ANNUAL WATER QUALITY REPORT

Taunton River & Tributaries

Prepared by Zachary Donahue
Project Manager
Veolia North America
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TAUNTON RIVER AND TRIBUTARIES SAMPLING PROJECT

This is a collaborative monitoring project between Veolia Water and the Taunton River Watershed Alliance (TRWA). The purpose of this project is to develop baseline characterization data to measure changes in the watershed over time and to screen for water quality problems.

A WATERSHED

A watershed is a geographic area in which all surface and groundwater flows downhill to a common point, such as a river, stream, pond, lake, wetland or estuary. Rain and melting snow drain into streams, tributaries, wetlands, lakes or seep into the ground. As the water runs off the land, sediment and dissolved materials are picked up. In natural areas, such as swamps and forests a filtering effect occurs and sediments and other materials are naturally removed from the water. Conversely, the rain and melted snow run quickly over paved areas and parking lots picking up pollutants and carrying them directly into the watershed.

TAUNTON RIVER WATERSHED

The City of Taunton is located at the heart of the Taunton River Watershed. The water flows through many tributaries and streams such as the Three Mile River, Mill River, Snake River, and the Cobb Brook into the larger Taunton River, which then drains to Narragansett Bay. This watershed is 562 square miles and is the second largest watershed in Massachusetts. Its mainstem from Bridgewater to Fall River represents 40 miles of free-flowing water, the longest undammed coastal river in New England. In 2009 it was designated a federal Wild and Scenic River. It includes habitat for many plants and animals as well as the largest remaining wetland in the State, the Hockomock Swamp, at 16,800 acres, the largest natural lake in Massachusetts the Assawompsett Ponds and a major alewife run on the Taunton and Nemasket Rivers.

The Taunton River is designated as a Class B stream by the State of Massachusetts. This means that it meets the criteria as a habitat for fish, other aquatic life, and wildlife, and for primary and secondary contact recreation. Primary contact recreation includes wading, swimming, diving, surfing and water skiing. Secondary contact recreation includes fishing, boating and limited contact incident to shoreline activities.

VEOLIA NORTH AMERICA

Veolia provides contract operation of water and wastewater treatment facilities and related systems. In 1998 Veolia Water (then known as “PSG”) entered into a twenty-year contract with the City of Taunton to operate and maintain their wastewater treatment plant and manage and administer a pollution prevention program. The Pollution Prevention Program included collaborating with the TRWA on a watershed monitoring project. In August of 2006, the service

contract was expanded to include operation and maintenance of the sanitary sewer collection system. This contract is to run concurrently with the wastewater contract. In 2018 and again in 2023 the city chose to extend both contracts for an additional five years.

TRWA

The TRWA is a volunteer organization dedicated to protecting and restoring the Taunton River Watershed. Its goals are keeping the watershed's rivers, ponds and streams aesthetically pleasing and useable for all recreational pursuits and restoring and keeping the drinking water clean and abundant. The TRWA has a team of volunteer samplers that collect water samples. Veolia Water Taunton receives the water samples, performs some laboratory analyses to monitor the quality of the water and forwards some samples to an outside contract laboratory, Microbac Laboratories, Inc. of Dayville, CT, for additional analysis.

SAMPLING SCHEDULE

Sampling is performed monthly from the months of April through October, on the second Tuesday, between the hours of 4:30 a.m. and 8:30 a.m. Monthly sampling was picked because it is frequent enough to include wet-weather events, dry spells, and temperature variations. The second Tuesday of the month was chosen because there are generally no national holidays celebrated on this day. Sampling has been eliminated during the winter months due to safety concerns, snow and ice on bridges, and because colder water has higher dissolved oxygen content and so the oxygen stress on the river is greatly reduced. Also, there is less microbial growth in colder water; therefore, bacteria counts are usually decreased. The samples are collected in the morning because during photosynthesis, which occurs in the daytime, plants release more oxygen than is used by respiration and decomposition, raising oxygen levels. However, at night, with no photosynthesis oxygen levels are depleted. By sampling in the early morning, water quality can be assessed during a time when the river would be under the greatest oxygen stress.

SAMPLING LOCATIONS

During 2023, twenty sites were sampled. Samples are taken close/from bridges, normally at public access, due to safety considerations and accessibility for parking. These sites were chosen to cover a representative area of the central Taunton River watershed's waterways as well as significant tributaries which affect the health and uses of the Taunton River watershed. The Taunton River is tidal (Class SB) up to Route 24 at the Raynham/Taunton line (just south of Route 44) – aquatic life including fish and wildlife migrate up and downstream. The better the water quality is throughout the watershed, the greater the aquatic life diversity. This equals greater ecological, recreational, and economic value of the Taunton River, Estuary, Mount Hope Bay, and greater Narragansett Bay.

STREET/BRIDGE LOCATION	RIVER	GPS Location	ID
CENTER ST., BERKLEY BRIDGE	TAUNTON RIVER	N41°50' 6.1/W71°06' 28.7	TNT 01
PLAIN ST., TAUNTON	TAUNTON RIVER	N41°53' 9.7/W71°05' 20.5	TNT 02
BEDFORD ST., RT. 18, BRIDGEWATER	TAUNTON RIVER	N41°56' 12/W70°57' 56	BED 01 (TNT 03)
CHERRY ST., BRIDGEWATER	TAUNTON RIVER	N41°58' 42.3/W70°54' 44	CHE 01 (TNT 04)
ROUTE 79, ASSONET R., BRIDGE	ASSONET RIVER	N41°47' 37.9/W71°04' 3.6	ASO 01
SEGREGANSETT RIVER BRIDGE, BROOK ST., DIGHTON	SEGREGANSETT RIVER	N41°49' 32/W71°07' 37	SEG
CHICKAMUCKETSETT BROOK BRIDGE, BERKLEY ST., BERKLEY	CHICKAMUCKSETT BROOK	N41°49' 58.3/W71°06' 25	BER 01
SOMERSET AVE., ROUTE 138 TAUNTON	THREE MILE	N41°51' 19.9/W71°06' 56	TMR 01
COHANNET ST., ROUTE 44 TAUNTON	THREE MILE	N41°53' 11.4/W71°08'	TMR 02
CRANE ST., NORTON	THREE MILE	N41°56' 48.3/W71°09' 38	TMR 03
INGELL ST., TAUNTON	MILL RIVER	N41°58' 46/W71°04' 55.6	MIL 01
WASHINGTON ST., TAUNTON	MILL RIVER	N41°54' 11.7/W71°05' 51	MIL 02
WHITTENDON ST., TAUNTON	MILL RIVER	N41°55' 24/W71°06' 21.5	MIL 03
ROUTE 44, RAYNHAM	FORGE RIVER	N41°54' 18.3/W71°03' 35	FORGE
MIDDLEBOROUGH AVE., TAUNTON	COTLEY RIVER	N41°53'/W71°01' 28.4	COT 01
RIVER ST., RAYNHAM	FURNACE BROOK	N41°53' 35/W71°00' 04.7	FBR 01
CHURCH ST., RAYNHAM	TAUNTON RIVER	N41°53' 37/W71°00' 10.6	CHU-01
HAYWARD ST., BRIDGEWATER	TOWN RIVER	N41°59' 51/W70°57' 13.2	TWH 01
HIGH ST., BRIDGEWATER	MATFIELD RIVER	N41°59' 58.1/W70°56' 16	MAT 01
MURDOCK ST., MIDDLEBORO	NEMASKET RIVER	N41°56' 01.1/W70°55' 23.9	NEM-01

MONITORING PARAMETERS

Temperature	Total Phosphorus	Enterococci Bacteria
Dissolved Oxygen	Nitrate-Nitrogen	Total Suspended Solids
pH		

Temperature – It is important because it determines how much oxygen the water can hold and the rate at which many biochemical reactions can occur. Warmer water will hold less oxygen. Aquatic organisms are dependent on certain temperature ranges for their optimal health. The temperature for a warm water fishery Class B stream should be <28.3 degrees Celsius. The exception is sites TNT-01 and TNT-02, which are Class SB. For those sites the temperature should be <29 degrees C and a maximum daily mean of <25.7 degrees C.

DO (Dissolved Oxygen) – The river system both produces and consumes oxygen. It gains oxygen from the atmosphere and from plants as a result of photosynthesis. Oxygen is consumed during respiration by aquatic animals, decomposition of organic matter, and various chemical reactions. Oxygen is measured in its dissolved form. If more DO is consumed than is produced, dissolved oxygen levels decline. The DO of a Class B river should be greater than 5.00 to support life.

pH – The pH measures the acidity or alkalinity of water on a scale of 1.0 – 14.0 with 7 being neutral. 1.0 would be the most acidic and 14.0 would be the most basic or alkaline. The acidity affects the rate of biochemical reactions in the water. The pH of a Class B stream should be 6.5 to 8.3. A pH outside of this range reduces diversity in the river because it stresses the physiological systems of most organisms and can reduce reproduction. Low pH may also allow toxic elements to precipitate out of solution and become available for uptake by aquatic plants and animals.

Total phosphorus (Total P) - Phosphorus occurs in water in several forms called phosphates. The test that we use to measure total phosphorus includes all of the forms of phosphates. Phosphates are necessary for biological growth, yet it is the nutrient that is in the shortest supply in most fresh waters. For this reason, it is referred to as a "limiting" nutrient (meaning it limits the amount of biological growth). A small increase in the level of phosphorus may result in an undesirable chain of events including excessive growth of aquatic plants, low dissolved oxygen and death of certain aquatic animals. What happens is that aquatic plants such as algae grow in excess and cause algal blooms. When the algae die, the process of decomposition depletes oxygen from the water. This results in low dissolved oxygen levels and possibly fish kills. Phosphate enters the water both naturally and from humans. It naturally occurs in soil and rocks. It may be introduced from human activities such as runoff from fertilized lawns and crop land, failing septic systems, wastewater treatment plants, road salt (which incorporates phosphorus compounds as anti-caking agents), commercial cleaning operations, and stormwater from roads and parking lots (wash-off of deposition from auto exhausts and fluid leaks).

NO_3-N is Nitrate Nitrogen - Nitrogen is normally found in water or soil as ammonia (NH_3), nitrite (NO_2) and nitrate (NO_3). Like phosphorus, nitrogen is also a necessary part of the life cycle. Most plants, animals, and microorganisms require some form of nitrogen for growth and reproduction. Like phosphorus, concentrations above certain levels can cause problems like accelerated plant growth. Accelerated plant growth can smother benthic habitat and life as well as cause low levels of dissolved oxygen. Excessive amounts of nitrates can come from sewage, animal manure, run off from fertilized lawns, stormwater from roads and parking lots, and industrial discharges than contain corrosion inhibitors. Nitrates from land sources end up in rivers more quickly than nutrients like phosphorus. This is because they dissolve in water more readily than phosphorus, which has an attraction for soil particles. Nitrates persist and move through ground water more readily than phosphorus. Nitrates serve as a better indicator of sewage pollution during dry weather.

Enterococci Bacteria – Enterococci bacteria are indicators of the presence of human sewage or animal manure. Although they are not harmful themselves, they indicate the possible presence of disease-causing bacteria and viruses. Their presence in streams suggests that disease causing microorganisms might be present and that swimming and eating shellfish might be a health risk. Reported as number of colony forming units (CFU)/100 milliliters of sample. The Water Quality Target Value for Class B and SB for enterococci is 35 CFU per 100 ml as a 90-day geometric mean and no more than 10% of all samples greater than 130 CFU/100 ml. These targets are from the latest MA Water Quality Standards 314 CMR for Class B and SB waters effective 11/12/2021.

TSS – This is an indicator of water clarity. TSS measures the level of particulate matter and sediment in the water column. Suspended solids include silt, sediment and clay particles, plankton, algae, fine organic debris and other particulate matter. Suspended solids can cause turbidity which interferes with sunlight penetrating through the water column. This may slow photosynthesis by aquatic plants. Sediment could result in filling-in sensitive habitat that is needed for aquatic life. Sources of solids are industrial discharges, sewage, fertilizers, road runoff, and soil erosion. The monitoring program over many years never measured TSS levels of concern so TRWA suggested that TSS analysis only be conducted on samples which the lab manager observes have visible high levels of sediment.

Salinity – The Taunton River is designated as salt water (SB) from where it passes under Route 24 until it reaches Narragansett Bay.

ANALYTICAL METHODS

This monitoring program uses widely accepted standardized methods and techniques for collecting high quality data, including quality control/quality assurance procedures. The testing focuses on physical, chemical and biological water quality indicators. A Sampling SOP is available upon request.

Analyte/Parameter	Analytical Method
pH	Lab measurement with calibrated meter
Temperature	Field Thermometer
Total Suspended Solids (TSS)	Standard Methods SM 2540 D, 20th Edition
Enterococci Bacteria	Membrane Filtration Using Membrane-Enterococcus Indoxyl-B-D-Glucoside Agar, EPA 1600
Total Phosphorus	Standard Methods, SM 4500 P E. Analysis conducted by contract laboratory, Microbac Labs
Nitrate-Nitrogen	EPA 300.0. Analysis conducted by contract laboratory, Microbac Labs

Dissolved Oxygen	Lab measurement with calibrated meter
Salinity	Specific Gravity Conversion

QUALITY CONTROL AND QUALITY ASSURANCE PROCEDURES

QA/QC procedures ensure that the data which is generated is accurate and precise. Accuracy shows how close a data point is to a "known" value. Precision data shows the repeatability of a variable, how often the analyst can run the test and achieve the same result. A series of results can be precise, meaning all very similar in value, but not be accurate, which means they are not close to a true or known value. The best data is both accurate and precise.

