Client Code: 3157 **Client:** Tetra Tech
Project Manager: Richard Wheeler **Project:** 6222- Blue Marsh Beach 1,2,3
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) CHL **Comments:**

7014718-01 SB-1
TNC EC#s, FC, TC#s
Matrix: Non-Potable Water Date: 07/24/17
Type: Grab Time: 0630
A - Sterile_Pl 250ml NaThio

7014718-02 SB-2
EC#s, FC, TC#s
Matrix: Non-Potable Water Date: 07/24/17
Type: Grab Time: 0632
A - Sterile_Pl 250ml NaThio

7014718-03 SB-3
EC#s, FC, TC#s
Matrix: Non-Potable Water Date: 07/24/17
Type: Grab Time: 0634
A - Sterile_Pl 250ml NaThio

N/P			07/24/17 0640
Relinquished By	Date/Time	Received By	Date/Time
			07/24/17 0720
Relinquished By	Date/Time	Received at Laboratory By	Date/Time

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	10.3°C
Samples on Ice?	(Yes) No NA
Approved By:	CHL
Entered By:	

Printed: 7/21/2017 4:16:30PM

Report Template: wko WorkOrder COC ls

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Reviewed and Approved by:

Richard Wheeler
Project Manager

Certificate of Analysis

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

Laboratory No.: 7015109
Report: 07/31/17
Lab Contact: Richard Wheeler

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

Project Info: 6222- Blue Marsh Beach 1,2,3

Lab ID: 7015109-01 **Collected By:** Crystal H Leister **Sampled:** 07/27/17 06:13 **Received:** 07/27/17 06:39
Sample Desc: SB-1 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	4	mpn/100ml	1	SM 9223 B	07/27/17 10:00		TNS
Fecal Coliform	5	/100ml	2	SM 9222 D	07/27/17 10:05	Report	TNS
Total Coliform	1300	mpn/100ml	1	SM 9223 B	07/27/17 10:00		TNS

Lab ID: 7015109-02 **Collected By:** Crystal H Leister **Sampled:** 07/27/17 06:15 **Received:** 07/27/17 06:39
Sample Desc: SB-2 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	4	mpn/100ml	1	SM 9223 B	07/27/17 10:00		TNS
Fecal Coliform	6	/100ml	2	SM 9222 D	07/27/17 10:05		TNS
Total Coliform	1300	mpn/100ml	1	SM 9223 B	07/27/17 10:00		TNS

Lab ID: 7015109-03 **Collected By:** Crystal H Leister **Sampled:** 07/27/17 06:17 **Received:** 07/27/17 06:39
Sample Desc: SB-3 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	12	mpn/100ml	1	SM 9223 B	07/27/17 10:00		TNS
Fecal Coliform	13	/100ml	2	SM 9222 D	07/27/17 10:05		TNS
Total Coliform	1700	mpn/100ml	1	SM 9223 B	07/27/17 10:00		TNS

Notes and Definitions

Report Duplicate analysis was outside the acceptable limit of 20%RPD at 67%.

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

WORK ORDER
Chain of Custody

7015109

Client Code: 3157
Client: Tetra Tech
Project Manager: Richard Wheeler
Project: 6222- Blue Marsh Beach 1,2,3
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

Comments:

Collected By : CHL
(Full Name)

7015109-01 SB-1
MS EC#s, FC, TC#s
Matrix: Non-Potable Water Date: 07/27/17
Type: Grab Time: 0615
A - Sterile_Pl 250ml NaThio

7015109-02 SB-2
EC#s, FC, TC#s
Matrix: Non-Potable Water Date: 07/27/17
Type: Grab Time: 0615
A - Sterile_Pl 250ml NaThio

7015109-03 SB-3
EC#s, FC, TC#s
Matrix: Non-Potable Water Date: 07/27/17
Type: Grab Time: 0617
A - Sterile_Pl 250ml NaThio

NP		[signature]	07/27/17 0622
Relinquished By	Date/Time	Received By	Date/Time
		[signature]	07/27/17 0639
Relinquished By	Date/Time	Received at Laboratory By	Date/Time

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	17.9°C
Samples on Ice?	(Yes) No NA
Approved By:	
Entered By:	CHL

Printed: 7/26/2017 4:40:23PM

Report Template: wko WorkOrder COC ls

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Reviewed and Approved by:

