Biological Assessment of

# Panama City Beach WWTP #1

Bay County

NPDES # FL0021512

Sampled January 29, 2018

February 2019

**Biology Program**

**DEP Laboratory**

**Division of Environmental Assessment and Restoration**

DEP Laboratory Quality Manual

NELAC Certification No. E31780

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## Summary of Results

Alkalinity and lead measured at the downstream site exceeded Class III Freshwater Quality Criteria (62-302.530, F.A.C.). It was deemed that there was no appropriate Control Site at the time of reconnaissance; therefore, it is difficult to determine the exact impact the effluent is having on the downstream site. Sucralose levels measured in the downstream site sample are indicative that the effluent is flowing through the wetland and reaching the downstream site. Overall, the effluent does not appear to be negatively affecting this segment of Laird Creek.

## Facility Overview

The Panama City Wastewater Treatment Facility is an advanced domestic wastewater facility. A Facility Summary, including a description of the facility, summary of permit limits, an Administrative Order (AO), and Discharge Monitoring Report (DMR) information is provided in Appendix A. The facility is currently operating under the Administrative Order AO087NW for pH, in which the limits can range from 5.0-8.5 until December 1, 2019. A portion of the effluent is continuously discharged into a 2,900 acre receiving wetland (Figure 1) which then flows into Laird Creek. A portion of the discharge goes to reuse areas in Panama City Beach.

Laird Creek falls within the Panhandle West Nutrient Watershed Region for Numeric Nutrient Criteria (NNC). The Department has some specific conductance data that indicates West Laird Creek may be tidally influenced. Tidal influence is known to affect the Stream Condition Index (SCI). At the time of this sampling event and report writing, the segment is still classified as predominantly fresh. More data is needed to determine the applicability of the stream NNC. For this region, the NNC thresholds, which are expressed as annual geometric mean concentrations not to be exceeded more than once in any three calendar year period, are 0.06 mg/L total phosphorus and 0.67 mg/L total nitrogen (62-302.531(2)(c), F.A.C.). This FYI event can only provide single sample results; therefore, compliance should be determined with additional sampling events per Rule 62-302.351, F.A.C. http://ca.dep.state.fl.us/mapdirect/?focus=nutrientcriteria.

