2020 ANNUAL PROGRESS REPORT

City of Port Wentworth Watershed Protection Plan

Project Number CSAV180025

Prepared for

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1 INTRODUCTION

This document was prepared by Goodwyn, Mills & Cawood, Inc. (GMC) and comprises the 2020 Watershed Protection Plan (WPP) Annual Progress Report covering the timeframe from January 1, 2019 through December 31, 2019 for Port Wentworth, Georgia.

To promote the goals of restoring and protecting Georgia's water resources Georgia Environmental Protection Division (GAEPD) requires the entity (permittee) holding a permit for a new water pollution control plant (WPCP), expansion of an existing WPCP, or WPCP that operates at 1 million gallons per day (MGD) or greater to participate in the state's Watershed Planning and Monitoring Program (WPMP). The state's WPMP consists of a three-phased program of implementing an approved Watershed Monitoring Plan; developing an approved Watershed Assessment (WA); and developing and implementing an approved Watershed Protection Plan (WPP) outlining strategies to be used to protect water quality as well as the steps necessary to improve and ultimately meet water quality standards.

- Watershed Assessment (WA):

Port Wentworth is located along the coast of Georgia within Chatham County approximately eleven (11) miles north of the City of Savannah. The City includes approximately 16.6 square miles (10,632 acres). Most of the City (10,003 acres) was not sewered in 2006 and with the construction of the WPCP, the City's sewer service area now includes the entire city limits. The Port Wentworth Watershed Assessment (WSA) was approved by EPD on September 7, 2006. Water quality monitoring was conducted at originally at seven (7) monitoring sites within streams and rivers draining the City's sewer service area/city limits.

Port Wentworth is bordered on the east by the Savannah River which as an alluvial river originating in the Blue Ridge province in extreme north Georgia. The river serves as the border between Georgia and South Carolina and its basin (HUC6#: 030601) includes portions of the Piedmont and Coastal Plain provinces. The Savannah River empties into the Atlantic Ocean near Savannah, GA. Waterways within Port Wentworth are mostly tidewater rivers and may be considered estuarine due to similar water quality characteristics (salinity, turbidity, etc.) with water common to coastal estuaries.

The Watershed Assessment and Watershed Protection Plan was developed due the City's desire to construct a new water pollution control plant (WPCP). As part of the process for obtaining a National Pollution Discharge Elimination System (NPDES) permit, the City is required to conduct a watershed assessment and develop a WPP. This requirement is stated in the Georgia Department of Natural Resources' guidebook, *"Planning for Domestic Wastewater Systems."* Wastewater treatment and disposal for the City of Port Wentworth, as well as several local commercial and industrial operations, was provided by the industrial Weyerhaeuser Company Port Wentworth Mill treatment facility (NPDES Permit No. GA0002798). This facility had a history of non-compliance related to fecal coliform concentrations in effluent discharges to the Savannah River. Due to the non-compliance issues of the existing plant and to meet the needs of the growing community, the City constructed a wastewater system to treat and dispose of domestic wastewater within the City. The initial capacity of the new wastewater plant was 2.0 MGD with provisions for further expansion as required due to growth and demand.

- Watershed Protection Plan (WPP):

The ultimate goal of the state's WPP is to provide the City with a technically sound and defensible basis for making informed watershed protection decisions within their sewer service area. To ensure the WPP is being properly implemented, Port Wentworth is required to submit an Annual Progress Report by June 30th of each year for the activities conducted during the previous year.

The following information is to be provided in the WPP Annual Progress Report:

Annual Certification of WPP Implementation

Certification of WPP implementation is prepared each year and submitted to GAEPD by June 30th. The report summarizes all of the data collected during the previous year and discussion concerning observed results. In addition, it includes both hard copy and electronic versions of the water quality data, and biological data, if appropriate, for use by GAEPD.

Electronic Submittal of Long-Term Trend Monitoring Data

Water quality and bioassessment data is submitted annually in electronic form on compact disk (CD) or flash drive using GAEPD's Microsoft Excel templates and another submittal guidance, as provided on the GAEPD website.

Annual Progress Report per EPD's October 2015 Guidance Document

Summary of Best Management Practices

The City submits an Annual Progress Report by June 30th outlining any specific actions or best management practices (BMPs) that were implemented during the previous calendar year; continuous BMPs; and BMPs occurring as a result of other programs. The report also discusses the effectiveness of existing BMPs with regard to observed monitoring results including recommendations for future improvements.