Richard Wheeler
Project Manager

Certificate of Analysis

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

Laboratory No.: 7015343
Report: 08/03/17
Lab Contact: Richard Wheeler

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

Project Info: 6222- Blue Marsh Beach 1,2,3

Lab ID: 7015343-01 **Collected By:** Crystal H Leister **Sampled:** 07/31/17 06:35 **Received:** 07/31/17 06:59
Sample Desc: SB-1 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	6	mpn/100ml	1	SM 9223 B	07/31/17 16:15		BLS
Fecal Coliform	6	/100ml	2	SM 9222 D	07/31/17 10:15	Report	TNS
Total Coliform	550	mpn/100ml	1	SM 9223 B	07/31/17 16:15		BLS

Lab ID: 7015343-02 **Collected By:** Crystal H Leister **Sampled:** 07/31/17 06:37 **Received:** 07/31/17 06:59
Sample Desc: SB-2 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	11	mpn/100ml	1	SM 9223 B	07/31/17 16:15		BLS
Fecal Coliform	13	/100ml	2	SM 9222 D	07/31/17 10:15		TNS
Total Coliform	690	mpn/100ml	1	SM 9223 B	07/31/17 16:15		BLS

Lab ID: 7015343-03 **Collected By:** Crystal H Leister **Sampled:** 07/31/17 06:39 **Received:** 07/31/17 06:59
Sample Desc: SB-3 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	3	mpn/100ml	1	SM 9223 B	07/31/17 16:15		BLS
Fecal Coliform	10	/100ml	2	SM 9222 D	07/31/17 10:15		TNS
Total Coliform	610	mpn/100ml	1	SM 9223 B	07/31/17 16:15		BLS

Notes and Definitions

Report Duplicate analysis was outside the acceptable limit of 20%RPD at 22%.

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

WORK ORDER
Chain of Custody

7015343

Client Code: 3157 **Client:** Tetra Tech
Project Manager: Richard Wheeler **Project:** 6222- Blue Marsh Beach 1,2,3
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 : CHL (Full Name)

Comments:

7015343-01 SB-1
EC#s, FC, TC#s
Matrix: Non-Potable Water **Date:** 07/31/17
Type: Grab **Time:** 0635
A - Sterile_Pl 250ml NaThio

7015343-02 SB-2
EC#s, FC, TC#s
Matrix: Non-Potable Water **Date:** 07/31/17
Type: Grab **Time:** 0639
A - Sterile_Pl 250ml NaThio

7015343-03 SB-3
EC#s, FC, TC#s
Matrix: Non-Potable Water **Date:** 07/31/17
Type: Grab **Time:** 0639
A - Sterile_Pl 250ml NaThio

Relinquished By	Date/Time	Received By	Date/Time
N/P		[signature]	07/31/17 0643
		[signature]	07/31/17 0659

Relinquished By	Date/Time	Received at Laboratory By	Date/Time

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	18.6°C
Samples on Ice?	Yes No NA
Approved By:	
Entered By:	CHL

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: 7/28/2017 3:55:00PM

Report Template: wko WorkOrder COC ls

MJRA Terms & Conditions

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Sample Submission, Sample Acceptance & Sampling Containers

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Analytical Results, Sample Collection Integrity & Subcontracting

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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 Wheeler
Project Manager

Certificate of Analysis

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

Laboratory No.: 7015677
Report: 08/07/17
Lab Contact: Richard Wheeler

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

Project Info: 6222- Blue Marsh Beach 1,2,3

Lab ID: 7015677-01 **Collected By:** Crystal H Leister **Sampled:** 08/03/17 08:12 **Received:** 08/03/17 08:38
Sample Desc: SB-1 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	20	mpn/100ml	1	SM 9223 B	08/03/17 11:55		PLW
Fecal Coliform	21	/100ml	2	SM 9222 D	08/03/17 11:00	Report	PLW
Total Coliform	920	mpn/100ml	1	SM 9223 B	08/03/17 11:05		PLW

Lab ID: 7015677-02 **Collected By:** Crystal H Leister **Sampled:** 08/03/17 08:14 **Received:** 08/03/17 08:38
Sample Desc: SB-2 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	57	mpn/100ml	1	SM 9223 B	08/03/17 11:55		PLW
Fecal Coliform	86	/100ml	2	SM 9222 D	08/03/17 11:00		PLW
Total Coliform	730	mpn/100ml	1	SM 9223 B	08/03/17 11:05		PLW

Lab ID: 7015677-03 **Collected By:** Crystal H Leister **Sampled:** 08/03/17 08:16 **Received:** 08/03/17 08:38
Sample Desc: SB-3 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	59	mpn/100ml	1	SM 9223 B	08/03/17 11:55		PLW
Fecal Coliform	120	/100ml	2	SM 9222 D	08/03/17 11:00		PLW
Total Coliform	980	mpn/100ml	1	SM 9223 B	08/03/17 11:05		PLW

Notes and Definitions

Report Duplicate analysis was outside the acceptable limit of 20%RPD at 32%.