The QA/QC Report is included as Appendix A. TRWA collects one duplicate and one blank for every 10 samples (2 /month) for its most environmentally important parameters (nitrate, total phosphorus and enterococci). TRWA has a MassDEP approved Quality Assurance Project Plan (QAPP) for these parameters available on its website https://savethetaunton.org/.

DATA COLLECTED DURING YEAR 2023

See the data sheets and graphs in Appendix B.

RESULTS – INTERPRETATION OF DATA

Temperature and Dissolved Oxygen: Temperature varies seasonally and affects the ability of the water to hold oxygen. Cold water holds more oxygen than warm water. Thermal discharges, such as water used to cool machinery in a manufacturing plant or a power plant, raise the temperature of the water and lower its oxygen content. The temperature (in degrees Celsius) ranged from 13.0 – 23.0. In general, as the water temperature increased the dissolved oxygen levels decreased. The DO levels ranged from 3.13 – 11.27. The two highest monthly averages of water temperature measured were July and September. Due to the higher water temperatures, 3 of the samples collected had DO levels below the critical level of 5.00 ppm. NEM-01 was below the critical level for July and September and ASO-01 measured below the critical level for September.

Nutrients – Nitrogen and Phosphorus: At present there are only narrative water quality standards for nutrients in Massachusetts and the Taunton River Watershed. These criteria state that unless naturally occurring, all surface waters shall be free from nutrients in concentrations that would cause or contribute to impairment of existing or designate uses . . . Any existing point source discharge containing nutrients in concentrations that would cause or contribute to cultural eutrophication . . . shall be provided with the most appropriate treatment . . . to remove such nutrients to ensure protection of existing and designated uses. When issuing NDPES permits for states that employ narrative criteria, the EPA must translate those

criteria into a "calculated numeric water quality criterion" that the EPA demonstrates will attain and maintain applicable narrative water quality criteria and will fully protect the designated use. 40 C.F.R. § 122.44(d)(1)(vi)(A).

In Massachusetts EPA uses the water Quality Target Values for Total Phosphorus of 0.100 mg/l for freshwaters in free-flowing streams and 0.050 mg/l in lakes, ponds, impoundments and streams tributary to them. These values are from the EPA Suggested Criteria for Water sometimes called the Gold Book. For nitrogen levels in the Taunton River estuary and Mount Hope Bay EPA used a TN calculated water quality criterion of 0.45 mg/l (between 0.39 to 0.5 mg/l values which MassDEP uses in Total Maximum Daily Loads TMDLs for estuaries without eel grass in good to fair condition.

A rule of thumb when assessing the data is that in general, the nitrate level should be 10 to 16 times greater than the phosphorus level. The range of nutrient levels is summarized below.

Year	Range of Nitrate-Nitrogen level	Range of Phosphorus level
1999	0.2 mg/l - 3.5 mg/l	0.0 mg/l – 0.40 mg/l
2000	0.5 mg/l – 2.6 mg/l	0.0 mg/l - 0.33 mg/l
2001	0.0 mg/l – 2.6 mg/l	0.0 mg/l – 0.39 mg/l
2002	0.0 mg/l – 4.4 mg/l	0.0 mg/l – 0.82 mg/l
2003	0.32 mg/l – 113 mg/l	0.0 mg/l - 0.35 mg/l
2004	0.0 mg/l – 3.5 mg/l	0.0 mg/l – 0.36 mg/l
2005	0.0 mg/l – 4.2 mg/l	0.0 mg/l – 0.34 mg/l
2006	0.07 mg/l – 2.2 mg/l	0.0 mg/l – 0.98 mg/l
2007	0.11 mg/l – 6.2 mg/l	0.0 mg/l – 1.0 mg/l
2008	0.0 mg/l – 2.6 mg/l	0.0 mg/l – 0.45 mg/l
2009	0.0 mg/l – 1.2 mg/l	0.0 mg/l – 0.36 mg/l
2010	0.0 mg/l – 4.1 mg/l	0.0 mg/l – 0.19 mg/l
2011	0.02 mg/l – 2.1 mg/l	0.0 mg/l – 0.52 mg/l
2012	0.0 mg/L – 2.7 mg/L	0.0 mg/L – 0.22 mg/L
2013	0.0 mg/L – 2.3 mg/L	0.0 mg/L – 0.24 mg/L
2014	0.0 mg/L – 6.2 mg/L	0.0 mg/L – 0.23 mg/L
2015	0.0 mg/L – 4.7 mg/L	0.0 mg/L – 0.85 mg/L
2016	0.0 mg/L – 13 mg/L	0.0 mg/L – 0.39 mg/L
2017	0.05 mg/L – 7.32 mg/L	0.01 mg/L – 0.82 mg/L
2018	0.05 mg/L – 2.74 mg/L	0.01 mg/L – 0.18 mg/L
2019	0.05 mg/L – 5.55 mg/L	0.01 mg/L – 0.15 mg/L
2020	Monitoring season canceled due to the COVID-19 pandemic	
2021	0.03 mg/L – 1.05 mg/L	0.02 mg/L – 0.26 mg/L
2022	0.05 mg/L – 4.28 mg/L	0.01 mg/L – 0.20 mg/L
2023	0.05 mg/L – 1.37 mg/L	0.01 mg/L – 0.22 mg/L

Enterococci Bacteria: The Massachusetts standard where enterococci are the chosen indicator, is 35 CFU per 100 ml as a 90-day geometric mean and no more than 10% of all samples greater than 130 CFU/100 ml. These targets are from the latest MA Water Quality Standards 314 CMR for both Class B and SB waters effective 11/12/2021.

Because the Taunton River is tidally influenced, sources of enterococci bacteria from both upstream and downstream can be measured in the samples collected. Examples of sources include failing septic systems, stormwater runoff, illicit sewer connections, failing infrastructure and combined sewer overflows (CSOs). These sources have a much greater impact during wet weather. A number of significant weather events occurred in July, August and September; resulting in some of the highest rainfall totals on record. The enterococci sampling results reflect the impact the rainfall had on the Taunton River Watershed during these months.

The range of enterococci results was from 10 colonies/100 mL to 2000 colonies/100 mL. Every site exceeded the 90-day geometric mean criterion of 35 colonies/100 mL level of concern at least once during the 2023 sampling season (see data sheet and chart). The range of 90-day geometric mean (July – September) was from 187 colonies/100 mL to 1003 colonies/100 mL. For sites TNT-01 and TNT-02, which are in Class SB waters, the same criteria apply (90-day geometric mean shall not exceed 35 colonies per 100 mL and no more than 10% of all samples shall exceed 130 colonies per 100 mL.) These sites had 90-day geometric means of 814 and 703 colonies per 100 mL well over the 35 colonies per 100 mL water quality criterion.

The Mill River runs through the "Core" area of the City. This is the oldest part of the City. As directed by the EPA in an Administrative Order, the City is investigating this area extensively for combined sewers overflows (pipes that carry both storm water and sanitary sewer and are divided by a weir wall which may have degraded or the pipe size is inadequate for the flow and there is crossover between storm and sanitary). Any pipes that are found to be overflowing sanitary sewer to the storm drains are being corrected by the City. Any pipes found to be overflowing storm water to the sanitary sewer line are being placed on a schedule for separation.

pH: Most of the rivers and ponds in the Taunton watershed have a natural pH of around 5. They are slightly acidic and also naturally tea-colored due to the iron bogs of the Hockomock Swamp. pH samples are taken in the field and range from 2.7 – 6.9. Of note are sites COT-01, CHU-01, TWH-01, MAT-01, and NEM-01, which had one or two pH results well below a 6.5. A significant rain event occurred the day before the September sampling occurred. Rain being acidic likely caused the drop in pH results observed in September.

TSS and Turbidity: Because of low turbidity observed during sampling both suspended solids and turbidity measurements were not taken this year.

CONCLUSION

As a result of the TRWA's decision to replace fecal coliform testing with enterococci testing and taking one duplicate and one blank for every 10 samples (2 per month) and the documentation of the QA program that was submitted, TRWA has obtained MADEP approval of the Quality Assurance Project Plan (QAPP) in October of 2019.

Enterococci is currently a concern at all sites due to each of them exceeding the MassDEP's new standard of 90-day geometric mean 35 colonies/100 ml. The City is continuing sewer and infrastructure improvements, including pipe replacement, re-lining, manhole repairs and replacement, and separation of storm drains and sewer lines. The intense rainstorms this summer particularly during July and September generated readily apparent increases in both bacteria and total phosphorus. This illustrates the importance of stormwater management.

A major improvement to the sampling program has been the installation of a river gauge on the Mill River. The closest sampling location to the gauge is the Washington Street site, MIL-02. Obtaining flow values for the river allows us to convert concentration-based values to mass-based values. We can measure the nutrients in pounds, which allow us to compare data on an equal scale from month to month. A graph is attached which shows the pounds of nutrients discharging from the Mill River into the Taunton River. This is included in Appendix B. The nutrient loading levels on the Mill River over the past ten years have, for the most part, shown a steady decrease. This is most likely due to the repair and replacement of broken sewer pipes, the re-lining of impaired sewer pipe and the separation of sanitary sewer pipe and storm water pipe throughout the City of Taunton.

*****Thank you to our TRWA volunteers:**

Jeff Morse	Brad Gonyer	Robert Sullivan
Anne Morse	Donna Berthelette	Janice McGonagle
Carolyn Borden	Steve Silva	Shaun Tibbetts
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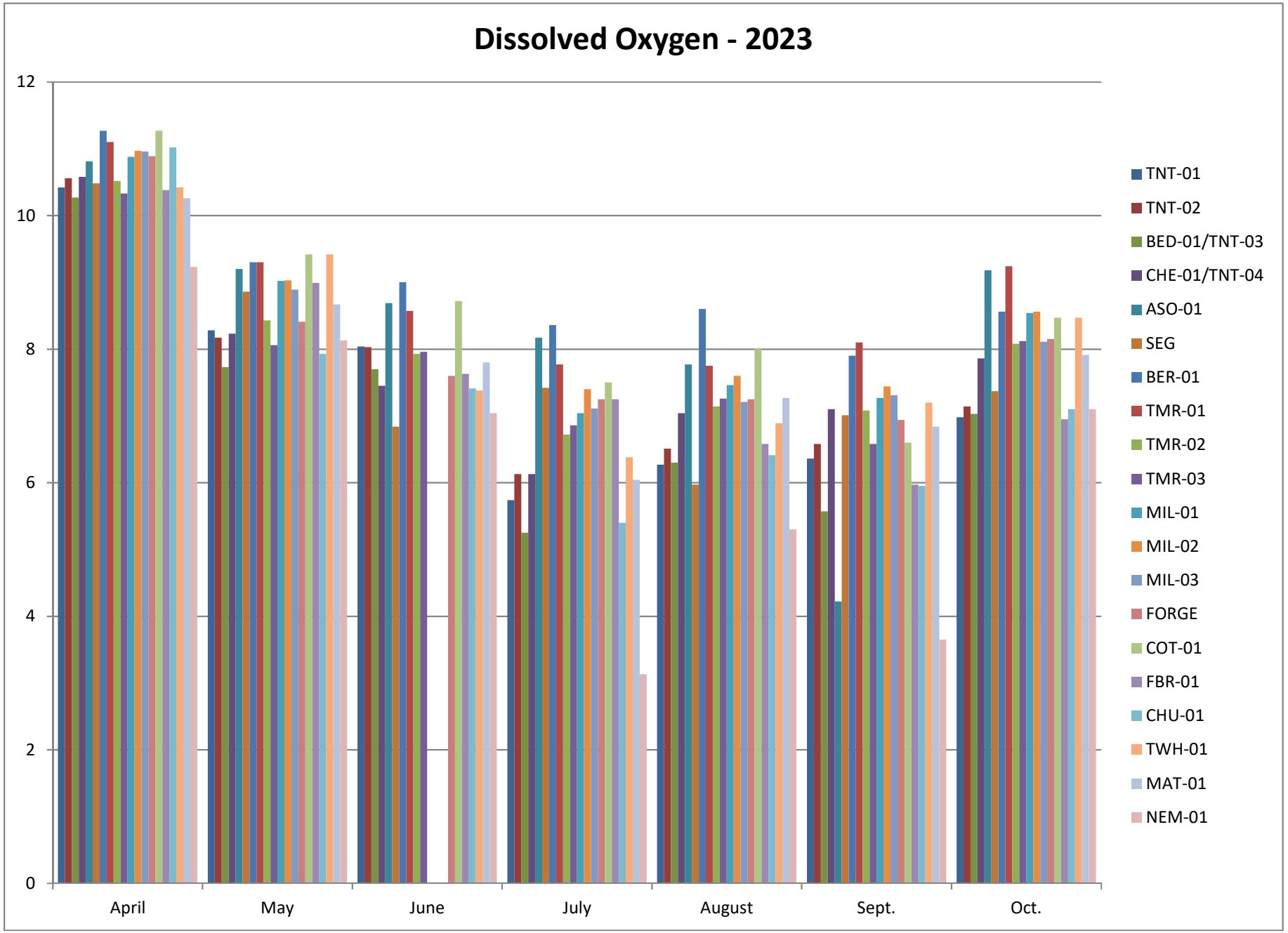
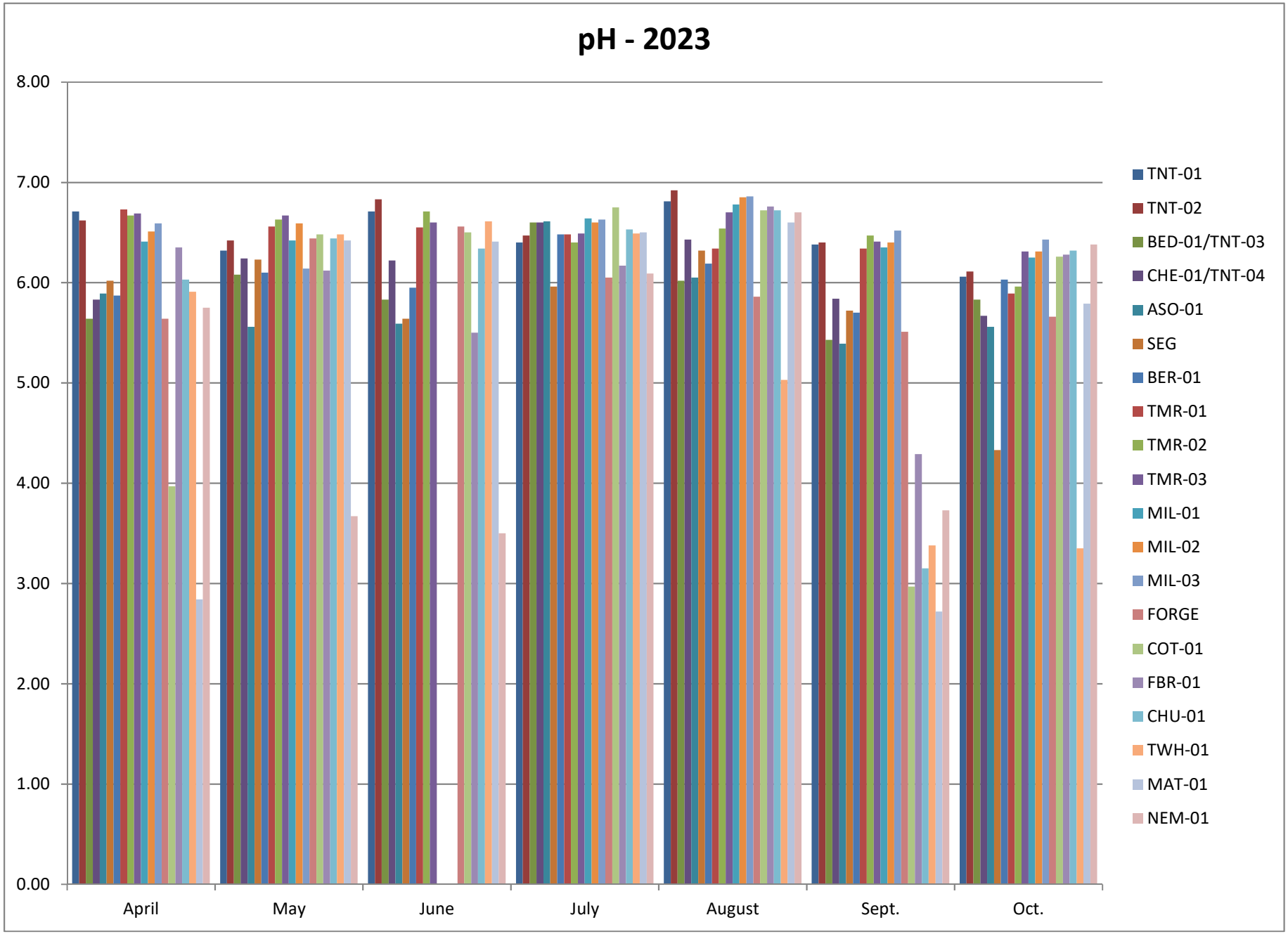
Elaine Rezendes	Alannah Almeda	Natalie Johnson
Steve Desrosiers	Rachel Desrosiers	Shari Sprong
Bill Ferry	Bill VanMeter	Alma Weightman
Carolyn Lazaris	Kit VanMeter	
Cheryl Graham	Annette Murphy	