## Methods

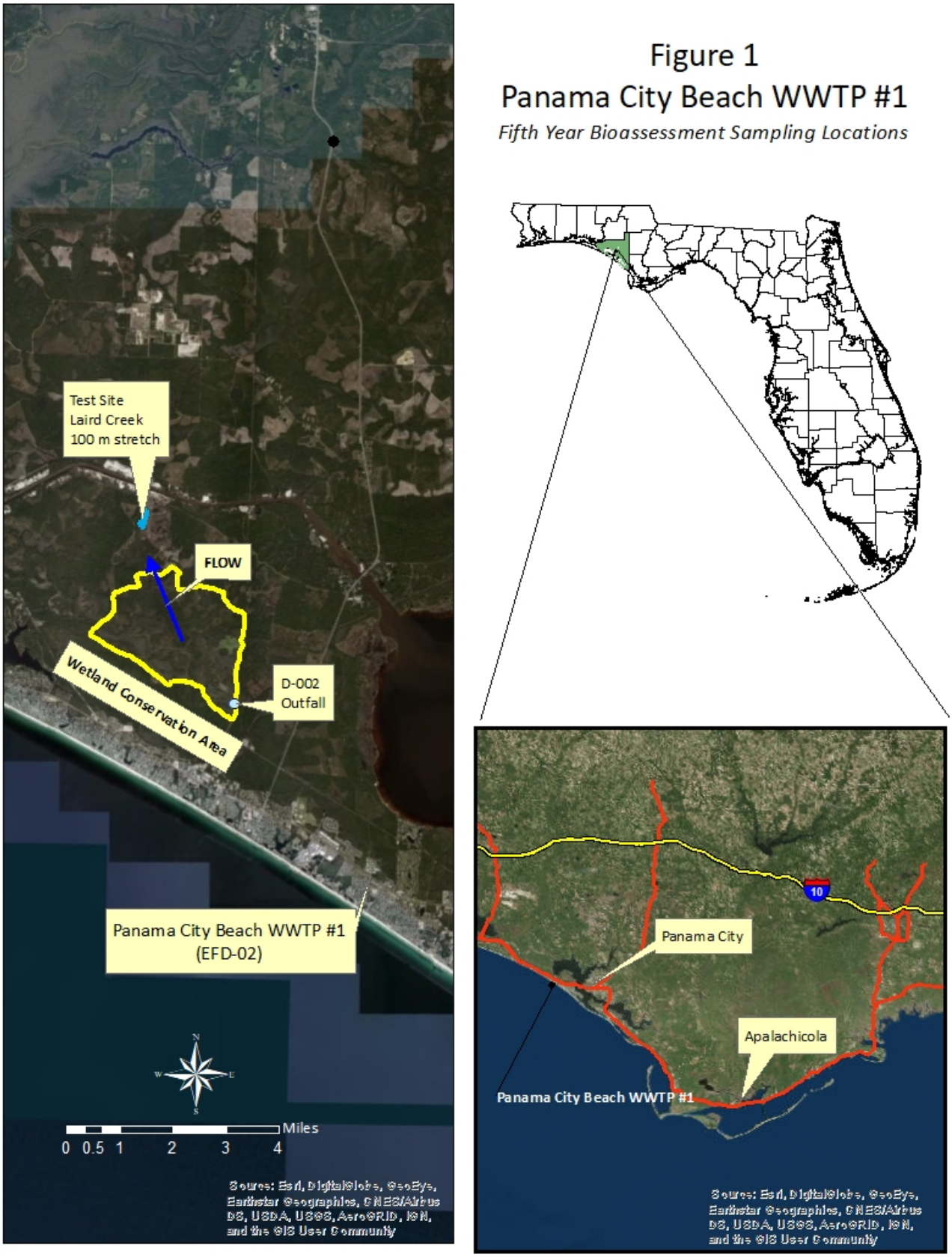
Effluent grab and composite samples were collected from monitoring site location EFF-01, prior to dechlorination. Effluent and downstream site grabs were taken on 1/29/18 and effluent composites were sampled on 1/29/18, 1/31/18, and 2/2/18. Chemical and biological samples were only taken from a downstream site located in Laird Creek beginning approximately 1000 m downstream of the point of discharge and ending 900 m downstream of the point of discharge (see Bioassessment Sampling Locations-Map).

All field and laboratory methods followed DEP Standard Operating Procedures (see https://floridadep.gov/dear/quality-assurance/content/dep-sops and https://floridadep.gov/dear/florida-dep-laboratory/content/dep-laboratory-quality-assurance-manual-and-sops for details) and met DEP quality assurance/quality control standards (see https://floridadep.gov/dear/quality-assurance). Explanations of specific methods and measurements can be found in Appendix B.

All references to 62-302.530, F.A.C. are to the surface water quality criteria table with an effective date of 02/17/2016 and a notice identification number of 17115667. New limits for Escherichia coli (E. coli), enterococci, and total ammonia nitrogen were approved on 07/24/2017.

The following were involved in this investigation: Nathan Mulkey, Mike King and Lucas Grantham (DEP Northwest Regional Operation Center, Pensacola), and DEP Laboratory in Tallahassee. The report was reviewed by District representatives and the Point Source Studies Review Committee (Mike Tanski, Andrew Tintle, and Adrienne Pennington).

**Bioassessment Sampling Locations – Map**



## Results

Physical and Chemical Parameters/Site Characterization (See Table 1 and Appendices B, D, and E)

- The specific conductance measured at the downstream site was 164 µmhos/cm, a freshwater condition at the time of sampling.
- The Habitat Assessment score at the downstream site was 92, which places it in the suboptimal category. This 100 m stretch of Laird Creek had two major productive habitats and low substrate availability. The downstream site also scored low on bank stability, riparian buffer width, and vegetation quality of the riparian zone.

Analytical Water Chemistry (See Table 2 and Appendix E)

- Effluent nutrients detected in the grab and composite samples complied with Class III Freshwater Quality Criteria(62-302.530, F.A.C.). and permit limits.
- Nitrate-nitrite, ortho-phosphate and total phosphorus detected in the effluent samples were an order of magnitude higher than the amount detected in the downstream site sample. Total kjeldahl nitrogen (TKN), and total ammonia values were higher in the effluent sample than in the downstream site sample. In this event, the discharged effluent met permit limits for TP and TN yet was contributing concentrations greater than those measured in the downstream sample.
- Alkalinity in the downstream site sample did not meet the Class III Freshwater Quality Criterion.
- Chlorophyll *a* (corrected) was undetected in the effluent sample and was detected at a low level in the downstream site sample.