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

WORK ORDER
Chain of Custody

7015677

Client Code: 3157
Project Manager: Richard Wheeler
Client: Tetra Tech
Project: 6222- Blue Marsh Beach 1,2,3
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) CHL
Comments:

7015677-01 SB-1
EC#s, FC, TC#s
Matrix: Non-Potable Water
Type: Grab
Date: 08/03/17
Time: 0812
A - Sterile_Pl 250ml NaThio

7015677-02 SB-2
EC#s, FC, TC#s
PLW
Matrix: Non-Potable Water
Type: Grab
Date: 08/03/17
Time: 0814
A - Sterile_Pl 250ml NaThio

7015677-03 SB-3
EC#s, FC, TC#s
Matrix: Non-Potable Water
Type: Grab
Date: 08/03/17
Time: 0816
A - Sterile_Pl 250ml NaThio

Relinquished By: N/P	Date/Time	Received By:	Date/Time: 08/03/17 0821
Relinquished By	Date/Time	Received at Laboratory By:	Date/Time: 08/03/17 0838

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.

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	18.7°C
Samples on Ice?	Yes No NA
Approved By:	
Entered By:	

MJRA Terms & Conditions

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Sample Submission, Sample Acceptance & Sampling Containers

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Turnaround Times (TAT)

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Warranty & Litigation

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Reviewed and Approved by:

Richard Wheeler
Project Manager

Certificate of Analysis

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

Laboratory No.: 7015947
Report: 08/09/17
Lab Contact: Richard Wheeler

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

Project Info: 6222- Blue Marsh Beach 1,2,3

Lab ID: 7015947-01 **Collected By:** Crystal H Leister **Sampled:** 08/07/17 06:44 **Received:** 08/07/17 07:15
Sample Desc: SB-1 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	6	mpn/100ml	1	SM 9223 B	08/07/17 16:20		TNS
Fecal Coliform	8	/100ml	2	SM 9222 D	08/07/17 11:15	Report	TNS
Total Coliform	610	mpn/100ml	1	SM 9223 B	08/07/17 16:20		TNS

Lab ID: 7015947-02 **Collected By:** Crystal H Leister **Sampled:** 08/07/17 06:46 **Received:** 08/07/17 07:15
Sample Desc: SB-2 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	13	mpn/100ml	1	SM 9223 B	08/07/17 16:20		TNS
Fecal Coliform	13	/100ml	2	SM 9222 D	08/07/17 11:15		TNS
Total Coliform	770	mpn/100ml	1	SM 9223 B	08/07/17 16:20		TNS

Lab ID: 7015947-03 **Collected By:** Crystal H Leister **Sampled:** 08/07/17 06:48 **Received:** 08/07/17 07:15
Sample Desc: SB-3 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	12	mpn/100ml	1	SM 9223 B	08/07/17 16:20		TNS
Fecal Coliform	15	/100ml	2	SM 9222 D	08/07/17 11:15		TNS
Total Coliform	1300	mpn/100ml	1	SM 9223 B	08/07/17 16:20		TNS

Notes and Definitions

Report Duplicate analysis was outside the acceptable limit of 20%RPD at 28%.

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

WORK ORDER
Chain of Custody

7015947

Client Code: 3157
Client: Tetra Tech
Project Manager: Richard Wheeler
Project: 6222- Blue Marsh Beach 1,2,3
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 : CML
(Full Name)

Comments:

7015947-01 SB-1
NS EC#s, FC, TC#s
Matrix: Non-Potable Water
Type: Grab
Date: 08/07/17
Time: 0644
A - Sterile_Pl 250ml NaThio

7015947-02 SB-2
EC#s, FC, TC#s
Matrix: Non-Potable Water
Type: Grab
Date: 08/07/17
Time: 0646
A - Sterile_Pl 250ml NaThio

7015947-03 SB-3
EC#s, FC, TC#s
Matrix: Non-Potable Water
Type: Grab
Date: 08/07/17
Time: 0648
A - Sterile_Pl 250ml NaThio