Water Quality and Biological Monitoring

In the Annual Progress Report, the City provides a summary of the current water quality and biological monitoring programs; results from the previous calendar year; and any observed trends in comparison with previous years' observations.

Summary of Changes in the WPP

The WPP is a living document and may be modified based on changing conditions in concurrence with the assigned GAEPD reviewer. It may also be necessary to make temporary, contemporaneous changes, or modifications to the WPP due to funding availability, scheduling conflicts, or climatic conditions. Any modifications or variances from the approved WPP are summarized in the Annual Progress Report.

The following information is provided by the Port Wentworth to meet the 2020 Annual Progress Report requirements covering WPP activities conducted during the 2019 calendar year.

2 ANNUAL CERTIFICATION OF WPP IMPLEMENTATION

I certify, under penalty of law, that the approved Watershed Protection Plan for Port Wentworth is being implemented. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. This certification is made for the period of January 1, 2019 through December 31, 2019.

Certified correct this 11th day of June 2020;

By: _____

(Signature)

Phil Jones, City Administrator

3 ELECTRONIC SUBMITTALS

Electronic versions of the available water quality data collected for the reporting period are submitted on the enclosed flash drive using the newly revised GAEPD Excel formats provided on GAEPD's website. Tabulated data are appended, as needed, for the supporting discussion regarding observed results of monitoring activities. The data available for submittal with this annual report includes all the 2019 water quality.

The 2019 water quality sampling results (January 1, 2019 – December 31, 2019) consist of one (1) wet weather event in June, three (3) dry weather events conducted in March, September, and December and two (2) series of bacteriological sampling events to obtain 4-day geometric means conducted in May and August/September of 2019. The 2019 water quality sampling results are provided in **Appendix A** (*2019 GA EPD Water Quality Data Spreadsheet*).

The 2019 biological sampling results consist of one (1) benthic macroinvertebrate community assessment and one (1) physical habitat assessment (including particle substrate count) conducted in February 2019. The 2019 biological sampling results are provided in **Appendix B** (*2019 Monitoring Report Long-Term Biological and Habitat Monitoring*).

4 SUMMARY OF BEST MANAGEMENT PRACTICES

In accordance with the approved WPP's implementation schedule and updates provided in the 2019 Annual Progress Report, the City implemented the following activities during the 2019 calendar year:

2019 WPP Activities

NPDES Phase 1 Medium MS4 Stormwater Management Program

- MS4 Control Structure Programs
- Illicit Discharge Detection and Elimination (IDDE) Plan
- Flood Management Projects
- Pesticide, Herbicide, Fertilizer Application
- Spill Response Procedures
- Proper Management & Disposal of Used Oil & Toxic Materials
- Industrial Facility Inspection Program
- Updates to the SWMP

A. Newly Implemented BMPs

The City did not implement any new BMPs during 2019.

B. Continuous BMPs

The City completed all the approved long-term monitoring activities for calendar year 2019. Port Wentworth also continued compliance with the NPDES Phase I Medium MS4 Program (Permit #GAS000210). The City sustained implementation of the programs listed above in compliance with the SWMP. The City's public works maintained and updated the MS4 control structure inventory including MS4 inspections. The MS4 outfalls were dry weather screened and investigated in compliance with the IDDE Plan. The City evaluated existing flood control devices as part of the City's Capital Improvement Program (CIP) to determine if retrofitting devices for additional pollutant removal is feasible. Proper protocol for the Pesticide, Herbicide, Fertilizer Application SOP was in place to certify commercial applicators & distributors before issuing business license requiring applicants to have a commercial pesticide applicators license. Documentation was maintained on any spill occurrences and cleanup performed through the City's Work Order database. The City provides education through their website for Proper Management of Toxic Materials, along with industry specific educational literature about proper waste management and disposal during HVPS and Industrial Site Inspections. The City also operates a curbside recycling program. An inventory of the Industrial Facilities within the City is also updated annually.

C. BMPs Supporting Other Programs

The City has a number of other program activities that indirectly support the goals of the WPP. The City implements planning procedures through the Comprehensive Plan, conducts street maintenance with

weekly sweepers, and sanitary sewer infiltration controls through daily inspections. Educational activities are also implemented throughout the year by the City. They provide educational brochures and/or other relevant literature to industrial facilities during inspections. The City also provides various educational information and links on the government website as well as brochures at City Hall and during outreach events.