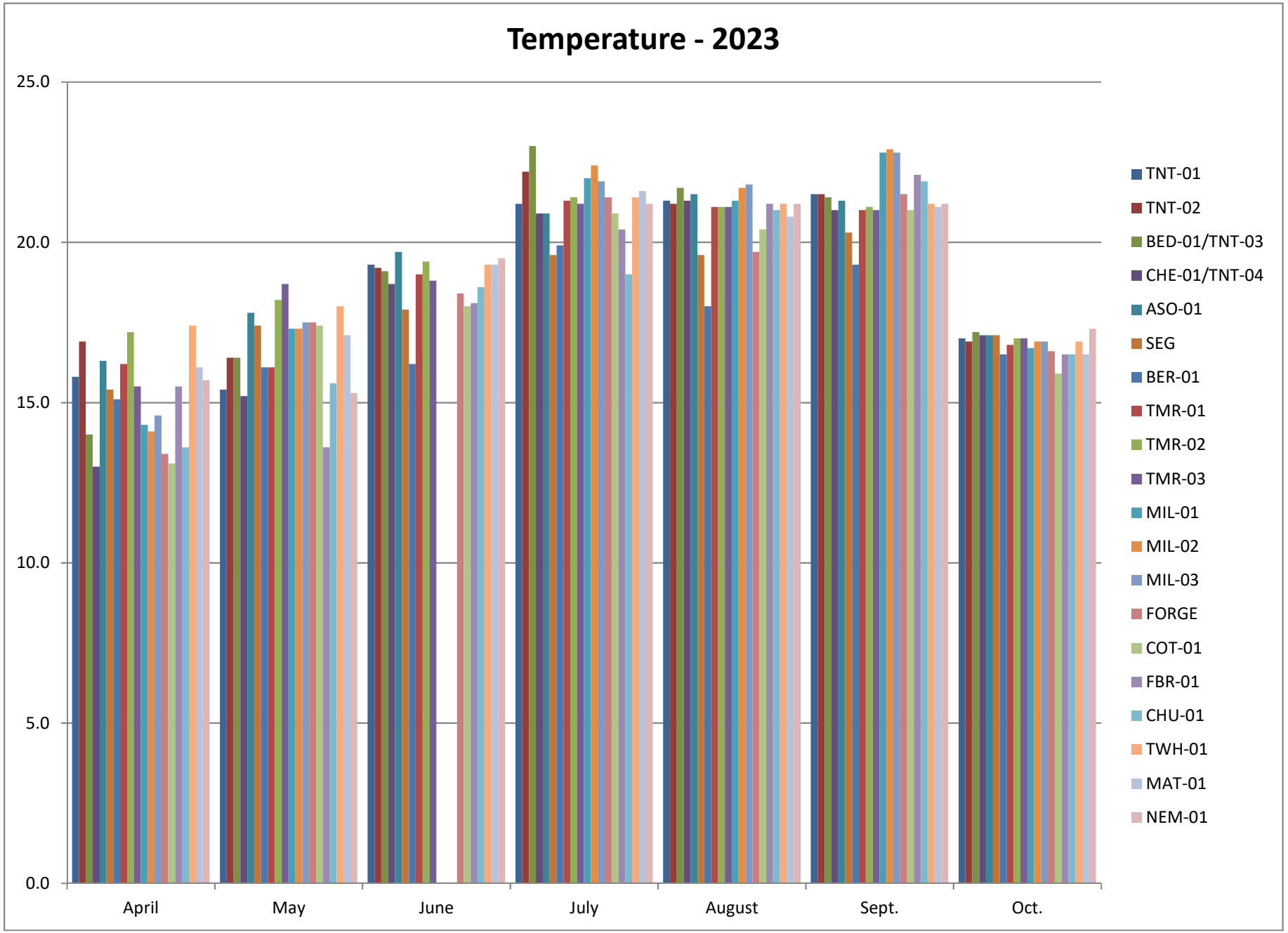
Appendix A – Year 2023 Data


Dissolved Oxygen - 2023
12
10
8
6
4
2
0
April
May
June
July
August
Sept.
Oct.
TNT-01
TNT-02
BED-01/TNT-03
CHE-01/TNT-04
ASO-01
SEG
BER-01
TMR-01
TMR-02
TMR-03
MIL-01
MIL-02
MIL-03
FORGE
COT-01
FBR-01
CHU-01
TWH-01
MAT-01
NEM-01

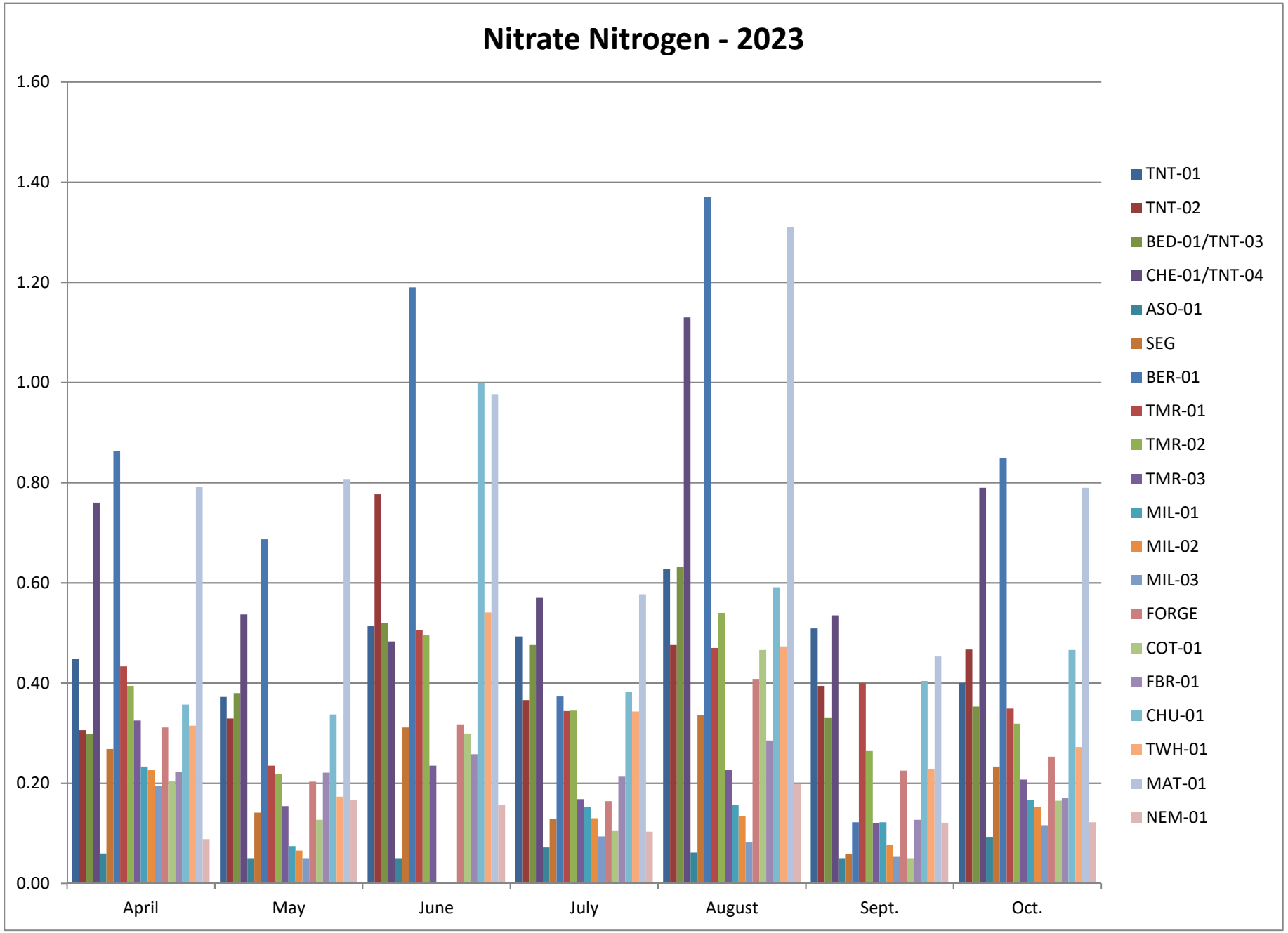
2023 TRWA Sampling Results for Dissolved Oxygen (mg/l)			TARGET FOR CONCERN - LESS THAN 5.0 MG/L (or high values during blooms)								
Sample	**Site No.**	**River & Location Description**	**April**	**May**	**June**	**July**	**August**	**Sept.**	**Oct.**		
1	TNT-01	Taunton R. Br, Center St., Berkley	10.42	8.28	8.04	5.74	6.27	6.36	6.98		
2	TNT-02	Taunton R. Br, Plain St., Taunton	10.56	8.17	8.03	6.13	6.51	6.58	7.14		
3	BED-01/TNT-03	Taunton R., Rt 18, Bedford St., Bridgewater	10.27	7.73	7.70	5.25	6.30	5.57	7.03		
4	CHE-01/TNT-04	Taunton R. Br, Cherry St., Bridgewater	10.58	8.23	7.45	6.13	7.04	7.1	7.86		
5	ASO-01	Assonet R. Bridge, Rt 79	10.81	9.2	8.69	8.17	7.77	4.22	9.18		
6	SEG	Segregansett R. Br, Brook St. Dighton	10.48	8.86	6.84	7.42	5.97	7.01	7.37		
7	BER-01	Chuckamucksett Brk. Br, Berkley St.	11.27	9.3	9.00	8.36	8.60	7.90	8.56		
8	TMR-01	Three Mile R. Br, Rt 138, Somerset Ave.	11.10	9.30	8.57	7.77	7.75	8.10	9.24		
9	TMR-02	Three Mile R. Br, Rt 44, Cohannet St.	10.52	8.43	7.93	6.72	7.14	7.08	8.08		
10	TMR-03	Three Mile R. Br, Crane St., Norton	10.33	8.06	7.96	6.86	7.26	6.58	8.12		
11	MIL-01	Mill R., Ingell St., Taunton	10.88	9.02	NR	7.04	7.46	7.27	8.54		
12	MIL-02	Mill R., Washington St., Taunton	10.97	9.03	NR	7.40	7.60	7.44	8.56		
13	MIL-03	Mill R., Whittendon St., Taunton	10.96	8.89	NR	7.11	7.21	7.31	8.11		
14	FORGE	Forge R. Br, Rt 44, Raynham	10.89	8.41	7.60	7.25	7.25	6.94	8.15		
15	COT-01	Cotley R., Middleboro Ave, Taunton	11.27	9.42	8.72	7.5	8.01	6.60	8.47		
16	FBR-01	Furnace Brk., River St., E. Taunton	10.38	8.99	7.63	7.25	6.58	5.97	6.95		
17	CHU-01	Taunton River Br, Church St., Raynham	11.02	7.93	7.41	5.40	6.41	5.95	7.10		
18	TWH-01	Town R., Br, Hayward St., Bridgewater	10.42	9.42	7.38	6.38	6.89	7.20	8.47		
19	MAT-01	Matfield R., Br, High St., Bridgewater	10.26	8.67	7.80	6.04	7.27	6.84	7.91		
20	NEM-01	Nemasket R., Murdock St., Middleboro	9.23	8.13	7.04	**3.13**	5.30	**3.65**	7.10		
		Duplicate Sample Location	**DUP #**	**DUP Results**							
April	COT-01	Cotley R., Middleboro Ave, Taunton	DUP 1	11.19							
	BER-01	Chuckamucksett Brk. Br, Berkley St.	DUP 2	11.52							
May	FBR-01	Furnace Brk., River St., E. Taunton	DUP 1	9.05							
	TMR-02	Three Mile R. Br, Rt 44, Cohannet St.	DUP 2	NR							
June	TNT-02	Taunton R. Br, Plain St., Taunton	DUP 1	8.03							
	ASO-01	Assonet R. Bridge, Rt 79	DUP 2	8.66							
July	BED-01/TNT-03	Taunton R., Rt 18, Bedford St., Bridgewater	DUP 1	5.74							
	SEG	Segregansett R. Br, Brook St. Dighton	DUP 2	7.22							
August	TNT-02	Taunton R. Br, Plain St., Taunton	DUP 1	6.54							
	MAT-01	Matfield R., Br, High St., Bridgewater	DUP 2	7.21							
Sept.	COT-01	Cotley R., Middleboro Ave, Taunton	DUP 1	6.57							
	MIL-01	Mill R., Ingell St., Taunton	DUP 2	7.38							
Oct.	NEM-01	Nemasket R., Murdock St., Middleboro	DUP 1	7.05							
	TMR-02	Three Mile R. Br, Rt 44, Cohannet St.	DUP 2	8.04							