N/P
Relinquished By Date/Time

Received By 08/07/17 0656
Date/Time

Relinquished By Date/Time

Received at Laboratory By 08/07/17 0715
Date/Time

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	14.6°C
Samples on Ice?	(Yes) No NA
Approved By:	CML
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: 8/4/2017 2:35:50PM

Report Template: wko WorkOrder COC ls

MJRA Terms & Conditions

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Reviewed and Approved by:

Richard Wheeler
Project Manager

Certificate of Analysis

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

Laboratory No.: 7016474
Report: 08/15/17
Lab Contact: Richard Wheeler

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

Project Info: 6222- Blue Marsh Beach 1,2,3

Lab ID: 7016474-01 **Collected By:** Crystal H Leister **Sampled:** 08/10/17 06:22 **Received:** 08/10/17 06:46
Sample Desc: SB-1 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	2	mpn/100ml	1	SM 9223 B	08/10/17 16:17		BLS
Fecal Coliform	8	/100ml	2	SM 9222 D	08/10/17 9:15	Report	TNS
Total Coliform	2000	mpn/100ml	1	SM 9223 B	08/10/17 16:17		BLS

Lab ID: 7016474-02 **Collected By:** Crystal H Leister **Sampled:** 08/10/17 06:24 **Received:** 08/10/17 06:46
Sample Desc: SB-2 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	2	mpn/100ml	1	SM 9223 B	08/10/17 16:17		BLS
Fecal Coliform	5	/100ml	2	SM 9222 D	08/10/17 9:15		TNS
Total Coliform	870	mpn/100ml	1	SM 9223 B	08/10/17 16:17		BLS

Lab ID: 7016474-03 **Collected By:** Crystal H Leister **Sampled:** 08/10/17 06:26 **Received:** 08/10/17 06:46
Sample Desc: SB-3 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	3	mpn/100ml	1	SM 9223 B	08/10/17 16:17		BLS
Fecal Coliform	11	/100ml	2	SM 9222 D	08/10/17 9:15		TNS
Total Coliform	1100	mpn/100ml	1	SM 9223 B	08/10/17 16:17		BLS

Notes and Definitions

Report Duplicate analysis was outside the acceptable limit of 20%RPD at 22%.

M.J. Reider Associates, Inc.

107 Angelica St, Reading PA, 19611
610-374-5129 www.mjreider.com

WORK ORDER
Chain of Custody

7016474

Client Code: 3157
Project Manager: Richard Wheeler
Client: Tetra Tech
Project: 6222- Blue Marsh Beach 1,2,3
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 : CHL
(Full Name)

Comments:

7016474-01 SB-1
TNS EC#s, FC, TC#s
Matrix: Non-Potable Water **Date:** 08/10/17
Type: Grab **Time:** 0622
A - Sterile_Pl 250ml NaThio

7016474-02 SB-2
EC#s, FC, TC#s
Matrix: Non-Potable Water **Date:** 08/10/17
Type: Grab **Time:** 0624
A - Sterile_Pl 250ml NaThio

7016474-03 SB-3
EC#s, FC, TC#s
Matrix: Non-Potable Water **Date:** 08/10/17
Type: Grab **Time:** 0626
A - Sterile_Pl 250ml NaThio

Relinquished By	Date/Time	Received By	Date/Time
N/P		[signature]	08/10/17 0632
		[signature] (Received at Laboratory By)	08/10/17 0646

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.

Sample Kit Prepared By:	Date/Time

Sample Temp (°C): 16.9°C
Samples on Ice? (Yes) No NA
Approved By: CHL
Entered By:

Printed: 8/9/2017 3:34:43PM

Report Template: wko WorkOrder COC ls

MJRA Terms & Conditions

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Reviewed and Approved by:

Richard Wheeler
Project Manager

Certificate of Analysis

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

Laboratory No.: 7016802
Report: 08/18/17
Lab Contact: Richard Wheeler

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

Project Info: 6222- Blue Marsh Beach 1,2,3

Lab ID: 7016802-01 **Collected By:** Crystal H Leister **Sampled:** 08/14/17 06:34 **Received:** 08/14/17 07:02
Sample Desc: SB-1 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	5	mpn/100ml	1	SM 9223 B	08/14/17 16:50		BLS
Fecal Coliform	10	/100ml	2	SM 9222 D	08/14/17 10:23		TNS
Total Coliform	920	mpn/100ml	1	SM 9223 B	08/14/17 16:50		BLS