Metals (See Table 3 and Appendix E)

- Effluent metals were detected at levels that complied with Class III Freshwater Quality Criteria (62-302.530, F.A.C.) and effluent permit limits.
- The downstream site lead exceeded Class III Freshwater Quality Criterion (62-302.530(39), F.A.C.).
- Copper and chromium were detected in the downstream site sample between the method detection limit (MDL) and practical quantitation limit (PQL).

Microbiology (See Table 2 and Appendix E)

- Enterococci and fecal coliform analyses were performed by The Water Spigot, Panama City, Florida.
- Fecal coliforms were not detected in the effluent but were detected in the downstream site sample.
- Enterococci were detected in the downstream site sample.

Toxicity Whole Effluent Test (See Table 2)

- The Chronic Definitive bioassay sample hold time of 36 hours was exceeded. The tests were invalidated and reported as “No Result.”
- For more information or to obtain copies of the toxicity bench sheets, please contact the Biology Laboratory at 850-245-8177.

Algal Growth Potential (See Table 4 and Appendix E)

- The AGP values in the effluent and downstream site were conducted using the freshwater species, *Pseudokirchneriella subcapitata*. The effluent sample was 40 times higher than the downstream site sample. The analytical chemistry suggests that the effluent site is nitrogen-limited, and the downstream site is phosphorus limited.

Flora (See Appendix D)

- Two temporally independent Linear Vegetation Survey (LVS) samplings showing a Coefficient of Conservatism score ≥ 2.5 and the frequency of occurrence of Florida Exotic Plant Pest Council (FLEPPC) exotic taxa ≤ 25% are needed to achieve NNC floral metrics. Sites with no observed macrophytes are considered to achieve the LVS component of the NNC. Two temporally independent Rapid Periphyton survey (RPS) samplings with ≤ 25% rank 4-6 (algae >6mm thick) coverage are needed to achieve NNC floral metrics. This FYI event can only provide single sample results; therefore, Numeric Nutrient Criteria (NNC) compliance should be determined with additional sampling events.
- For the LVS, the downstream site lacked aquatic macrophytes.

- The RPS was performed at the downstream site. The canopy cover was less than 25% for most of the downstream site. It was noted that the water was tannic, which can inhibit algal growth. Thick algal growth can be expected at lightly shaded areas such as the downstream site. However, RPS did not indicate nutrient enrichment at the downstream site.

Macroinvertebrates (See Table 6)

- Qualitative macroinvertebrates were only collected from a downstream site in Laird Creek. It was determined by the samplers that there was no suitable comparable stream that was not influenced by the discharge to use as a control site. The downstream site sample did not contain enough organisms to reach the number required in replicate 2 and therefore the Stream Condition Index (SCI) value could not be calculated (see Appendix B for an explanation of SCI Categories). Laird Creek had very good water velocity at the time of sampling, but also had some evidence of habitat smothering which could contribute to the low habitat availability and consequently low quality and quantity of macroinvertebrate communities. The downstream site macroinvertebrate community was mostly comprised of Oligochaetes and Dipterans, which are generally not indicative of a healthy stream (see Appendix B for an explanation of how these SCI metrics typically respond to human disturbance).
- For more information or to obtain a copy of the taxa lists, please contact the Biology Laboratory at 850-245-8177.

## Literature Cited


Fore, L.S., Frydenborg, R., Miller, D., Frick, T., Whiting, D., Espy, J., and Wolfe, L. 2007. Development and Testing of Biomonitoring Tools for Macroinvertebrates in Florida Streams (Stream Condition Index and Biorecon). Florida Department of Environmental Protection. 110 pp.

Karr, J.R. & E.W. Chu. 1998. Restoring life in running waters: Better biological monitoring. Island Press. Covelo, California. 200 p.

Miller, W. E., T. E. Maloney, and J. C. Greene. 1978. The *Selenastrum capricornutum* Printz algal assay bottle test. EPA600/978-018. U. S. EPA, Cincinnati, Ohio. 126 p.