pH - 2023
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
April
May
June
July
August
Sept.
Oct.
TNT-01
TNT-02
BED-01/TNT-03
CHE-01/TNT-04
ASO-01
SEG
BER-01
TMR-01
TMR-02
TMR-03
MIL-01
MIL-02
MIL-03
FORGE
COT-01
FBR-01
CHU-01
TWH-01
MAT-01
NEM-01

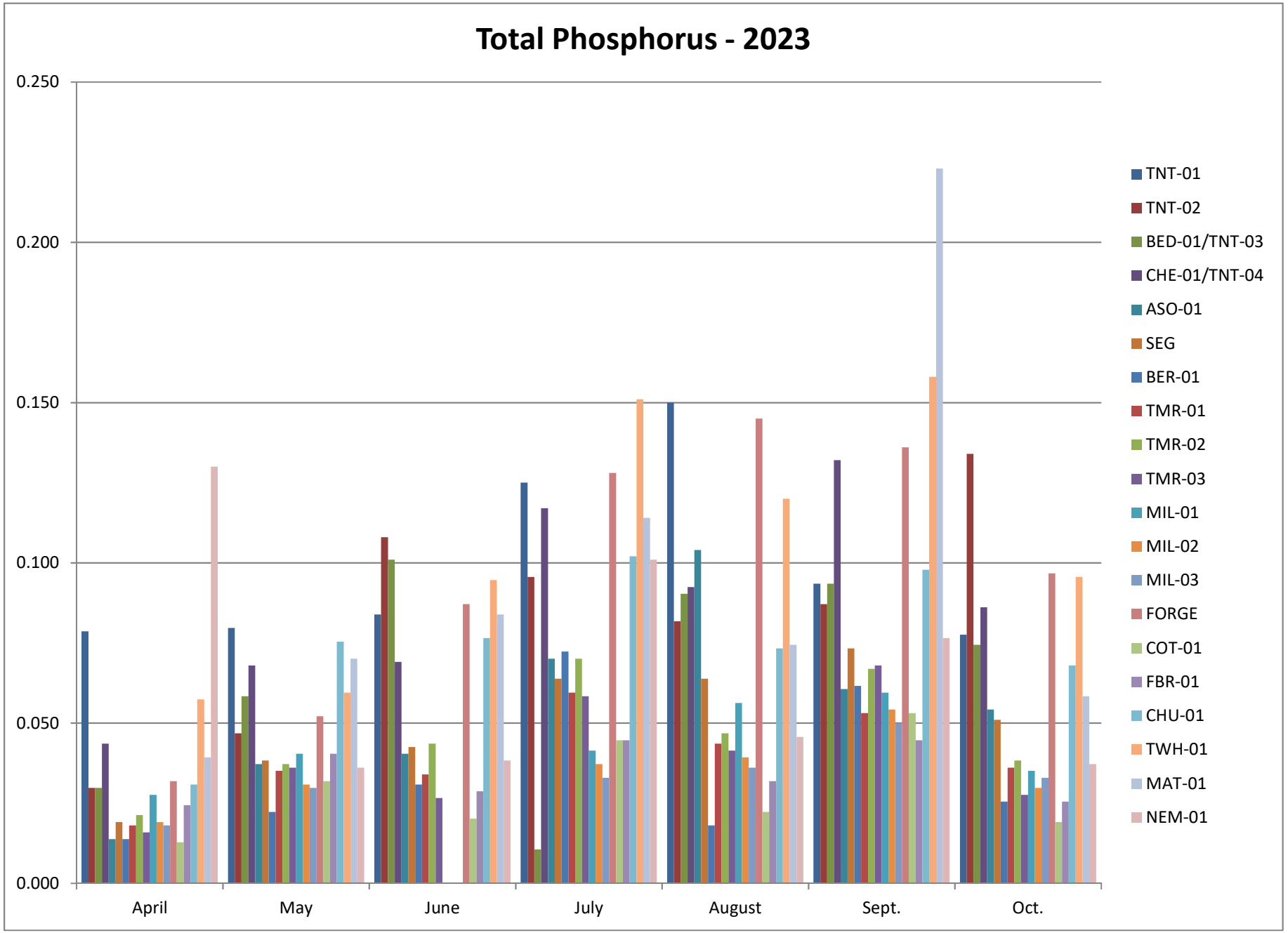
2023 TRWA Sampling Results for pH			TARGET FOR CONCERN - Outside Range 6.5 through 8.3 or 0.5 units from natural								
Sample	**Site No.**	**River & Location Description**	**April**	**May**	**June**	**July**	**August**	**Sept.**	**Oct.**		
1	TNT-01	Taunton R. Br, Center St., Berkley	6.71	6.32	6.71	6.40	6.81	6.38	6.06		
2	TNT-02	Taunton R. Br, Plain St., Taunton	6.62	6.42	6.83	6.47	6.92	6.40	6.11		
3	BED-01/TNT-03	Taunton R., Rt 18, Bedford St., Bridgewater	5.64	6.08	5.83	6.60	6.02	5.43	5.83		
4	CHE-01/TNT-04	Taunton R. Br, Cherry St., Bridgewater	5.83	6.24	6.22	6.60	6.43	5.84	5.67		
5	ASO-01	Assonet R. Bridge, Rt 79	5.89	5.56	5.59	6.61	6.05	5.39	5.56		
6	SEG	Segregansett R. Br, Brook St. Dighton	6.02	6.23	5.64	5.96	6.32	5.72	4.33		
7	BER-01	Chuckamucksett Brk. Br, Berkley St.	5.87	6.10	5.95	6.48	6.19	5.70	6.03		
8	TMR-01	Three Mile R. Br, Rt 138, Somerset Ave.	6.73	6.56	6.55	6.48	6.34	6.34	5.89		
9	TMR-02	Three Mile R. Br, Rt 44, Cohannet St.	6.67	6.63	6.71	6.40	6.54	6.47	5.96		
10	TMR-03	Three Mile R. Br, Crane St., Norton	6.69	6.67	6.60	6.49	6.70	6.41	6.31		
11	MIL-01	Mill R., Ingell St., Taunton	6.41	6.42	NR	6.64	6.78	6.35	6.25		
12	MIL-02	Mill R., Washington St., Taunton	6.51	6.59	NR	6.60	6.85	6.40	6.31		
13	MIL-03	Mill R., Whittendon St., Taunton	6.59	6.14	NR	6.63	6.86	6.52	6.43		
14	FORGE	Forge R. Br, Rt 44, Raynham	5.64	6.44	6.56	6.05	5.86	5.51	5.66		
15	COT-01	Cotley R., Middleboro Ave, Taunton	**3.97**	6.48	6.50	6.75	6.72	**2.97**	6.26		
16	FBR-01	Furnace Brk., River St., E. Taunton	6.35	6.12	5.50	6.17	6.76	4.29	6.28		
17	CHU-01	Taunton River Br, Church St., Raynham	6.03	6.44	6.34	6.53	6.72	**3.15**	6.32		
18	TWH-01	Town R., Br, Hayward St., Bridgewater	5.91	6.48	6.61	6.49	5.03	**3.38**	**3.35**		
19	MAT-01	Matfield R., Br, High St., Bridgewater	**2.84**	6.42	6.41	6.50	6.60	**2.72**	5.79		
20	NEM-01	Nemasket R., Murdock St., Middleboro	5.75	**3.67**	**3.50**	6.09	6.70	**3.73**	6.38		
		Duplicate Sample Location	**DUP #**	**DUP Results**							
April	COT-01	Cotley R., Middleboro Ave, Taunton	DUP 1	3.97							
	BER-01	Chuckamucksett Brk. Br, Berkley St.	DUP 2	5.85							
May	FBR-01	Furnace Brk., River St., E. Taunton	DUP 1	NR							
	TMR-02	Three Mile R. Br, Rt 44, Cohannet St.	DUP 2	NR							
June	TNT-02	Taunton R. Br, Plain St., Taunton	DUP 1	6.53							
	ASO-01	Assonet R. Bridge, Rt 79	DUP 2	5.71							
July	BED-01/TNT-03	Taunton R., Rt 18, Bedford St., Bridgewater	DUP 1	5.12							
	SEG	Segregansett R. Br, Brook St. Dighton	DUP 2	6.64							
August	TNT-02	Taunton R. Br, Plain St., Taunton	DUP 1	6.29							
	MAT-01	Matfield R., Br, High St., Bridgewater	DUP 2	6.19							
Sept.	COT-01	Cotley R., Middleboro Ave, Taunton	DUP 1	3.08							
	MIL-01	Mill R., Ingell St., Taunton	DUP 2	6.44							
Oct.	NEM-01	Nemasket R., Murdock St., Middleboro	DUP 1	5.83							
	TMR-02	Three Mile R. Br, Rt 44, Cohannet St.	DUP 2	6.32							


Temperature - 2023
25.0
20.0
15.0
10.0
5.0
0.0
April
May
June
July
August
Sept.
Oct.
TNT-01
TNT-02
BED-01/TNT-03
CHE-01/TNT-04
ASO-01
SEG
BER-01
TMR-01
TMR-02
TMR-03
MIL-01
MIL-02
MIL-03
FORGE
COT-01
FBR-01
CHU-01
TWH-01
MAT-01
NEM-01