Lab ID: 7016802-02 **Collected By:** Crystal H Leister **Sampled:** 08/14/17 06:36 **Received:** 08/14/17 07:02
Sample Desc: SB-2 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	1	mpn/100ml	1	SM 9223 B	08/14/17 16:50		BLS
Fecal Coliform	3	/100ml	2	SM 9222 D	08/14/17 10:23		TNS
Total Coliform	410	mpn/100ml	1	SM 9223 B	08/14/17 16:50		BLS

Lab ID: 7016802-03 **Collected By:** Crystal H Leister **Sampled:** 08/14/17 06:38 **Received:** 08/14/17 07:02
Sample Desc: SB-3 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	4	mpn/100ml	1	SM 9223 B	08/14/17 16:50		BLS
Fecal Coliform	13	/100ml	2	SM 9222 D	08/14/17 10:23		TNS
Total Coliform	550	mpn/100ml	1	SM 9223 B	08/14/17 16:50		BLS

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

WORK ORDER
Chain of Custody

7016802

Client Code: 3157
Client: Tetra Tech
Project Manager: Richard Wheeler
Project: 6222- Blue Marsh Beach 1,2,3
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) CHL
Comments:

7016802-01 SB-1
TNS EC#s, FC, TC#s NAP
Matrix: Non-Potable Water
Type: Grab
A - Sterile_Pl 250ml NaThio
Date: 08/14/17
Time: 0634

7016802-02 SB-2
EC#s, FC, TC#s NAP
Matrix: Non-Potable Water
Type: Grab
A - Sterile_Pl 250ml NaThio
Date: 08/14/17
Time: 0636

7016802-03 SB-3
EC#s, FC, TC#s NAP
Matrix: Non-Potable Water
Type: Grab
A - Sterile_Pl 250ml NaThio
Date: 08/14/17
Time: 0638

N/P			
Relinquished By	Date/Time	Received By	Date/Time 08/14/17 0644
Relinquished By	Date/Time	Received at Laboratory By	Date/Time 08/14/17 0702

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	18.8°C
Samples on Ice?	(Yes) No NA
Approved By:	
Entered By:	CHL

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: 8/12/2017 2:09:38PM

Report Template: wko WorkOrder COC ls

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Reviewed and Approved by:

Richard Wheeler
Project Manager

Certificate of Analysis

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

Laboratory No.: 7017152
Report: 08/21/17
Lab Contact: Richard Wheeler

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

Project Info: 6222- Blue Marsh Beach 1,2,3

Lab ID: 7017152-01 **Collected By:** Anthony A Paolucci **Sampled:** 08/17/17 06:13 **Received:** 08/17/17 06:50
Sample Desc: SB-1 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	16	mpn/100ml	1	SM 9223 B	08/17/17 10:15		TNS
Fecal Coliform	24	/100ml	2	SM 9222 D	08/17/17 10:15		TNS
Total Coliform	>2400	mpn/100ml	1	SM 9223 B	08/17/17 10:15		TNS

Lab ID: 7017152-02 **Collected By:** Anthony A Paolucci **Sampled:** 08/17/17 06:14 **Received:** 08/17/17 06:50
Sample Desc: SB-2 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	80	mpn/100ml	1	SM 9223 B	08/17/17 10:15		TNS
Fecal Coliform	110	/100ml	2	SM 9222 D	08/17/17 10:15		TNS
Total Coliform	>2400	mpn/100ml	1	SM 9223 B	08/17/17 10:15		TNS

Lab ID: 7017152-03 **Collected By:** Anthony A Paolucci **Sampled:** 08/17/17 06:15 **Received:** 08/17/17 06:50
Sample Desc: SB-3 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	16	mpn/100ml	1	SM 9223 B	08/17/17 10:15		TNS
Fecal Coliform	18	/100ml	2	SM 9222 D	08/17/17 10:15		TNS
Total Coliform	730	mpn/100ml	1	SM 9223 B	08/17/17 10:15		TNS

M.J. Reider Associates, Inc.