Plafkin, J. L., M. T. Barbour, K. D. Porter, S. K. Gross and R. M. Hughes. 1989. Rapid bioassessment protocols for use in streams and rivers: Benthic macroinvertebrates and fish. U. S. EPA, Office of Water Regulations and Standards, Washington D.C., EPA 440-4-89-001.

**Table 1. Effluent limits, Class III Freshwater Criteria and field parameters**

| Panama City WWTP #1 | Units | Class III Criteria | Effluent Permit Limits | Effluent Comp 1/29/18 | Effluent Grab 1/29/18 | Effluent Comp 1/31/18 | Down-stream Site |
|---|---|---|---|---|---|---|---|
| Habitat Assessment | - | - | - | - | - | - | 92 |
| Sample Depth | m | - | - | 3.0 | 3.0 | - | 0.3 |
| Temperature | C | - | - | 19.0 | 19.0 | 17.9 | 14.2 |
| pH | SU | 6.0 - 8.5 | 5.0-8.5 s[1] | 7.2 | 7.2 | 7.2 | 4.8 |
| Specific Conductance | µmhos/cm | ≤ 1,275 | - | - | - | - | 164 |
| Salinity | ppt | - | - | 0 c | 0 c | 0 c | 0 c |
| Dissolved Oxygen | % saturation | > 67.5 | - | 77.6 c | 77.6 c | 92.8 c | 70.6 c |
| Dissolved Oxygen | mg/L | - | ≥ 5.0 s | 7.2 | 7.2 | 8.8 | 7.2 |
| Total Residual Chlorine for disinfection | mg/L | - | ≥ 0.5 | 1.11 | - | 0.89 | - |
| Total Residual Chlorine for dechlorination | mg/L | - | ≤ 0.01 | - | - | 0.00[2] | - |

A dash (-) indicates sample/measurement was not collected or criterion/limit does not exist

c - Value is calculated

s - Single sample

1 – Facility is under A.O. No. 087NW for pH

2 – Value provided by facility

**Table 2. Effluent limits, Class III Freshwater Criteria and analytical water chemistry data**

| Panama City WWTP #1 | Units | Class III Criteria | Effluent Permit Limits | Effluent Comp 1/29/18 | Effluent Grab 1/29/18 | Effluent Comp 1/31/18 | Down-stream Site |
|---|---|---|---|---|---|---|---|
| Ortho-phosphate | mg P/L | - | - | - | 0.27 | - | 0.020 |
| Total Phosphorus | mg P/L | < 0.06[3] | ≤ 2.0 sp | 0.25 | 0.38 | - | 0.048 |
| Total Ammonia | mg N/L | - | - | 0.032 | 0.053 | - | 0.014 |
| Un-ionized Ammonia (calculated salinity) | mg N/L | ≤ 0.02 s | - | ≤ 0.02 | ≤ 0.02 | - | ≤ 0.02 |
| Nitrate and Nitrite | mg N/L | - | - | 1.3 | 0.59 | - | 0.12 |
| Total Kjeldahl Nitrogen | mg N/L | - | - | 1.3 | 1.2 | - | 0.99 |
| Organic Nitrogen | mg N/L | - | - | 1.27 c | 1.1 c | - | 0.98 c |
| Total Nitrogen | mg N/L | < 0.67[3] | ≤ 6.0 sp | 2.6 c | 1.8 c | - | 1.1 c[6] |
| Total Organic Carbon | mg C/L | - | - | 7.8 | 7.8 A | - | 29 |
| Chlorophyll *a* - Corrected | µg/L | - | - | - | - | 0.55 U | 2.4 A |
| CBOD, 5 day, N - inhibited | mg/L | - | ≤ 10.0 sp | 0.27 IQ | - | - | 3.2 A |
| Total Suspended Solids | mg/L | - | ≤ 10.0 | 2 U | - | - | 11 |
| Turbidity | NTU | < 29 t | - | - | - | 1.4 | 7.5 |
| Color (true) | PCU | - | - | - | - | 14 | 330 |
| Alkalinity | mg CaCO3/L | ≥ 20 | - | - | 84 | - | 1.4 I e |
| Chloride | mg Cl/L | - | - | - | - | 99 | 31 |
| Sulfide[4] | mg/L | ≤ 5.2 | - | 2.0 Q | - | - | 3.2 Q |
| Fluoride | mg F/L | ≤ 10.0 | - | - | - | 0.69 | 0.067 I |
| Sulfate | mg SO4/L | - | - | - | - | 33 | 13 |
| **Microbiology** | | | | | | | |
| Fecal Coliforms[5] | cfu/100 mL | - | ≤ 800 s | 2 U | - | - | 833 B e |
| Enterococci[5] | cfu/100 mL | - | - | - | - | - | 560 |
| **Toxicity (Chronic 7-day IC25, percent mortality in 100% effluent)** | | | | | | | |
| Bioassay – Water flea dechlorinated (*C. dubia*) - definitive | % | - | > 100 | No Result Q | - | - | - |
| Bioassay – Fish dechlorinated (*P. promelas*) - definitive | % | - | > 100 | No Result Q | - | - | - |
| Bioassay – Water flea (*C. dubia*) - screen | % | - | - | No Result Q | - | - | - |
| Bioassay – Fish (*P. promelas*) - screen | % | - | - | No Result Q | - | - | - |