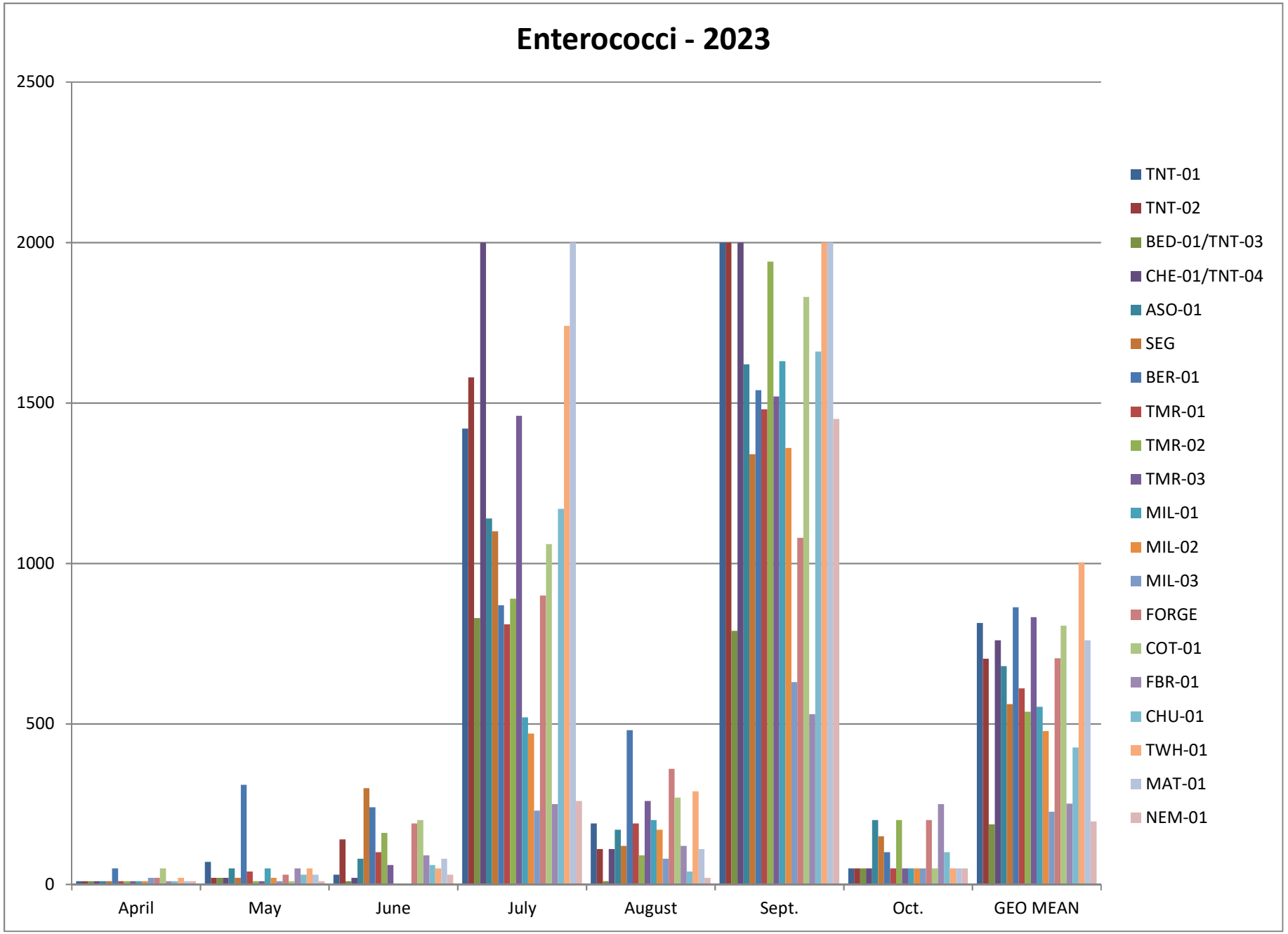
2023 TRWA Sampling Results for Temperature (Degrees C)			TARGET FOR CONCERN - Greater Than 28.3°C								
Sample	**Site No.**	**River & Location Description**	**April**	**May**	**June**	**July**	**August**	**Sept.**	**Oct.**		
1	TNT-01	Taunton R. Br, Center St., Berkley	15.8	15.4	19.3	21.2	21.3	21.5	17.0		
2	TNT-02	Taunton R. Br, Plain St., Taunton	16.9	16.4	19.2	22.2	21.2	21.5	16.9		
3	BED-01/TNT-03	Taunton R., Rt 18, Bedford St., Bridgewater	14.0	16.4	19.1	23.0	21.7	21.4	17.2		
4	CHE-01/TNT-04	Taunton R. Br, Cherry St., Bridgewater	13.0	15.2	18.7	20.9	21.3	21.0	17.1		
5	ASO-01	Assonet R. Bridge, Rt 79	16.3	17.8	19.7	20.9	21.5	21.3	17.1		
6	SEG	Segregansett R. Br, Brook St. Dighton	15.4	17.4	17.9	19.6	19.6	20.3	17.1		
7	BER-01	Chuckamucksett Brk. Br, Berkley St.	15.1	16.1	16.2	19.9	18.0	19.3	16.5		
8	TMR-01	Three Mile R. Br, Rt 138, Somerset Ave.	16.2	16.1	19.0	21.3	21.1	21.0	16.8		
9	TMR-02	Three Mile R. Br, Rt 44, Cohannet St.	17.2	18.2	19.4	21.4	21.1	21.1	17.0		
10	TMR-03	Three Mile R. Br, Crane St., Norton	15.5	18.7	18.8	21.2	21.1	21.0	17.0		
11	MIL-01	Mill R., Ingell St., Taunton	14.3	17.3	NR	22.0	21.3	22.8	16.7		
12	MIL-02	Mill R., Washington St., Taunton	14.1	17.3	NR	22.4	21.7	22.9	16.9		
13	MIL-03	Mill R., Whittendon St., Taunton	14.6	17.5	NR	21.9	21.8	22.8	16.9		
14	FORGE	Forge R. Br, Rt 44, Raynham	13.4	17.5	18.4	21.4	19.7	21.5	16.6		
15	COT-01	Cotley R., Middleboro Ave, Taunton	13.1	17.4	18.0	20.9	20.4	21.0	15.9		
16	FBR-01	Furnace Brk., River St., E. Taunton	15.5	13.6	18.1	20.4	21.2	22.1	16.5		
17	CHU-01	Taunton River Br, Church St., Raynham	13.6	15.6	18.6	19.0	21.0	21.9	16.5		
18	TWH-01	Town R., Br, Hayward St., Bridgewater	17.4	18.0	19.3	21.4	21.2	21.2	16.9		
19	MAT-01	Matfield R., Br, High St., Bridgewater	16.1	17.1	19.3	21.6	20.8	21.1	16.5		
20	NEM-01	Nemasket R., Murdock St., Middleboro	15.7	15.3	19.5	21.2	21.2	21.2	17.3		
		Duplicate Sample Location	**DUP #**	**DUP Results**			**Duplicate sample obtained by second reading**				
April	COT-01	Cotley R., Middleboro Ave, Taunton	DUP 1	13.5			**with another thermometer or reading by another**				
	BER-01	Chuckamucksett Brk. Br, Berkley St.	DUP 2	12.5			**team member.**				
May	FBR-01	Furnace Brk., River St., E. Taunton	DUP 1	14.2							
	TMR-02	Three Mile R. Br, Rt 44, Cohannet St.	DUP 2	NR			**NR - Not Reported, no sample**				
June	TNT-02	Taunton R. Br, Plain St., Taunton	DUP 1	19.2							
	ASO-01	Assonet R. Bridge, Rt 79	DUP 2	19.6							
July	BED-01/TNT-03	Taunton R., Rt 18, Bedford St., Bridgewater	DUP 1	21.0							
	SEG	Segregansett R. Br, Brook St. Dighton	DUP 2	20.0							
August	TNT-02	Taunton R. Br, Plain St., Taunton	DUP 1	21.1							
	MAT-01	Matfield R., Br, High St., Bridgewater	DUP 2	21.0							
Sept.	COT-01	Cotley R., Middleboro Ave, Taunton	DUP 1	21.0							
	MIL-01	Mill R., Ingell St., Taunton	DUP 2	22.3							
Oct.	NEM-01	Nemasket R., Murdock St., Middleboro	DUP 1	17.7							
	TMR-02	Three Mile R. Br, Rt 44, Cohannet St.	DUP 2	17.5							


Nitrate Nitrogen - 2023
1.60
1.40
1.20
1.00
0.80
0.60
0.40
0.20
0.00
April
May
June
July
August
Sept.
Oct.
TNT-01
TNT-02
BED-01/TNT-03
CHE-01/TNT-04
ASO-01
SEG
BER-01
TMR-01
TMR-02
TMR-03
MIL-01
MIL-02
MIL-03
FORGE
COT-01
FBR-01
CHU-01
TWH-01
MAT-01
NEM-01

2023 TRWA Sampling Results for Nitrate (mg/l)				TARGET FOR CONCERN - GREATER THAN 0.4 MG/L							
Sample	**Site No.**	**River & Location Description**	**April**	**May**	**June**	**July**	**August**	**Sept.**	**Oct.**	**AVG****	
1	TNT-01	Taunton R. Br, Center St., Berkley	**0.45**	0.37	**0.51**	**0.49**	**0.63**	**0.51**	0.40	**0.49**	
2	TNT-02	Taunton R. Br, Plain St., Taunton	0.31	0.33	**0.78**	0.37	**0.48**	0.39	**0.47**	**0.47**	
3	BED-01/TNT-03	Taunton R., Rt 18, Bedford St., Bridgewater	0.30	0.38	**0.52**	**0.48**	**0.63**	0.33	0.35	**0.45**	
4	CHE-01/TNT-04	Taunton R. Br, Cherry St., Bridgewater	**0.76**	**0.54**	**0.48**	**0.57**	**1.13**	**0.54**	**0.79**	**0.67**	
5	ASO-01	Assonet R. Bridge, Rt 79	0.06	0.05	0.05	0.07	0.06	0.05	0.09	0.06	
6	SEG	Segregansett R. Br, Brook St. Dighton	0.27	0.14	0.31	0.13	0.34	0.06	0.23	0.20	
7	BER-01	Chuckamucksett Brk. Br, Berkley St.	**0.86**	**0.69**	**1.19**	0.37	**1.37**	0.12	**0.85**	**0.77**	
8	TMR-01	Three Mile R. Br, Rt 138, Somerset Ave.	0.43	0.24	**0.51**	0.34	**0.47**	0.40	0.35	0.38	
9	TMR-02	Three Mile R. Br, Rt 44, Cohannet St.	0.39	0.22	**0.50**	0.35	**0.54**	0.26	0.32	0.36	
10	TMR-03	Three Mile R. Br, Crane St., Norton	0.33	0.15	0.24	0.17	0.23	0.12	0.21	0.19	
11	MIL-01	Mill R., Ingell St., Taunton	0.23	0.07	NR	0.15	0.16	0.12	0.17	0.13	
12	MIL-02	Mill R., Washington St., Taunton	0.23	0.07	NR	0.13	0.14	0.08	0.15	0.11	
13	MIL-03	Mill R., Whittendon St., Taunton	0.19	0.05	NR	0.09	0.08	0.05	0.12	0.08	
14	FORGE	Forge R. Br, Rt 44, Raynham	0.31	0.20	0.32	0.16	**0.41**	0.23	0.25	0.26	
15	COT-01	Cotley R., Middleboro Ave, Taunton	0.21	0.13	0.30	0.11	**0.47**	0.05	0.17	0.20	
16	FBR-01	Furnace Brk., River St., E. Taunton	0.22	0.22	0.26	0.21	0.29	0.13	0.17	0.21	
17	CHU-01	Taunton River Br, Church St., Raynham	0.36	0.34	**1.00**	0.38	**0.59**	0.40	**0.47**	**0.53**	
18	TWH-01	Town R., Br, Hayward St., Bridgewater	0.32	0.17	**0.54**	0.34	**0.47**	0.23	0.27	0.34	
19	MAT-01	Matfield R., Br, High St., Bridgewater	**0.79**	**0.81**	**0.98**	**0.58**	**1.31**	**0.45**	**0.79**	**0.82**	
20	NEM-01	Nemasket R., Murdock St., Middleboro	0.09	0.17	0.16	0.10	0.20	0.12	0.12	0.14	
Month	**Site No.**	**Duplicate and Blank Locations by Month**	**DUP #**	**Duplicate Results**		**BL #**	**Blank Results**		** Avg is for the water quality months		
April	COT-01	Cotley R., Middleboro Ave, Taunton	DUP 1	0.21		BL 1	<0.05		of May through October used in		
	BER-01	Chuckamucksett Brk. Br, Berkley St.	DUP 2	0.87		BL 2	<0.05		NPDES permit TN limitation averaging.		
May	FBR-01	Furnace Brk., River St., E. Taunton	DUP 1	0.22		BL 1	<0.05				
	TMR-02	Three Mile R. Br, Rt 44, Cohannet St.	DUP 2	0.22		BL 2	<0.05		NR = Not Reported, no sample		
June	TNT-02	Taunton R. Br, Plain St., Taunton	DUP 1	0.78		BL 1	<0.05				
	ASO-01	Assonet R. Bridge, Rt 79	DUP 2	<0.05		BL 2	<0.05				
July	BED-01/TNT-03	Taunton R., Rt 18, Bedford St., Bridgewater	DUP 1	0.47		BL 1	0.06				
	SEG	Segregansett R. Br, Brook St. Dighton	DUP 2	0.47		BL 2	0.13				
August	TNT-02	Taunton R. Br, Plain St., Taunton	DUP 1	0.48		BL 1	<0.05				
	MAT-01	Matfield R., Br, High St., Bridgewater	DUP 2	1.32		BL 2	<0.05				
Sept.	COT-01	Cotley R., Middleboro Ave, Taunton	DUP 1	0.05		BL 1	<0.05				
	MIL-01	Mill R., Ingell St., Taunton	DUP 2	0.11		BL 2	<0.05				
Oct.	NEM-01	Nemasket R., Murdock St., Middleboro	DUP 1	0.12		BL 1	0.12				
	TMR-02	Three Mile R. Br, Rt 44, Cohannet St.	DUP 2	0.32		BL 2	0.08				


Total Phosphorus - 2023
0.250
0.200
0.150
0.100
0.050
0.000
April
May
June
July
August
Sept.
Oct.
TNT-01
TNT-02
BED-01/TNT-03
CHE-01/TNT-04
ASO-01
SEG
BER-01
TMR-01
TMR-02
TMR-03
MIL-01
MIL-02
MIL-03
FORGE
COT-01
FBR-01
CHU-01
TWH-01
MAT-01
NEM-01