107 Angelica St, Reading PA, 19611
610-374-5129 www.mjreider.com

WORK ORDER
Chain of Custody

7017152

Client Code: 3157
Project Manager: Richard Wheeler
Client: Tetra Tech
Project: 6222- Blue Marsh Beach 1,2,3
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 : AAP
(Full Name)

Comments:

7017152-01 SB-1
EC#s, FC, TC#s
Matrix: Non-Potable Water
Type: Grab
Date: 8/17/17
Time: 1013
A - Sterile_Pl 250ml NaThio

7017152-02 SB-2
EC#s, FC, TC#s
Matrix: Non-Potable Water
Type: Grab
Date: 8/17/17
Time: 1014
A - Sterile_Pl 250ml NaThio

7017152-03 SB-3
EC#s, FC, TC#s
Matrix: Non-Potable Water
Type: Grab
Date: 8/17/17
Time: 1015
A - Sterile_Pl 250ml NaThio

NP			AAP 8/17/17 1020
Relinquished By	Date/Time	Received By	Date/Time
		8/17/17 ~~1050~~	
Relinquished By	Date/Time	Received at Laboratory By	Date/Time
		8/17/17 1050	

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	10
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: 8/16/2017 3:15:51PM

Report Template: wko WorkOrder COC ls

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Reviewed and Approved by:

Richard Wheeler
Project Manager

Certificate of Analysis

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

Laboratory No.: 7017437
Report: 08/23/17
Lab Contact: Richard Wheeler

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

Project Info: 6222- Blue Marsh Beach 1,2,3

Lab ID: 7017437-01 **Collected By:** Matthew C Stricker **Sampled:** 08/21/17 08:25 **Received:** 08/21/17 08:55
Sample Desc: SB-1 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	13	mpn/100ml	1	SM 9223 B	08/21/17 14:35		TNS
Fecal Coliform	15	/100ml	2	SM 9222 D	08/21/17 11:25		TNS
Total Coliform	690	mpn/100ml	1	SM 9223 B	08/21/17 14:35		TNS

Lab ID: 7017437-02 **Collected By:** Matthew C Stricker **Sampled:** 08/21/17 08:30 **Received:** 08/21/17 08:55
Sample Desc: SB-2 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	7	mpn/100ml	1	SM 9223 B	08/21/17 14:35		TNS
Fecal Coliform	13	/100ml	2	SM 9222 D	08/21/17 11:25		TNS
Total Coliform	330	mpn/100ml	1	SM 9223 B	08/21/17 14:35		TNS

Lab ID: 7017437-03 **Collected By:** Matthew C Stricker **Sampled:** 08/21/17 08:35 **Received:** 08/21/17 08:55
Sample Desc: SB-3 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	26	mpn/100ml	1	SM 9223 B	08/21/17 14:35		TNS
Fecal Coliform	40	/100ml	2	SM 9222 D	08/21/17 11:25		TNS
Total Coliform	2000	mpn/100ml	1	SM 9223 B	08/21/17 14:35		TNS

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

WORK ORDER
Chain of Custody

7017437

Client Code: 3157
Project Manager: Richard Wheeler

Client: Tetra Tech
Project: 6222- Blue Marsh Beach 1,2,3

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

Comments:

Collected By : MCS
(Full Name)

7017437-01 SB-1
EC#s, FC, TC#s
TNS
Matrix: Non-Potable Water Date: 8/21/17
Type: Grab Time: 825
A - Sterile_Pl 250ml NaThio

7017437-02 SB-2
EC#s, FC, TC#s
Matrix: Non-Potable Water Date: 8/21/17
Type: Grab Time: 830
A - Sterile_Pl 250ml NaThio

7017437-03 SB-3
EC#s, FC, TC#s
Matrix: Non-Potable Water Date: 8/21/17
Type: Grab Time: 835
A - Sterile_Pl 250ml NaThio

NP		Matt Stu	8/21/17 837
Relinquished By	Date/Time	Received By	Date/Time
		Matt Stu	8/21/17 855
Relinquished By	Date/Time	Received at Laboratory By	Date/Time

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	9
Samples on Ice?	Yes No NA
Approved By:	MCS
Entered By:	

Printed: 8/21/2017 6:41:37AM

Report Template: WO WorkOrder QOC 15

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Reviewed and Approved by:

Richard Wheeler
Project Manager

Certificate of Analysis

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

Laboratory No.: 7017808
Report: 08/29/17
Lab Contact: Richard Wheeler

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

Project Info: 6222- Blue Marsh Beach 1,2,3

Lab ID: 7017808-01 **Collected By:** Matthew C Stricker **Sampled:** 08/24/17 09:05 **Received:** 08/24/17 09:30
Sample Desc: SB-1 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	7	mpn/100ml	1	SM 9223 B	08/24/17 16:00		TNS
Fecal Coliform	10	/100ml	2	SM 9222 D	08/24/17 11:08	Report	TNS
Total Coliform	550	mpn/100ml	1	SM 9223 B	08/24/17 16:00		TNS