A dash (-) indicates sample/measurement was not collected or criterion/limit does not exist.
c - Value is calculated
e - Value exceeds Class III Freshwater Quality Criteria or Permit limit.
p - 24 hour flow proportioned composite
s - Single sample
t - Shall not exceed 29 NTUs above background

A - Value reported is the mean of two or more determinations
B - Results based on colony counts outside the acceptance range
I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit
Q - Sample held beyond normal holding time
U - Material analyzed for but not detected; value reported is the method detection limit
3 - Panhandle West Nutrient Watershed Region for Numeric Nutrient Criteria (NNC), 62-302.531(2)(c), F.A.C..
4 - Analysis performed by Test America, Savannah, Georgia
5 - Analysis performed by The Water Spigot, Panama City, Florida. Class III Freshwater criterium is now for *E. coli*; however, fecal coliforms and enterococci were tested for.

**Table 3. Effluent limits, Class III Freshwater Criteria and analytical metals data**

| Panama City WWTP #1 | Units | Effluent Comp Class III Criteria | Effluent Permit Limits | Effluent Comp | Downstream Site Class III Criteria | Downstream Site |
|---|---|---|---|---|---|---|
| Hardness | mg CaCO3/L | - | Report | 79.9 c | - | 12.8 c |
| Aluminum | µg/L | - | - | 52 | - | 686 |
| Arsenic | µg/L | ≤ 50 | - | 0.32 | ≤ 50 | 0.30 |
| Cadmium | µg/L | ≤ 0.229 b | - | 0.020 U | ≤ 0.09 b | 0.020 U |
| Calcium | mg/L | - | - | 25.3 | - | 3.11 |
| Chromium, Total [6] | µg/L | ≤ 71.7 b | - | 0.41 I | ≤ 0 27.7 | 0.65 I |
| Copper | µg/L | ≤ 7.7 b | - | 6.36 | ≤ 2.85 b | 0.22 I |
| Iron | µg/L | ≤ 1,000 | - | 53 I | ≤ 1,000 | 670 |
| Lead | µg/L | ≤ 2.28 b | - | 0.11 I | ≤ 0.544 b | 0.58e |
| Magnesium | mg/L | - | - | 4.07 | - | 1.22 |
| Nickel | µg/L | ≤ 43.2 b | - | 2.85 | ≤ 16.1 b | 1.09 |
| Potassium | mg/L | - | - | 11.0 | - | 3.5 |
| Selenium | µg/L | ≤ 5.0 | - | 0.20 U | ≤ 5.0 | 0.20 U |
| Silver | µg/L | ≤ 0.07 | - | 0.010 U | ≤ 0.07 | 0.010 U |
| Sodium | mg/L | - | - | 57.6 | - | 26.5 |
| Zinc | µg/L | ≤ 99.1 b | - | 85 | ≤ 37.0 b | 5.0 U |

A dash (-) indicates sample/measurement was not collected or criterion/limit does not exist.
b - Value is calculated based on hardness, (62-302.530(3))
c - Value is calculated
e - Value exceeds the Class III Freshwater Quality Criteria.
p - 24 hour flow proportioned composite
I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit
U - Material analyzed for but not detected; value reported is the method detection limit
6 - Class III Freshwater Quality Criterion (62-302.530(19)(a), F.A.C.) is for chromium-III