D. Effectiveness of Existing BMPs

The 2019 water quality observations appear to be generally good results from 2019 as well as the past few years. The existing WPP is effectively protecting water quality within the City. The City will continue to monitor the watersheds to establish more valid trending data and will prioritize any potential improvements at the monitoring sites.

5 WATER QUALITY

A. Monitoring Site Information

In accordance with the approved WPP and the previous Annual Progress Reports, the long-term monitoring requirements during the 2019 calendar year consisted of water quality monitoring for: one (1) wet weather event in June; three (3) dry weather events conducted in March, September, and December; the habitat assessment (including particle substrate count) and benthic macroinvertebrate sampling events occurred in February 2019; and two (2) series of bacteriological sampling events conducted in May and August/September.

Water quality sampling (including bacteriological sampling) was performed at all four (4) monitoring locations (CN-1, ST-1, LH-1, and BK-1) in Port Wentworth, Georgia in 2019. Biological sampling was performed at all four (4) monitoring locations in Port Wentworth, Georgia in 2019. Monitoring site descriptions and locations are provided in **Table 5-1** and **Figure 5-1**, respectively. The monitoring stations remain consistent with the original WA stations selected to evaluate water quality and represent watershed inputs (e.g., NPDES discharges) into the study streams and effects of land use in the drainage area.

Table 5-1: Port Wentworth WPP Monitoring Site Descriptions

Site ID	Site Location	Coordinates	Monitoring Site Type
CN-1	Unnamed canal at Armadale Road	(32.145772, -81.155216)	Water Quality & Bioassessment
ST-1	St. Augustine Creek at Highway 21	(32.172646, -81.188342)	Water Quality & Bioassessment
LH-1	Little Hurst Canal at Highway 21	(32.186874, -81.193488)	Water Quality & Bioassessment
BK-1	Black Creek at O'Leary Road	(32.198663, -81.187449)	Water Quality & Bioassessment