Lab ID: 7017808-02 **Collected By:** Matthew C Stricker **Sampled:** 08/24/17 09:08 **Received:** 08/24/17 09:30
Sample Desc: SB-2 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	3	mpn/100ml	1	SM 9223 B	08/24/17 16:00		TNS
Fecal Coliform	8	/100ml	2	SM 9222 D	08/24/17 11:08		TNS
Total Coliform	410	mpn/100ml	1	SM 9223 B	08/24/17 16:00		TNS

Lab ID: 7017808-03 **Collected By:** Matthew C Stricker **Sampled:** 08/24/17 09:11 **Received:** 08/24/17 09:30
Sample Desc: SB-3 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	9	mpn/100ml	1	SM 9223 B	08/24/17 16:00		TNS
Fecal Coliform	20	/100ml	2	SM 9222 D	08/24/17 11:08		TNS
Total Coliform	400	mpn/100ml	1	SM 9223 B	08/24/17 16:00		TNS

Notes and Definitions

Report Duplicate analysis was outside the acceptable limit of 20%RPD at 22%.

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

WORK ORDER
Chain of Custody

7017808

Client Code: 3157
Project Manager: Richard Wheeler
Client: Tetra Tech
Project: 6222- Blue Marsh Beach 1,2,3
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 : MCS
(Full Name)

Comments:

7017808-01 SB-1 — **Matrix:** Non-Potable Water — Date: 8/24/17
Type: Grab — Time: 905
TNJ EC#s, FC, TC#s
A - Sterile_Pl 250ml NaThio

7017808-02 SB-2 — **Matrix:** Non-Potable Water — Date: 8/24/17
Type: Grab — Time: 908
EC#s, FC, TC#s
A - Sterile_Pl 250ml NaThio

7017808-03 SB-3 — **Matrix:** Non-Potable Water — Date: 8/24/17
Type: Grab — Time: 911
EC#s, FC, TC#s
A - Sterile_Pl 250ml NaThio

Relinquished By	Date/Time	Received By	Date/Time
NP		Matt Str	8/24/17 913
Relinquished By	Date/Time	Received at Laboratory By	Date/Time
		Matt Str	8/24/17 930

Sample Kit Prepared By:	Date/Time

Sample Temp (°C): 6
Samples on Ice? (Yes) No NA
Approved By: MCS
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: 8/24/2017 6:30:13AM

Report Template: wko WorkOrder COC ls

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Sample Submission, Sample Acceptance & Sampling Containers

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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 Wheeler
Project Manager

Certificate of Analysis

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

Laboratory No.: 7018158
Report: 08/30/17
Lab Contact: Richard Wheeler

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

Project Info: 6222- Blue Marsh Beach 1,2,3

Lab ID: 7018158-01 **Collected By:** Crystal H Leister **Sampled:** 08/28/17 06:38 **Received:** 08/28/17 07:05
Sample Desc: SB-1 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	4	mpn/100ml	1	SM 9223 B	08/28/17 8:55		TNS
Fecal Coliform	6	/100ml	2	SM 9222 D	08/28/17 9:00	Report	TNS
Total Coliform	820	mpn/100ml	1	SM 9223 B	08/28/17 8:55		TNS

Lab ID: 7018158-02 **Collected By:** Crystal H Leister **Sampled:** 08/28/17 06:40 **Received:** 08/28/17 07:05
Sample Desc: SB-2 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	14	mpn/100ml	1	SM 9223 B	08/28/17 8:55		TNS
Fecal Coliform	20	/100ml	2	SM 9222 D	08/28/17 9:00		TNS
Total Coliform	>2400	mpn/100ml	1	SM 9223 B	08/28/17 8:55		TNS

Lab ID: 7018158-03 **Collected By:** Crystal H Leister **Sampled:** 08/28/17 06:42 **Received:** 08/28/17 07:05
Sample Desc: SB-3 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	5	mpn/100ml	1	SM 9223 B	08/28/17 8:55		TNS
Fecal Coliform	8	/100ml	2	SM 9222 D	08/28/17 9:00		TNS
Total Coliform	1200	mpn/100ml	1	SM 9223 B	08/28/17 8:55		TNS

Notes and Definitions

Report Duplicate analysis was outside the acceptable limit of 20%RPD at 40%.