**Table 4. Measured and predicted algal growth potential (AGP; mg dry weight/L) for total soluble inorganic nitrogen (TSIN), ortho-phosphate (OP), total nitrogen (TN) and total phosphorus (TP) limitation and ratios of nitrogen to phosphorus**

| Panama City Beach WWTP #1 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Location** | **Test Species** | **AGP (measured)** | **Predicted AGP (TSIN) ± 20%** | **Predicted AGP (OP) ± 20%** | **Predicted AGP (TN) ± 20%** | **Predicted AGP (TP) ± 20%** | **Inorganic N:P ratio** | **Total N:P ratio** |
| Effluent Grab | *Pseudokirchneriella subcapitata* | 80.8 | 24.4 ± 4.9 | 116.1 ± 23.2 | 68 ± 13.6 | 163.4 ± 32.7 | 2.4 | 4.7 |
| Downstream Site | *Pseudokirchneriella subcapitata* | 2.04 | 5.1 ± 1 | 8.6 ± 1.7 | 42.2 ± 8.4 | 20.6 ± 4.1 | 6.7 | 23.1 |

**Table 5. Effluent limits, Class III Freshwater Criteria and analytical organic and pesticide data**

| Panama City WWTP #1 | Units | Class III Criteria | Effluent Grab | Downstream Site |
|---|---|---|---|---|
| Bentazon | µg/L | - | 0.0084 IJ | - |
| Sucralose | µg/L | - | 68 | 24 |

A dash (-) indicates sample/measurement was not collected or criterion/limit does not exist.

I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit

J - Estimated value

**Table 6. Macroinvertebrate Dipnet Samples - Qualitative**

| **Panama City Beach WWTP #1** | |
|---|---|
| **Stream Condition Index 2012** | **No Result X** |
| Replicate | Rep 1 |
| **Stream Condition Index Metrics** | |
| Number of Total Taxa | 29 |
| Number of Ephemeroptera Taxa | 0 |
| Number of Trichoptera Taxa | 3 |
| Number of Clinger Taxa | 4 |
| Number of Long-lived Taxa | 1 |
| Number of Sensitive Taxa | 4 |
| Percent of Dominant Taxon | 34.4 |
| Percent Suspension Feeders and Filterers | 2.2 |
| Percent of Tanytarsini Individuals | 0.0 |
| Percent of Very Tolerant Individuals | 0.0 |
| Total Number of Individuals | 160 |
| **Community Composition: Percent of total** | |
| Dominant Taxon Name | Enchytraeidae (Oligochaeta) |
| Coleoptera | 13.8 |
| Decapoda | 2.5 |
| Diptera | 45.0 |
| Ephemeroptera | 0.0 |
| Gastropoda | 0.0 |
| Isopoda | 0.6 |
| Odonata | 0.6 |
| Oligochaeta | 34.4 |
| Plecoptera | 0.0 |
| Trichoptera | 1.9 |
| Other | 1.2 |
| **Functional Feeding Groups: Percent of total** | |
| Browser-Grazers | 0.3 |
| Burrowing Deposit Feeders | 34.4 |
| Piercers | 5.0 |
| Predators | 14.4 |
| Scavengers | 1.6 |
| Scrapers | 0.9 |
| Shredders | 10.9 |
| Surface Deposit Feeders | 29.7 |
| Suspension Feeders | 2.2 |
| Unknown | 0.6 |

X – Too few individuals to calculate SCI value.

**Appendix A**
**State of Florida**

**Department of Environmental Protection**

**Facility Introduction & Summary**

| **PART I: Information gathered prior to sampling event** | |
|---|---|
| **Prepared By:** Lucas Grantham | **Contact Number:** (850)767-0041 |
| **Facility Name (as it appears on permit):** Panama City Beach WWTP#1 | **Former Names:** N/A |
| **NPDES Permit Number:** FL0021512 | **Permit Expiration Date:** December 4, 2018 |
| **Physical Address:** 206 North Gulf Boulevard Panama City Beach, FL 32413 | |
| **District:** NWD | **County:** Bay |
| **Function of Facility:** Municipal wastewater treatment facility. | |
| **Facility Type:** Domestic Wastewater | **Permitted Capacity (MGD):** 14 MGD MADF WWTF with effluent discharge flow to a 2,900 acre receiving wetland and 10 MGD AADF discharge of reclaimed water flow to public access general reuse areas. |
| **Mean Flow for previous 12 months for all EXTERNAL outfalls listed in permit (list date range including months):** 6.6 MGD (October 2016-September 2017) | |
| **If applicable, Mean Flow for previous 12 months for REUSE outfall(s) (list date range including months):** 2.6 MGD (October 2016-September 2017) | |
| **Description of type of Discharge:**<br>☒ **Continuous** ☐ **Intermittent** ☐ **Seasonal** ☐ **Rainfall Dependent**<br>☐ **Other, please specify:** | |