2023 TRWA Sampling Results for Total Phosphorus (mg/l)				TARGET FOR CONCERN - GREATER THAN 0.100 mg/l							
Sample	**Site No.**	**River & Location Description**	**April**	**May**	**June**	**July**	**August**	**Sept.**	**Oct.**	**AVG****	
1	TNT-01	Taunton R. Br, Center St., Berkley	0.079	0.080	0.084	**0.125**	**0.150**	0.094	0.078	**0.102**	
2	TNT-02	Taunton R. Br, Plain St., Taunton	0.030	0.047	**0.108**	0.096	0.082	0.087	**0.134**	**0.092**	
3	BED-01/TNT-03	Taunton R., Rt 18, Bedford St., Bridgewater	0.030	0.058	**0.101**	0.011	0.090	0.094	0.074	**0.071**	
4	CHE-01/TNT-04	Taunton R. Br, Cherry St., Bridgewater	0.044	0.068	0.069	**0.117**	0.092	**0.132**	0.086	**0.094**	
5	ASO-01	Assonet R. Bridge, Rt 79	0.014	0.037	0.040	0.070	0.104	0.061	0.054	**0.061**	
6	SEG	Segregansett R. Br, Brook St. Dighton	0.019	0.038	0.043	0.064	0.064	0.073	0.051	**0.055**	
7	BER-01	Chuckamucksett Brk. Br, Berkley St.	0.014	0.022	0.031	0.072	0.018	0.062	0.026	0.038	
8	TMR-01	Three Mile R. Br, Rt 138, Somerset Ave.	0.018	0.035	0.034	0.060	0.044	0.053	0.036	0.044	
9	TMR-02	Three Mile R. Br, Rt 44, Cohannet St.	0.021	0.037	0.044	0.070	0.047	0.067	0.038	0.050	
10	TMR-03	Three Mile R. Br, Crane St., Norton	0.016	0.036	0.027	0.058	0.041	0.068	0.028	0.043	
11	MIL-01	Mill R., Ingell St., Taunton	0.028	0.040	NR	0.041	0.056	0.060	0.035	0.047	
12	MIL-02	Mill R., Washington St., Taunton	0.019	0.031	NR	0.037	0.039	0.054	0.030	0.038	
13	MIL-03	Mill R., Whittendon St., Taunton	0.018	0.030	NR	0.033	0.036	0.050	0.033	0.036	
14	FORGE	Forge R. Br, Rt 44, Raynham	0.032	0.052	0.087	**0.128**	**0.145**	**0.136**	0.097	**0.107**	
15	COT-01	Cotley R., Middleboro Ave, Taunton	0.013	0.032	0.020	0.045	0.022	0.053	0.019	0.032	
16	FBR-01	Furnace Brk., River St., E. Taunton	0.024	0.040	0.029	0.045	0.032	0.045	0.026	0.036	
17	CHU-01	Taunton River Br, Church St., Raynham	0.031	0.075	0.077	**0.102**	0.073	0.098	0.068	**0.082**	
18	TWH-01	Town R., Br, Hayward St., Bridgewater	0.057	0.060	0.095	**0.151**	**0.120**	**0.158**	0.096	**0.113**	
19	MAT-01	Matfield R., Br, High St., Bridgewater	0.039	0.070	0.084	**0.114**	0.074	**0.223**	0.058	**0.104**	
20	NEM-01	Nemasket R., Murdock St., Middleboro	**0.130**	0.036	0.038	**0.101**	0.046	0.077	0.037	**0.056**	
		Duplicate and Blank Locations by Month		**Duplicate Results**		**Blank Results**			** Avg is for the water quality months		
April	COT-01	Cotley R., Middleboro Ave, Taunton	DUP 1	0.012		BL 1	<0.0106		of May through October (season AVG).		
	BER-01	Chuckamucksett Brk. Br, Berkley St.	DUP 2	<0.0106		BL 2	<0.0106		NPDES permits use TP mo. avg. limits.		
May	FBR-01	Furnace Brk., River St., E. Taunton	DUP 1	0.068		BL 1	0.0191		Based on observations TRWA considers		
	TMR-02	Three Mile R. Br, Rt 44, Cohannet St.	DUP 2	0.033		BL 2	<0.0191		a season AVG **≥ 0.05 mg/l is concern**.		
June	TNT-02	Taunton R. Br, Plain St., Taunton	DUP 1	0.125		BL 1	<0.0106				
	ASO-01	Assonet R. Bridge, Rt 79	DUP 2	0.050		BL 2	<0.0106				
July	BED-01/TNT-03	Taunton R., Rt 18, Bedford St., Bridgewater	DUP 1	0.109		BL 1	<0.0106				
	SEG	Segregansett R. Br, Brook St. Dighton	DUP 2	0.271		BL 2	0.0723				
August	TNT-02	Taunton R. Br, Plain St., Taunton	DUP 1	0.089		BL 1	<0.0106				
	MAT-01	Matfield R., Br, High St., Bridgewater	DUP 2	0.078		BL 2	<0.0500				
Sept.	COT-01	Cotley R., Middleboro Ave, Taunton	DUP 1	0.06		BL 1	0.0165				1
	MIL-01	Mill R., Ingell St., Taunton	DUP 2	0.06		BL 2	0.0149				
Oct.	NEM-01	Nemasket R., Murdock St., Middleboro	DUP 1	0.0372		BL 1	<0.0106				
	TMR-02	Three Mile R. Br, Rt 44, Cohannet St.	DUP 2	0.0329		BL 2	<0.0106				


Enterococci - 2023
2500
2000
1500
1000
500
0
April
May
June
July
August
Sept.
Oct.
GEO MEAN
TNT-01
TNT-02
BED-01/TNT-03
CHE-01/TNT-04
ASO-01
SEG
BER-01
TMR-01
TMR-02
TMR-03
MIL-01
MIL-02
MIL-03
FORGE
COT-01
FBR-01
CHU-01
TWH-01
MAT-01
NEM-01

2023 TRWA Sampling Results for Enterococci (colonies/100 ml)				TARGET FOR CONCERN - GREATER THAN 35 COLONIES/100 ML (Class B & SB waters)							
Sample	**Site No.**	**River & Location Description**	**April**	**May**	**June**	**July**	**August**	**Sept.**	**Oct.**	**90 Day Geo Mean July to Sept**	
1	TNT-01	Taunton R. Br, Center St., Berkley (SB Cr. 104)	10	70	30	1420	190	2000	50	814	
2	TNT-02	Taunton R. Br, Plain St., Taunton (SB Cr. 104)	10	20	140	1580	110	2000	50	703	
3	BED-01/TNT-03	Taunton R., Rt 18, Bedford St., Bridgewater	10	20	10	830	10	790	50	187	
4	CHE-01/TNT-04	Taunton R. Br, Cherry St., Bridgewater	10	20	20	2000	110	2000	50	761	
5	ASO-01	Assonet R. Bridge, Rt 79	10	50	80	1140	170	1620	200	680	
6	SEG	Segregansett R. Br, Brook St. Dighton	10	20	300	1100	120	1340	150	561	
7	BER-01	Chuckamucksett Brk. Br, Berkley St.	50	310	240	870	480	1540	100	863	
8	TMR-01	Three Mile R. Br, Rt 138, Somerset Ave.	10	40	100	810	190	1480	50	611	
9	TMR-02	Three Mile R. Br, Rt 44, Cohannet St.	10	10	160	890	90	1940	200	538	
10	TMR-03	Three Mile R. Br, Crane St., Norton	10	10	60	1460	260	1520	50	833	
11	MIL-01	Mill R., Ingell St., Taunton	10	50	NR	520	200	1630	50	553	
12	MIL-02	Mill R., Washington St., Taunton	10	20	NR	470	170	1360	50	477	
13	MIL-03	Mill R., Whittendon St., Taunton	20	10	NR	230	80	630	50	226	
14	FORGE	Forge R. Br, Rt 44, Raynham	20	30	190	900	360	1080	200	705	
15	COT-01	Cotley R., Middleboro Ave, Taunton	50	10	200	1060	270	1830	50	806	
16	FBR-01	Furnace Brk., River St., E. Taunton	10	50	90	250	120	530	250	251	
17	CHU-01	Taunton River Br, Church St., Raynham	10	30	60	1170	40	1660	100	427	
18	TWH-01	Town R., Br, Hayward St., Bridgewater	20	50	50	1740	290	2000	50	1003	
19	MAT-01	Matfield R., Br, High St., Bridgewater	10	30	80	2000	110	2000	50	761	
20	NEM-01	Nemasket R., Murdock St., Middleboro	10	10	30	260	20	1450	50	196	

		Duplicate and Blank Locations by Month		**Duplicate Results**	**Blank Results**		** Geometric Mean for any 90 days
April	COT-01	Cotley R., Middleboro Ave, Taunton	DUP 1	30	BL 1	<10	shall not exceed 35 colonies/100ml.
	BER-01	Chuckamucksett Brk. Br, Berkley St.	DUP 2	<10	BL 2	<10	No more than 10% of all samples
May	FBR-01	Furnace Brk., River St., E. Taunton	DUP 1	10	BL 1	<10	Collected shall exceed 130 CFU/100ml.
	TMR-02	Three Mile R. Br, Rt 44, Cohannet St.	DUP 2	10	BL 2	<10	Standard effective 11/12/2021.
June	TNT-02	Taunton R. Br, Plain St., Taunton	DUP 1	80	BL 1	10	
	ASO-01	Assonet R. Bridge, Rt 79	DUP 2	50	BL 2	<10	Results reported as **2000** were
July	BED-01/TNT-03	Taunton R., Rt 18, Bedford St., Bridgewater	DUP 1	10	BL 1	<10	reported as **> 2000** colonies by
	SEG	Segregansett R. Br, Brook St. Dighton	DUP 2	10	BL 2	1290	Microbac Lab (max that could be
August	TNT-02	Taunton R. Br, Plain St., Taunton	DUP 1	170	BL 1	<10	measured). 2000 used to calculate
	MAT-01	Matfield R., Br, High St., Bridgewater	DUP 2	170	BL 2	<10	the geometric mean.
Sept.	COT-01	Cotley R., Middleboro Ave, Taunton	DUP 1	1950	BL 1	<10	
	MIL-01	Mill R., Ingell St., Taunton	DUP 2	1610	BL 2	<10	
Oct.	NEM-01	Nemasket R., Murdock St., Middleboro	DUP 1	<50	BL 1	<1	
	TMR-02	Three Mile R. Br, Rt 44, Cohannet St.	DUP 2	50	BL 2	<1	

Appendix B – Mill River Flow Data and Nutrient Loading

Mill River Flow at Spring Street as recorded by the USGS

Year	Month	Day	Daily Mean CFS	Flow Gallons	MG
2007	March	13	107	69,151,104	69.15
2007	April	10	159	102,757,248	102.76
2007	May	8	89	57,518,208	57.52
2007	June	12	60	38,776,320	38.78
2007	July	10	4.1	2,649,715	2.65
2007	August	14	4.4	2,843,597	2.84
2007	September	11	19	12,279,168	12.28
2007	October	9	6	3,877,632	3.88
2007	November	13	17	10,986,624	10.99
2007	December	11	17	10,986,624	10.99

Year	Month	Day	Daily Mean CFS	Flow Gallons	MG
2008	March	11	493	318,612,096	318.61
2008	April	8	137	88,539,264	88.54
2008	May	13	66	42,653,952	42.65
2008	June	10	26.7	17,255,462	17.26
2008	July	8	16.5	10,663,488	10.66
2008	August	12	27.65	17,869,421	17.87
2008	September	9	32.45	20,971,526	20.97
2008	October	7	77.31	49,963,288	49.96
2008	November	4	58.71	37,942,629	37.94

Year	Month	Day	Daily Mean CFS	Flow Gallons	MG
2009	April	14	185	119,560,320	119.56
2009	May			-	-
2009	June	9	30	19,388,160	19.39
2009	July	14	97	62,688,384	62.69
2009	August	4	90	58,164,480	58.16
2009	September	8	34	21,973,248	21.97
2009	October	13	40	25,850,880	25.85
2009	November	10	71	45,885,312	45.89

Year	Month	Day	Daily Mean CFS	Flow Gallons	MG
2010	April	13	203	131,193,216	131.19
2010	May	11	68	43,946,496	43.95
2010	June	8	35	22,619,520	22.62
2010	July	13	8.5	5,493,312	5.49
2010	August	10	6.4	4,136,141	4.14
2010	September	14	9.7	6,268,838	6.27
2010	October	12	16	10,340,352	10.34

2010	November	9	49	31,667,328	31.67
2010	December	14	62	40,068,864	40.07

Year	Month	Day	Daily Mean CFS	Flow Gallons	MG
2011	April	12	136	87,892,992	87.89
2011	May	10	122	78,845,184	78.85
2011	June	14	99	63,980,928	63.98
2011	July	12	39	25,204,608	25.20
2011	August	9	96	62,042,112	62.04
2011	September	13	277	179,017,344	179.02
2011	October	11	103	66,566,016	66.57
2011	November	8	160	103,403,520	103.40

Year	Month	Day	Daily Mean CFS	Flow Gallons	MG
2012	March	13	74	47,824,128	47.82
2012	April	10	27	17,449,344	17.45
2012	May	5	60	38,776,320	38.78
2012	June	12	56	36,191,232	36.19
2012	July	10	19	12,279,168	12.28
2012	August	14	45	29,082,240	29.08
2012	September	11	17	10,986,624	10.99
2012	October	9	16	10,340,352	10.34
2012	November	13	91	58,810,752	58.81