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

WORK ORDER
Chain of Custody

7018158

Client Code: 3157
Project Manager: Richard Wheeler

Client: Tetra Tech
Project: 6222- Blue Marsh Beach 1,2,3

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) CHL

Comments:

7018158-01 SB-1
NS **EC#s, FC, TC#s** NAP
Matrix: Non-Potable Water
Type: Grab
A - Sterile_Pl 250ml NaThio
Date: 8/28/17
Time: 0638

7018158-02 SB-2
EC#s, FC, TC#s NAP
Matrix: Non-Potable Water
Type: Grab
A - Sterile_Pl 250ml NaThio
Date: 8/28/17
Time: 0640

7018158-03 SB-3
EC#s, FC, TC#s NAP
Matrix: Non-Potable Water
Type: Grab
A - Sterile_Pl 250ml NaThio
Date: 8/28/17
Time: 0642

Relinquished By: N/P — Date/Time:

Relinquished By: — Date/Time:

Received By: Cynthia J. Scott — Date/Time: 08/28/17 0648

Received at Laboratory By: Cynthia J. Scott — Date/Time: 08/28/17 0705

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	9.9°C
Samples on Ice?	(Yes) No NA
Approved By:	CHL
Entered By:	AWM

Report Template:

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: 8/28/2017 7:09:48AM

MJRA Terms & Conditions

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Reviewed and Approved by:

Richard Wheeler
Project Manager

Certificate of Analysis

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

Laboratory No.: 7018494
Report: 09/05/17
Lab Contact: Richard Wheeler

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

Project Info: 6222- Blue Marsh Beach 1,2,3

Lab ID: 7018494-01 **Collected By:** Crystal H Leister **Sampled:** 08/31/17 06:49 **Received:** 08/31/17 07:21
Sample Desc: SB-1 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	3	mpn/100ml	1	SM 9223 B	08/31/17 10:20		PLW
Fecal Coliform	3	/100ml	2	SM 9222 D	08/31/17 10:05		PLW
Total Coliform	250	mpn/100ml	1	SM 9223 B	08/31/17 10:20		PLW

Lab ID: 7018494-02 **Collected By:** Crystal H Leister **Sampled:** 08/31/17 06:51 **Received:** 08/31/17 07:21
Sample Desc: SB-2 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	1	mpn/100ml	1	SM 9223 B	08/31/17 10:20		PLW
Fecal Coliform	2	/100ml	2	SM 9222 D	08/31/17 10:05		PLW
Total Coliform	170	mpn/100ml	1	SM 9223 B	08/31/17 10:20		PLW

Lab ID: 7018494-03 **Collected By:** Crystal H Leister **Sampled:** 08/31/17 06:53 **Received:** 08/31/17 07:21
Sample Desc: SB-3 **Sample Type:** Grab

	Result	Unit	Rep. Limit	Procedure	Incubated	Analyte Notes	Analyst
Microbiology							
Escherichia coli	3	mpn/100ml	1	SM 9223 B	08/31/17 10:20		PLW
Fecal Coliform	3	/100ml	2	SM 9222 D	08/31/17 10:05		PLW
Total Coliform	170	mpn/100ml	1	SM 9223 B	08/31/17 10:20		PLW

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

WORK ORDER
Chain of Custody

7018494

Client Code: 3157
Client: Tetra Tech
Project Manager: Richard Wheeler
Project: 6222- Blue Marsh Beach 1,2,3
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) CHL
Comments:

7018494-01 SB-1
EC#s, FC, TC#s
Matrix: Non-Potable Water
Type: Grab
Date: 08/31/17
Time: 0649
A - Sterile_Pl 250ml NaThio

7018494-02 SB-2
EC#s, FC, TC#s
Matrix: Non-Potable Water
Type: Grab
Date: 08/31/17
Time: 0651
A - Sterile_Pl 250ml NaThio

7018494-03 SB-3
EC#s, FC, TC#s
Matrix: Non-Potable Water
Type: Grab
Date: 08/31/17
Time: 0653
A - Sterile_Pl 250ml NaThio

Relinquished By	Date/Time	Received By	Date/Time 08/31/17 0700
Relinquished By	Date/Time	Received at Laboratory By	Date/Time 08/31/17 0721

Sample Kit Prepared By:	Date/Time
Sample Temp (°C):	16.4°C
Samples on Ice?	(Yes) No NA
Approved By:	CHL
Entered By:	

Printed: 8/30/2017 2:34:57PM

Report Template: wko WorkOrder COC ls

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Reviewed and Approved by:

Richard Wheeler
Project Manager