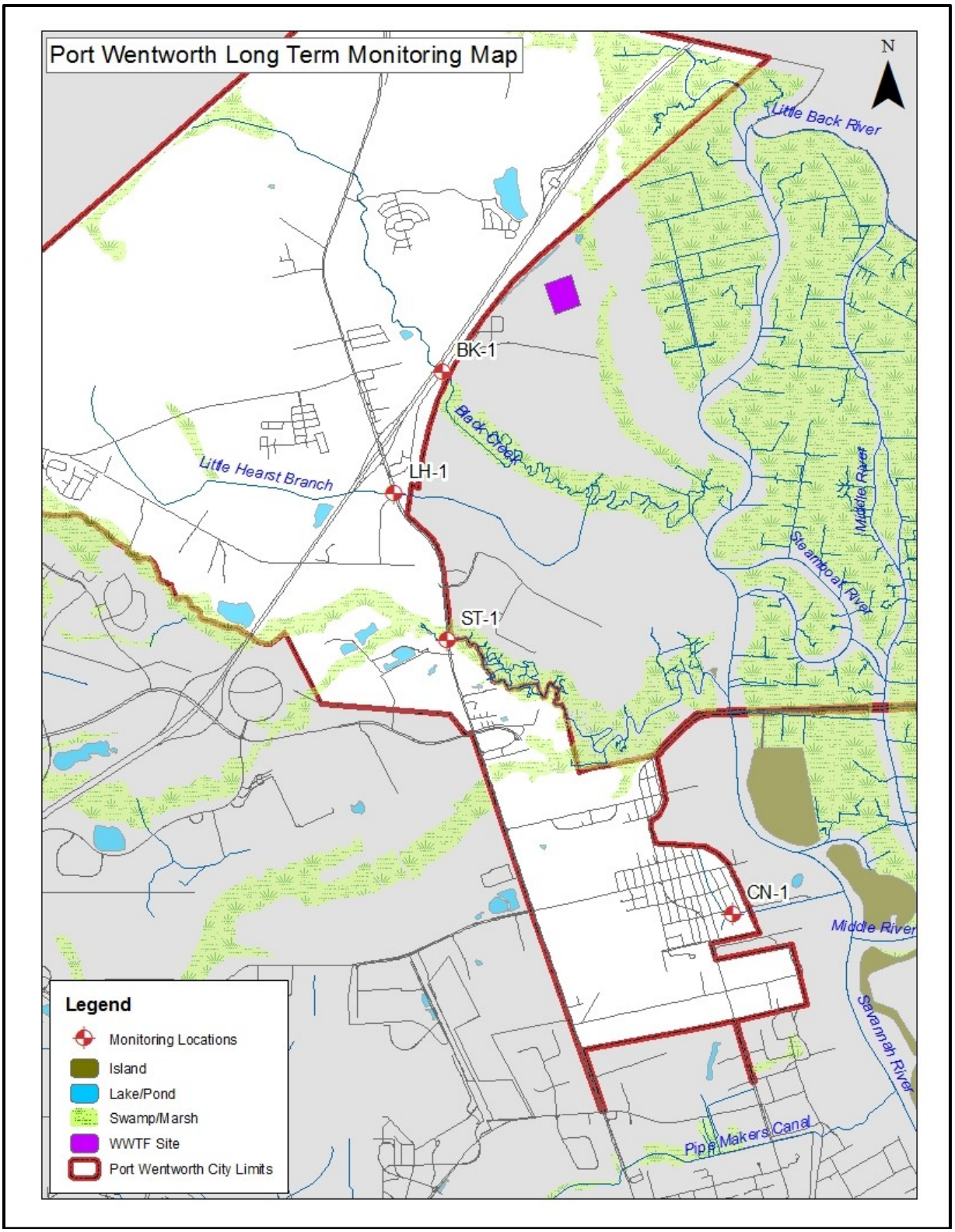

Figure 5-1: Port Wentworth Monitoring Site Locations

B. Water Quality Guidelines

Water quality results were evaluated based on the guidelines shown in Table 5-2.

Table 5-2 Water Quality Guidelines

Parameter	Guidelines (Screening Values) *
In-Situ	
pH	**6.0-8.5 Standard Units**
Dissolved Oxygen (DO)[a]	**Daily Average of 5.0 mg/L**
Water Temperature	**NTE 90°F (32°C)**
Specific Conductance	(150 µS/cm) [b]
Turbidity	(50 NTU) [j]
Bacteriological	
Fecal Coliform [c]	**May-Oct 200 cfu/100 mL** **Nov-April 1,000 cfu/100 mL**
E. coli	(126 *E. coli* cfu/100 mL) [k]
Enterococcus	(35 cfu/100ml) [k]
Nutrients and Other Parameters	
Biological Oxygen Demand (BOD_5)	(monthly average 5.0 mg/L)
Chemical Oxygen Demand	(50.0 mg/L) [l]
Nitrate-Nitrite Nitrogen	(10.0 mg/L – 1.0 mg/L) [m] (10.0 mg/L – 0.1 mg/L) [n]
Ammoniacal Nitrogen (Ammonia)	(0.41 mg/L) [e]
Total Kjeldahl Nitrogen (TKN)	(2.0 mg/ L) [n]
Total Phosphorous	(0.1 mg/L) [e]
Orthophosphate	(0.1 mg/L) [o]
Total Suspended Solids	(14.0 mg/L) [e]
Hardness	**None**
Alkalinity	(20.0 – 200 mg/L) [p]
Metals [f, g]	
Cadmium [h]	**40/8.8 µg/L**
Copper [i]	**4.8/3.1 µg/L**
Lead	**210/8.1 [i] µg/L**
Zinc	**90/81 µg/L**

[*] *Bold font indicates EPD guidelines*
[a] *Daily average of 5.0 mg/L and no less than 4.0 mg/L at all times for water supporting warm water species of fish.*
[b] *Screening value based on USEPA studies of inland fresh water streams supporting good mixed fisheries at a range of 150-500 µS/cm (https://archive.epa.gov/water/archive/web/html/vms59.html) EPA 841-B-97-003.*
[c] *Limits are geometric means for at least four samples collected over a 30-day period at intervals not less than 24 hours; For November – April period, no sample is to exceed 4,000 cfu/100mL.*
[e] *U.S. EPA recommended maximum for streams*
[f] *Metals expressed in terms of the dissolved fraction in the water column.*
[g] *Criterion is for adjusted acute/chronic levels based on a water hardness of 25 mg/L $CaCO_3$.*
[h] *Screening value based on USEPA's 2016 recommended aquatic life cadmium criteria.*
[i] *In-stream criterion may be higher than or lower than GAEPD laboratory detection limits depending upon the hardness of the water (391-3-6-.03).*
[j] *Screening value based on Appendix B allowable stormwater discharge for warm water fisheries under GAEPD General NPDES Permit #GAR100001.*