**Description of Sampling Location(s) - actual permit designation of permitted sampling point(s):**
**WETLAND DISCHARGE SAMPLE LOCATIONS**

FLW-03: Flow to Receiving Wetlands (D-002). The flow meter is a 24" Magmeter located on the discharge main from the wetlands pumping station.
EFD-02: Sampling Point for Dechlorination at Wetlands.
EFF-01: Composite and Grab Sampling Point
EFA-01: Sampling Point after Chlorine Contact Chamber.

**RECLAIMED WATER SAMPLE LOCATIONS**

FLW-02: Flow Monitoring to R-001 General Service Area. Flow meter is a 24" Magmeter located between the chlorine contact chamber and the reclaimed water storage tanks.
FLW-04: Flow for supplemental groundwater flow.
EFB-01: TSS and Turbidity Monitoring Point.
EFF-01: Sampling Point after Chlorine Contact Chamber.
EFA-01: Chlorine Contact Chamber.
WIM-1A: Located in Hog Pen Basin west of Dragonfly.
WIM-1B: Located in Baxley Homestead Basin west of Palmetto.
WIM-2: Located in Long Mudhole Basin near Longleaf.
WEP-3: Located in Bear Track Basin- Point of discharge from the receiving wetland.

**Description of Permitted Outfall(s):**

Surface Water Discharge D-002: An existing 14 MGD AADF discharge to a 2,900-acre receiving wetland (WBID# 1048). The Wetland Conservation Area is located just to the west of State Highway 79, north of U.S. Highway 98, and south of the intracoastal waterway. The point of discharge is located approximately at latitude 30°17'41" N, longitude 85°55'39" W.

Land Application R-001: An existing 10 MGD AADF permitted capacity public access general reuse area. Ground water is allowed to supplement (augment) the reclaimed water supply, if permit condition IV.19 through 22 are met.

**Description of Treatment Process (if multiple discharge points, include a detailed map or diagram of facility):**
Panama City Beach wastewater treatment facility (WWTF) is an existing advanced wastewater treatment (AWT) plant with treatment capacities of 10 MGD annual average daily flow (AADF) and 14 MGD monthly average daily flow (MADF). The WWTF operates in the extended aeration mode. The WWTF includes pretreatment [three (3) influent rotating drum screens (a capacity of 12.0 MGD, each) and two (2) vortex degritting units (capacity of 2.0 CY/HR, each)], four (4) modified orbal sim-pre process biological nutrient removal (BNR) basins [(capacity for 3 units @ 3.0 MGD,each and 1 unit @ 5.0 MGD) -anaerobic/anoxic volume of 3.91 MG, aeration volume of 2.9 MG,

2nd anoxic volume of 1.524 MG and reaeration volume of 0.381 MG], four (4) secondary clarifiers [unit surface area of 6,400 ft2 (0.766 MG) for 3 smaller units, each and 9,600 ft2 (1.005 MG) for the 1 larger unit], seven (7) filters [3 ABW filter surface units of 2.0 MGD (896 ft2), each and 4 disk filter units of (2.5 MGD (1,600 ft2), each], one (1) dual channel chlorination disinfection basin [total 561,000 gallons], dechlorination utilizing sodium bisulfite, five (5) aerobic digesters (digesters 1 thru 5 having volumes of 0.42 MG, 0.42 MG, 0.92 MG, 0.92 MG and 0.93 MG, respectively), and solids handling with two (2) belt filter presses, capacity of 2,400 lbs/hr, each. The facility is equipped with two (2) 5.0 MG reuse storage tanks and a 13.16 MG lined reject water storage pond.