Year	Month	Day	Daily Mean CFS	Flow Gallons	MG
2013	April	9	83	53,640,576	53.64
2013	May	14	41	26,497,152	26.50
2013	June	11	513	331,537,536	331.54
2013	July	9	65	42,007,680	42.01
2013	August	13	82	52,994,304	52.99
2013	September	10	15	9,694,080	9.69
2013	October	8	15	9,694,080	9.69
2013	November	12	9.8	6,333,466	6.33

Year	Month	Day	Daily Mean CFS	Flow Gallons	MG
2014	April	8	198	127,961,856	127.96
2014	May	13	79	51,055,488	51.06
2014	June	10	46	29,728,512	29.73
2014	July	8	29	18,741,888	18.74
2014	August	12	3.3	2,132,698	2.13
2014	September	9	2.9	1,874,189	1.87
2014	October	14	2.4	1,551,053	1.55
2014	November	12	37	23,912,064	23.91

Year	Month	Day	Daily Mean CFS	Flow Gallons	MG
2015	April	14	206	133,132,032	133.13
2015	May	12	66	42,653,952	42.65
2015	June	9	57	36,837,504	36.84
2015	July	14	32	20,680,704	20.68
2015	August	18	9.6	6,204,211	6.20
2015	September	8	3.5	2,261,952	2.26
2015	October	13	22	14,217,984	14.22
2015	November	10	10	6,462,720	6.46

Year	Month	Day	Daily Mean CFS	Flow Gallons	MG
2016	April	12	190	122,791,680	122.79
2016	May	10	86	55,579,392	55.58
2016	June	14	25	16,156,800	16.16
2016	July	12	9.5	6,139,584	6.14
2016	August	9	3.1	2,003,443	2.00
2016	September	13	2.4	1,551,053	1.55
2016	October	11	6.3	4,071,514	4.07
2016	November	8	7.4	4,782,413	4.78

Year	Month	Day	Daily Mean CFS	Flow Gallons	MG
2017	April	11	263	169,969,536	169.97
2017	May	9	164	105,988,608	105.99
2017	June	12	76.4	49,375,181	49.38
2017	July	10	34.7	22,425,638	22.43
2017	August	15	6.95	4,491,590	4.49
2017	September	12	3.67	2,371,818	2.37
2017	October	10	7.84	5,066,772	5.07
2017	November	14	81.3	52,541,914	52.54

Year	Month	Day	Daily Mean CFS	Flow Gallons	MG
2018	April	10	129	83,369,088	83.37
2018	May	8	107	69,151,104	69.15
2018	June	13	24.5	15,833,664	15.83
2018	July	11	14.4	9,306,317	9.31
2018	August	7	9.74	6,294,689	6.29
2018	September	11	12.2	7,884,518	7.88
2018	October	9	105	67,858,560	67.86
2018	November	13	430	277,896,960	277.90

Year	Month	Day	Daily Mean CFS	Flow Gallons	MG

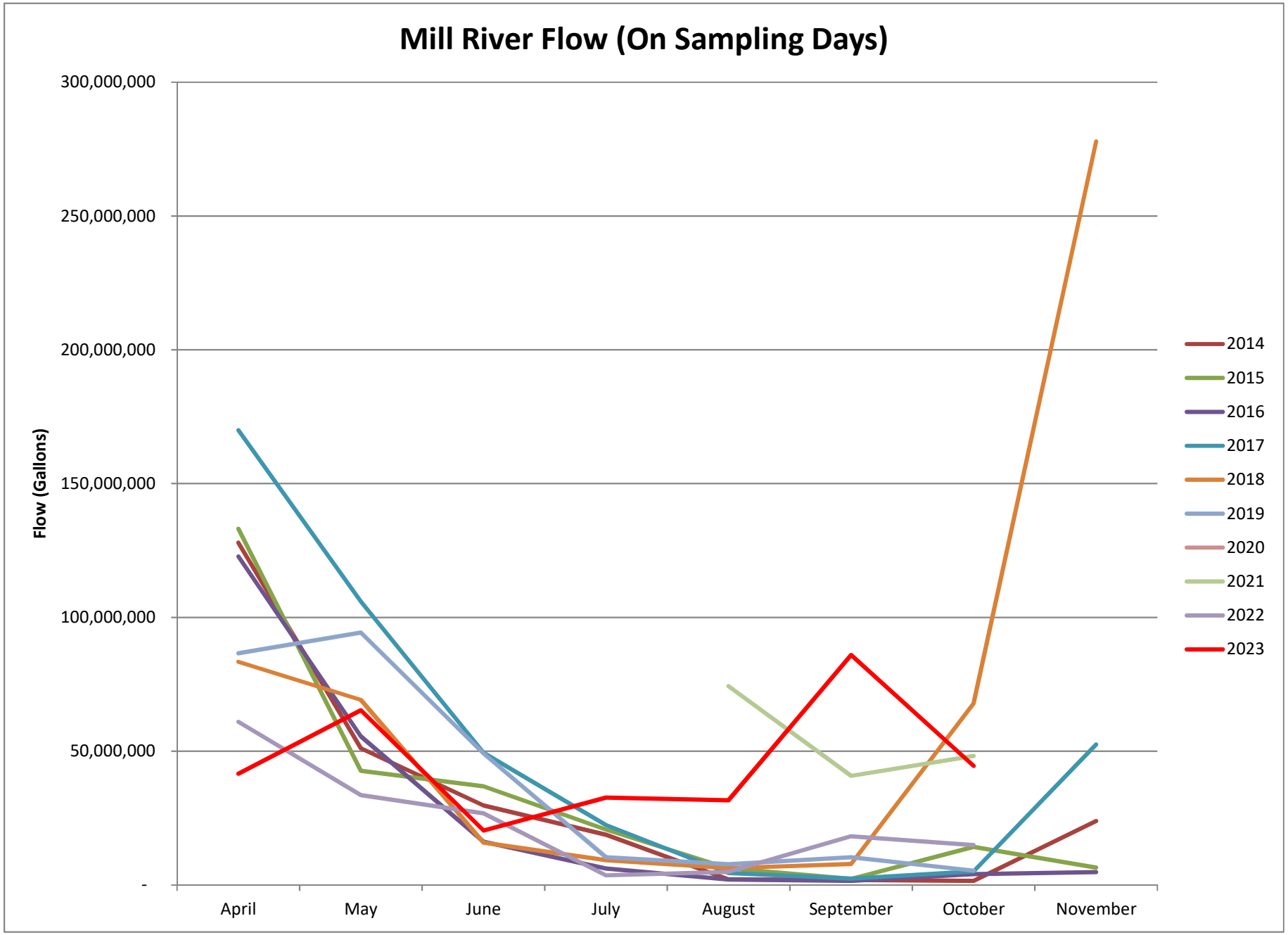
2019	April	9	134	86,600,448	86.60
2019	May	14	146	94,355,712	94.36
2019	June	18	76	49,116,672	49.12
2019	July	9	16	10,340,352	10.34
2019	August	13	12	7,755,264	7.76
2019	September	10	16	10,340,352	10.34
2019	October	8	8.3	5,364,058	5.36

Year	Month	Day	Daily Mean CFS	Flow Gallons	MG
2020	April				
2020	May				
2020	June				
2020	July		No sampling due to pandemic		
2020	August				
2020	September				
2020	October				

Year	Month	Day	Daily Mean CFS	Flow Gallons	MG
2021	April				
2021	May		No sampling due to pandemic		
2021	June				
2021	July				
2021	August	10	115	74,321,280	74.32
2021	September	14	63.1	40,779,763	40.78
2021	October	12	74.6	48,211,891	48.21

Year	Month	Day	Daily Mean CFS	Flow Gallons	MG
2022	April	12	94.3	60,943,450	60.94
2022	May	10	52	33,606,144	33.61
2022	June	14	41.4	26,755,661	26.76
2022	July	12	5.57	3,599,735	3.60
2022	August	9	7.54	4,872,891	4.87
2022	September	13	28.2	18,224,870	18.22
2022	October	11	23.1	14,928,883	14.93

Year	Month	Day	Daily Mean CFS	Flow Gallons	MG
2023	April	11	64.4	41,619,917	41.62
2023	May	9	101	65,273,472	65.27
2023	June	13	31.5	20,357,568	20.36
2023	July	11	50.5	32,636,736	32.64
2023	August	8	49	31,667,328	31.67
2023	September	12	133	85,954,176	85.95
2023	October	10	68.9	44,528,141	44.53


Mill River Flow (On Sampling Days)
Flow (Gallons)
300,000,000
250,000,000
200,000,000
150,000,000
100,000,000
50,000,000
-
April
May
June
July
August
September
October
November
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023

Mill River (MIL02) Nutrient Loading

2007	March	April	May	June	July	August	September	October	November
PO4 mg/l (MIL-02)	0.070	0.000	0.000	0.060		0.070	0.060	0.070	0.000
Flow-MGD	69.15	102.76	57.52	38.78	2.65	2.84	12.28	3.88	10.99
PO4 lbs	40.37	0.00	0.00	19.40	0.00	1.66	6.14	2.26	0.00
NO3 mg/l (MIL-02)	0.290	0.690	0.640	0.850		1.100	1.000	0.960	0.880
Flow-MGD	69.15	102.76	57.52	38.78	2.65	2.84	12.28	3.88	10.99
NO3 lbs	167.25	591.33	307.01	274.89	0.00	26.09	102.41	31.05	80.63

2008	March	April	May	June	July	August	September	October	November
PO4 mg/l (MIL-02)	0.000	0.000	0.060	0.080	0.100	0.100	0.050	0.093	0.450
Flow-MGD	318.61	88.54	42.65	17.26	10.66	17.87	20.97	49.96	37.94
PO4 lbs	0.00	0.00	21.34	11.51	8.89	14.90	8.75	38.75	142.40
NO3 mg/l (MIL-02)	1.100	0.310	0.460	0.600	0.640	0.630	0.630	0.540	0.280
Flow-MGD	318.61	88.54	42.65	17.26	10.66	17.87	20.97	49.96	37.94
NO3 lbs	2922.95	228.91	163.64	86.35	56.92	93.89	110.19	225.01	88.60

2009	April	May	June	July	August	September	October	November
PO4 mg/l (MIL-02)	0.000			0.090	0.150	0.000	0.000	0.000
Flow-MGD	119.56		19.39	62.69	58.16	21.97	25.85	45.89
PO4 lbs	0.00			47.05	72.76	0.00	0.00	0.00
NO3 mg/l (MIL-02)	0.160			0.080	0.060	0.060	0.050	0.080
Flow-MGD	119.56		19.39	62.69	58.16	21.97	25.85	45.89
NO3 lbs	159.54			41.83	29.11	11.00	10.78	30.61

2010	April	May	June	July	August	September	October	November
PO4 mg/l (MIL-02)	0.000	0.000	0.060	0.000	0.050	0.000	0.140	
Flow-MGD	131.19	43.95	22.62	5.49	4.14	6.27	10.34	31.67
PO4 lbs	0.00	0.00	11.32	0.00	1.72	0.00	12.07	
NO3 mg/l (MIL-02)	0.150	0.140	0.120	0.230	0.240	0.090	0.250	
Flow-MGD	131.19	43.95	22.62	5.49	4.14	6.27	10.34	31.67
NO3 lbs	164.12	51.31	22.64	10.54	8.28	4.71	21.56	

2011	April	May	June	July	August	September	October	November
PO4 mg/l (MIL-02)		0.000	0.000	0.060	0.000			
Flow-MGD	87.89	78.85	63.98	25.20	62.04	179.02	66.57	103.40
PO4 lbs		0.00	0.00	12.61	0.00			
NO3 mg/l (MIL-02)		0.080	0.090	0.080	0.120			
Flow-MGD	87.89	78.85	63.98	25.20	62.04	179.02	66.57	103.40
NO3 lbs		52.61	48.02	16.82	62.09			

2012	March	April	May	June	July	August	September	October	November
PO4 mg/l (MIL-02)		0.000		0.050	0.060	0.080	0.080	0.060	
Flow-MGD	47.82	17.45	38.78	36.19	12.28	29.08	10.99	10.34	58.81
PO4 lbs		0.00		15.09	6.14	19.40	7.33	5.17	
NO3 mg/l (MIL-02)		0.200		0.070	0.290	0.060	0.330	0.300	
Flow-MGD	47.82	17.45	38.78	36.19	12.28	29.08	10.99	10.34	58.81
NO3 lbs		29.11		21.13	29.70	14.55	30.24	25.87	

2013	March	April	May	June	July	August	September	October	November

PO4 mg/l (MIL-02)	0.000	0.000	0.060	0.100	0.100	0.080		
Flow-MGD	53.64	26.50	331.54	42.01	52.99	9.69	9.69	6.33
PO4 lbs	0.00	0.00	165.90	35.03	44.20	6.47		
NO3 mg/l (MIL-02)	0.450	0.360	0.240	0.320	0.290	0.290		
Flow-MGD	53.64	26.50	331.54	42.01	52.99	9.69	9.69	6.33
NO3 lbs	201.31	79.56	663.61	112.11	128.17	23.45		

2014	March	April	May	June	July	August	September	October	November
PO4 mg/l (MIL-02)		0.00	0.00		0.05			0.00	0.09
Flow-MGD		127.96	51.06	29.73	18.74	2.13	1.87	1.55	23.91
PO4 lbs		0.00	0.00		7.82			0.00	17.95
NO3 mg/l (MIL-02)		0.160	0.090		0.100			0.340	0.060
Flow-MGD		127.96	51.06	29.73	18.74	2.13	1.87	1.55	23.91
NO3 lbs		170.75	38.32		15.63			4.40	11.97