[k] *Screening value is geometric mean based on USEPA's 1986 Ambient Water Quality Criteria for Bacteria recommendation for fresh recreational waters.*
[l] *Screening value from Sabine River Authority of Texas (2001).*
[m] *Screening value based on maximum contaminate level (MCL) from USEPA National Primary Drinking Water Regulations. (https://www.nrc.gov/docs/ML1307/ML13078A040.pdf).*
[n] *Screening value from Fox and Absher (2003).*
[o] *Screening value based on Fox and Absher (2003) recommended level for total phosphorus not to exceed 0.10 mg/L.*
[p] *Screening value from BASIN website (2007) (http://ben.boulder.co.us/basin/data/COBWQ/bc/SC.html).*

C. Summary of Water Quality Monitoring

Water quality samples for one (1) wet weather event and three (3) dry sampling events for all four (4) monitoring sites were analyzed in a laboratory (GAEPD-approved) for the following parameters: chemical oxygen demand (COD), biochemical oxygen demand 5-day (BOD_5), total suspended solids (TSS), hardness, total phosphorus and ortho-phosphate, total kjeldahl nitrogen (TKN), ammonia, nitrate-nitrite, and alkalinity. Dissolved and total recoverable metals (Lead (PB), Copper (Cu), Zinc (Zn), and Cadmium (Cd)) were also analyzed during the wet weather event. In addition to the water chemistry sampling, two (2) 4-day bacteriological samples for all four (4) monitoring sites were analyzed in a laboratory (GAEPD-approved) for fecal coliform and Enterococcus. *In situ*, field measured, water quality parameters were reported for all four (4) monitoring sites and the August/September* bacteriological geomean which include: water temperature, pH, specific conductance, turbidity, and dissolved oxygen (DO). All the 2019 water quality monitoring data results (including bacteriological parameters) are summarized below and provided in the *2019 GA EPD Water Quality Data Spreadsheet* (**Appendix A**).

*GMC was informed by EPD to measure for the *in situ* data for the bacteriological sampling during the reporting period last year (June 2019), which is why we do not have *in situ* data for the May geometric mean. For the future long-term monitoring, GMC will conduct *in situ* measurements for all sampling events including the geometric means.

***In Situ* Measurements**

For the 2019 water quality dataset, *in situ* sampling (**Appendix A**) indicated all samples were within EPD guidelines for water temperature (i.e. all recorded values were below 32° C). Most values for DO and pH were near EPD guidelines (6.0 for pH and 4.0 mg/L for DO). Low DO and pH occur naturally in tannic, low flow waterways which are typical characteristics of the blackwater streams found in Port Wentworth. In 2019, only six (6) of the 32 samples had a pH level slightly below the minimum state standard of 6.0. Over half of the 32 samples for 2019 were below the state standard of 4.0 mg/L for DO during the summer sampling events at all sites, which is very common for these streams.

Nine (9) of the 32 samples for turbidity measurements in 2019 were above the 50 NTU screening value. The values for turbidity ranged from 4.0 NTU to 347 NTU. High turbidity values are a common occurrence for theses low flow coastal streams that comprise large amounts of organic material.

In situ specific conductance levels for water quality samples in 2019 averaged above 150 micro Siemens per centimeter (µS/cm). The exceedance of specific conductance at all sites results from salinity and are consistent with historic baseline observations due to saline content of coastal streams.

Nutrients and Other Non-Bacteriological Parameters

Average alkalinity values ranged from <5.0 mg/L to 113 mg/L. Waters with low alkalinity are more susceptible to changes in pH, however, the coastal streams naturally have a low pH due to the presence of tannic acids.

Additionally, hardness values remained low, less than 75.0 mg/L at the monitoring sites except for two (2) samples at site CN1 measuring 84.3 mg/L and 118 mg/L; and one (1) sample at Site ST1 measuring 133 mg/L. The hardness values ranged from 16.3 mg/L to 133 mg/L.

Over half of the 16 samples from the monitoring events slightly exceeded the 14 mg/L screening value for TSS at all sites and ranged from 3.5 mg/L to 112 mg/L. The highest TSS level is an outlier and was also measured at LH1 during the summer wet weather sampling event which can explain this amount of solids. These levels were relatively low for these slow-moving coastal streams with higher organic material.

All nitrate-nitrite concentrations (**Appendix A**) were within the screening levels. The highest concentration was during the summer event at Site ST-1, which measured 0.25 mg/L. The highest ammonia and TKN concentrations of 1.7 mg/L and 2.2 mg/L, respectively, were observed at Site CN1. Only two samples exceeded the screening level for ammonia (0.41 mg/L): 1.7 mg/L at Site Cn-1 and 0.97 mg/L at LH-1. Only two samples exceeded the screening level for TKN (2.0 mg/L): 2.2 mg/L at Site Cn-1 and 2.1 mg/L at Site LH-1.