2015	March	April	May	June	July	August	September	October	November
PO4 mg/l (MIL-02)		0.120	0.090	0.050	0.000	0.060	0.060		
Flow-MGD		133.13	42.65	36.84	20.68	6.20	2.26	14.22	6.46
PO4 lbs		133.24	32.02	15.36	0.00	3.10	1.13		
NO3 mg/l (MIL-02)		0.310	0.130	0.210	0.240	0.140	0.260		
Flow-MGD		133.13	42.65	36.84	20.68	6.20	2.26	14.22	6.46
NO3 lbs		344.20	46.25	64.52	41.39	7.24	4.90		

2016	March	April	May	June	July	August	September	October	November
PO4 mg/l (MIL-02)		0.010	0.018	0.028	0.026	0.058	0.017	0.019	0.014
Flow-MGD		122.79	55.58	16.16	6.14	2.00	1.55	4.07	4.78
PO4 lbs		10.24	8.34	3.77	1.33	0.97	0.22	0.65	0.56
NO3 mg/l (MIL-02)		0.290	0.140	0.140	0.210	0.340	0.380	0.270	0.140
Flow-MGD		122.79	55.58	16.16	6.14	2.00	1.55	4.07	4.78
NO3 lbs		296.98	64.89	18.86	10.75	5.68	4.92	9.17	5.58

2017	March	April	May	June	July	August	September	October	November
PO4 mg/l (MIL-02)		0.026	0.028	0.036	0.052	0.020	0.021	0.020	0.028
Flow-MGD		169.97	105.99	49.38	22.43	4.49	2.37	5.07	52.54
PO4 lbs		36.86	24.75	14.82	9.73	0.75	0.42	0.85	12.09
NO3 mg/l (MIL-02)		0.280	0.110	0.070	0.240	0.150	0.200	0.170	0.163
Flow-MGD		169.97	105.99	49.38	22.43	4.49	2.37	5.07	52.54
NO3 lbs		396.91	97.23	28.83	44.89	5.62	3.96	7.18	71.43

2018	March	April	May	June	July	August	September	October	November
PO4 mg/l (MIL-02)		0.014	0.023	0.033	0.037	0.029	0.035	0.034	0.035
Flow-MGD		83.37	69.15	15.83	9.31	6.29	7.88	67.86	277.90
PO4 lbs		9.60	13.50	4.34	2.89	1.51	2.31	19.24	81.35
NO3 mg/l (MIL-02)		0.327	0.126	0.28	0.218	0.195	0.185	0.0964	0.0816
Flow-MGD		83.37	69.15	15.83	9.31	6.29	7.88	67.86	277.90
NO3 lbs		227.36	72.67	36.97	16.92	10.24	12.17	54.56	189.12

2019	March	April	May	June	July	August	September	October	November
PO4 mg/l (MIL-02)		No Sample	0.023	0.038	No Sample	0.021	0.013	0.023	
Flow-MGD		86.60	94.36	49.12	10.34	7.76	10.34	5.36	
PO4 lbs			18.41	15.69		1.38	1.13	1.05	

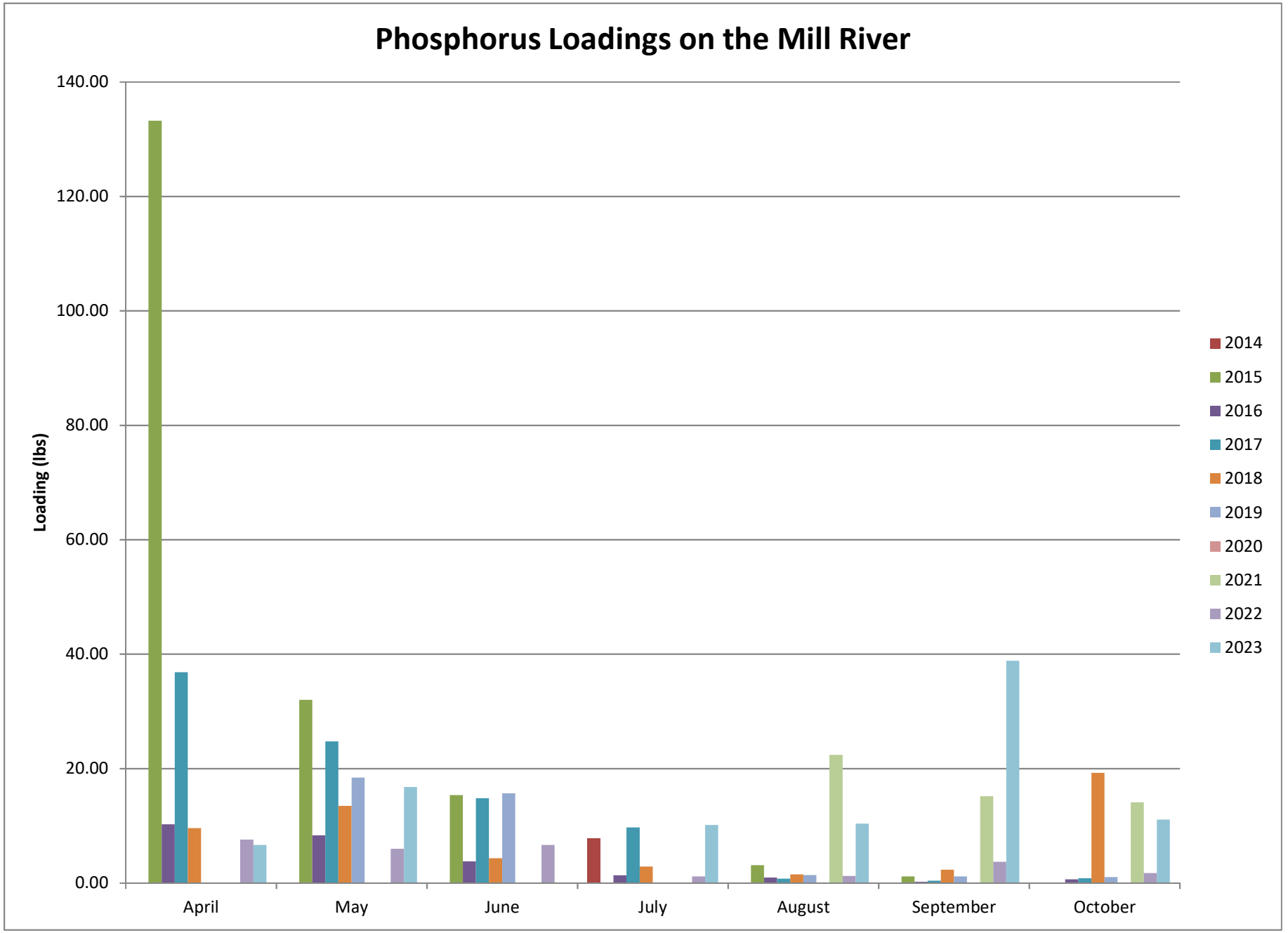
NO3 mg/l (MIL-02)		0.246	0.122	0.208	No Sample	0.140	0.076	0.154	
Flow-MGD		86.60	94.36	49.12	10.34	7.76	10.34	5.36	
NO3 lbs		177.67	96.01	85.20		9.06	6.54	6.89	

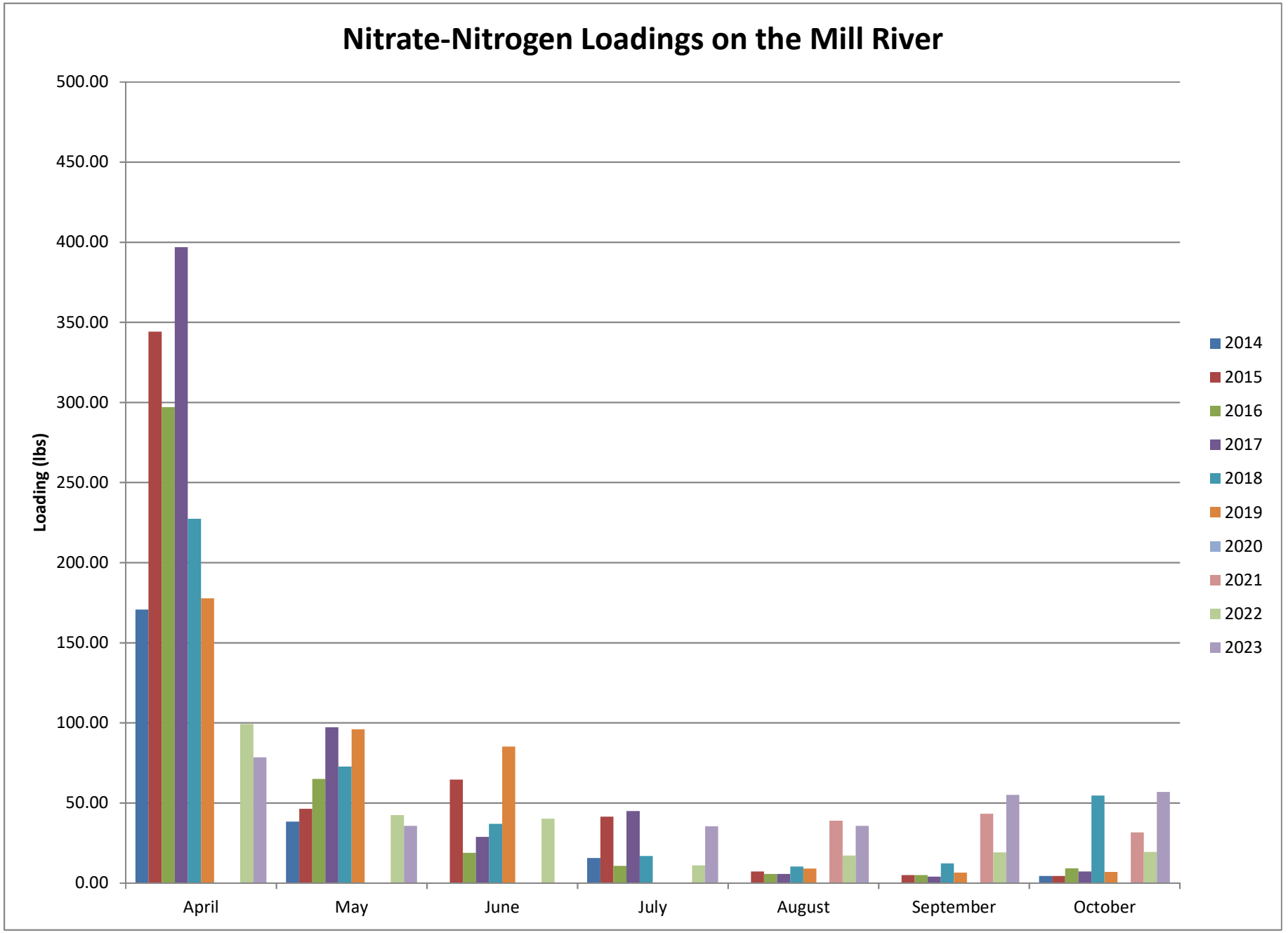
2020	March	April	May	June	July	August	September	October	November
PO4 mg/l (MIL-02)		No Sample	No Sample	No Sample	No Sample	No Sample	No Sample	No Sample	
Flow-MGD		-	-	-	-	-	-	-	
PO4 lbs									
NO3 mg/l (MIL-02)		No Sample	No Sample	No Sample	No Sample	No Sample	No Sample	No Sample	
Flow-MGD		-	-	-	-	-	-	-	
NO3 lbs									

2021	March	April	May	June	July	August	September	October	November
PO4 mg/l (MIL-02)		No Sample	No Sample	No Sample	No Sample	0.036	0.045	0.035	
Flow-MGD		-	-	-	-	74.32	40.78	48.21	
PO4 lbs						22.38	15.17	14.11	
NO3 mg/l (MIL-02)		No Sample	No Sample	No Sample	No Sample	0.063	0.127	0.079	
Flow-MGD		-	-	-	-	74.32	40.78	48.21	
NO3 lbs						38.93	43.19	31.56	

2022	March	April	May	June	July	August	September	October	November
PO4 mg/l (MIL-02)		0.015	0.021	0.030	0.038	0.030	0.024	0.014	
Flow-MGD		60.94	33.61	26.76	3.60	4.87	18.22	14.93	
PO4 lbs		7.57	5.97	6.65	1.15	1.21	3.71	1.72	
NO3 mg/l (MIL-02)		0.195	0.151	0.180	0.366	0.421	0.126	0.156	
Flow-MGD		60.94	33.61	26.76	3.60	4.87	18.22	14.93	
NO3 lbs		99.11	42.32	40.17	10.99	17.11	19.15	19.42	

2023	March	April	May	June	July	August	September	October	November
PO4 mg/l (MIL-02)		0.019	0.031	No Sample	0.037	0.039	0.054	0.030	
Flow-MGD		41.62	65.27	20.36	32.64	31.67	85.95	44.53	
PO4 lbs		6.63	16.77		10.13	10.38	38.85	11.07	
NO3 mg/l (MIL-02)		0.226	0.065	No Sample	0.130	0.135	0.077	0.153	
Flow-MGD		41.62	65.27	20.36	32.64	31.67	85.95	44.53	
NO3 lbs		78.45	35.60		35.38	35.65	55.05	56.82	


Phosphorus Loadings on the Mill River
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
Loading (lbs)
April
May
June
July
August
September
October
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023


Nitrate-Nitrogen Loadings on the Mill River
Loading (lbs)
500.00
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
April
May
June
July
August
September
October
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023