At least one sample from each site exceeded the screening level for phosphorus (0.1 mg/L) except Site St-1. Most of these values were only slightly higher than the screening limit. The two highest values of 0.7 mg/L and 0.54 mg/L were recorded during the summer sampling wet weather event at Sites CN1 and LH1. The levels for OP ranged from 0.68 mg/L to < 0.055 mg/L.

During the 2019 monitoring period three (3) sampling events exceeded the BOD_5 screening value of 5.0 mg/L. The highest outlier of 12.7 mg/L occurring at Site LH1 during the winter sampling dry weather event. COD concentrations ranged from < 25.0 at CN1 – 90.8 at BK1. These levels were relatively low for the historical trends.

Metals

No dissolved metals were detected above the minimum detection limits for cadmium, copper, lead, and zinc.

Bacteriological Parameters

Half of the monitoring sites exhibited elevated bacteriological concentrations exceeding state standards for fecal coliform (200 cfu/100mL). The fecal coliform geometric means ranged from a low of 52 cfu/100mL at Site BK1 to a high of 571 cfu/100mL at Site LH1. Most of the higher levels of fecal were only slightly above the standard, demonstrating a significant improvement from the historic trend. All sites exceeded the USEPA standards for Enterococcus (35 cfu/100 mL). Enterococcus geometric means ranged from a low of 196 cfu/100mL at Site BK-1 to a high of 2,668 cfu/100mL at Site CN1.

Table 5-2: Port Wentworth Geometric Means

Site	Fecal Coliform Geomean *CFU/100ml*		Enterococcus Geomean *CFU/100ml*	
	May	Aug/Sept	May	Aug/Sept
CN1	303	160	2,668	1,795
ST1	256	274	522	1,103
LH1	108	571	1,308	764
BK1	52	159	196	378

D. Summary of Macroinvertebrate Assessments

The most recent biological assessment for benthic macroinvertebrates and physical habitats (including particle substrate count) were performed on February 12, 2019 and are provided in **Appendix B**. Habitat and benthic macroinvertebrate assessments were performed at four (4) sites, CN1, ST1, LH1, and BK1 in accordance with the LTMP provided in the City's approved WPP.

Physical habitat assessments indicated severely degraded conditions at CN-1 and LH-1 (scores in mid "marginal" condition rating range), while conditions at BK-1 and ST-1 (mid to upper "suboptimal" range) were only slightly to moderately degraded. Habitat assessment scores and ratings at the study sites should be viewed with some caution, however. Habitat Parameters (HPs) #1 through #4 were difficult to score (and only marginally applicable) due to the tidal, marsh-like conditions in the study area. Total habitat assessment scores were reduced by low scores for HPs #3 (Pool Variability), #6 (Channel Alteration), and #7 (Channel Sinuosity), particularly at CN-1 and LH-1.

Benthic macroinvertebrate multi-metric index scores at the sites varied little, scoring from the middle to the upper end of the "fair" condition rating range. There did not appear to be a strong correlation between benthic macroinvertebrate community conditions and habitat conditions at the study sites. The study sites

all received very similar multi-metric index scores in 2019, despite significantly higher habitat assessment scores at BK-1 and ST-1.

Biological Monitoring Summary

A summary of habitat and macroinvertebrate community assessments for the 2019 study is presented in Table 13. Habitat conditions at the study sites ranged from slightly (mid to upper "suboptimal" condition rating range) to severely degraded (mid "marginal" range). Benthic macroinvertebrate community conditions were only moderately impacted (middle to upper "fair" range). Habitat assessment scores are trending upward at CN-1 and LH-1 but downward at BK-1 and ST-1. Multi-metric index scores are trending upward at CN-1 and ST-1 but downward at BK-1 and LH-1.

A summary of habitat and macroinvertebrate assessments is presented in Table 12 in **Appendix B**.

6 SUMMARY OF ANY CHANGES IN THE WPP

The format of the WPP Annual Progress Report has been updated to reflect the new 2015 GAEPD guidance and the water quality data spreadsheet has been updated to reflect the new October 2016 format. There are no other pending changes and/or modifications to the approved WPP at this time.

APPENDIX A

2019 GA EPD Water Quality Data Spreadsheet

APPENDIX B

2019 Monitoring Report Long-Term Biological and Habitat Monitoring