This permitting action is the issuance of a wastewater permit renewal which will allow continued operation of the 10 MGD AADF and 14 MGD MADF WWTF with effluent discharge flow to a 2,900 acre receiving wetland (WBID 1048) and 10 MGD AADF discharge of reclaimed water flow to public access general reuse areas. In addition, a designated reuse area equal to the City of Panama City Beach's wastewater franchise (general service) area is continued.

## PART I: Continued

**List <u>current</u> Effluent Limits of Outfall(s) to be Sampled: This should include any AO or CO limits the facility may be under**
**(Leave cell blank if not applicable)**

**A. Surface Water Discharges – Outfall D-002 to the receiving wetland**

| | | | Effluent Limitations | | Monitoring Requirements | | | |
|---|---|---|---|---|---|---|---|---|
| Parameter | Units | Max/Min | Limit | Statistical Basis | Frequency of Analysis | Sample Type | Monitoring Site Number | Notes |
| Flow to Wetlands (D-002) | MGD | Max<br>Max | 14.0<br>Report | Annual Average<br>Monthly Average | Continuous | Recording Flow Meter with Totalizer | FLW-03 | See I.A.4 |
| BOD, Carbonaceous 5 day, 20C | mg/L | Max<br>Max<br>Max<br>Max | 5.0<br>6.25<br>7.5<br>10.0 | Annual Average<br>Monthly Average<br>Weekly Average<br>Single Sample | 5 Days/Week | 24-hr FPC | EFF-01 | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Solids, Total Suspended | mg/L | Max<br>Max<br>Max<br>Max | 5.0<br>6.25<br>7.5<br>10.0 | Annual Average<br>Monthly Average<br>Weekly Average<br>Single Sample | 5 Days/Week | 24-hr FPC | EFF-01 | |
| Nitrogen, Total | mg/L | Max<br>Max<br>Max<br>Max | 3.0<br>3.75<br>4.5<br>6.0 | Annual Average<br>Monthly Average<br>Weekly Average<br>Single Sample | 5 Days/Week | 24-hr FPC | EFF-01 | |
| Nitrogen, Ammonia, Total (as N) | mg/L | Max | 2.0 | Monthly Average | 5 Days/Week | Grab | EFF-01 | |
| Phosphorus, Total (as P) | mg/L | Max<br>Max<br>Max<br>Max | 1.0<br>1.25<br>1.5<br>2.0 | Annual Average<br>Monthly Average<br>Weekly Average<br>Single Sample | 5 Days/Week | 24-hr FPC | EFF-01 | |
| pH | s.u. | Min<br>Max | 4.9<br>5.9 | Single Sample<br>Single Sample | Continuous | Meter | EFF-01 | See I.A.3 |
| Coliform, Fecal | #/100mL | Max<br>Max<br>Max | 200<br>200<br>800 | Annual Average<br>Monthly Geometric Mean<br>Single Sample | 4 Days/Week | Grab | EFF-01 | See I.A.5 |
| Chlorine, Total Residual (For Disinfection) | mg/L | Min | 0.5 | Single Sample | Continuous | Meter | EFA-01 | See I.A.3 and I.A.6 |
| Chlorine, Total Residual (For Dechlorination) | mg/L | Max | 0.01 | Single Sample | Daily; 24 hours | Grab | EFD-02 | |

**A. Surface Water Discharges – Outfall D-002 to the receiving wetland (Cont'd)**

| | | | Effluent Limitations | | Monitoring Requirements | | | |
|---|---|---|---|---|---|---|---|---|
| Parameter | Units | Max/Min | Limit | Statistical Basis | Frequency of Analysis | Sample Type | Monitoring Site Number | Notes |
| Oxygen, Dissolved (DO) | mg/L | Min | 5.0 | Single Sample | Daily; 24 hours | Grab | EFF-01 | |
| Lead, Total Recoverable | ug/L | Max | | Single Sample | Quarterly | 24-hr FPC | EFF-01 | See I.A.7 |
| Hardness, Total (as CaCO3) | mg/L | Max | Report | Single Sample | Quarterly | 24-hr FPC | EFF-01 | |
| Chronic Whole Effluent Toxicity, 7-Day IC25 (Ceriodaphnia dubia) | percent | Min | 100 | Single Sample | Annual | 24-hr FPC | EFF-01 | See I.A.8 |
| Chronic Whole Effluent Toxicity, 7-Day IC25 (Pimephales promelas) | percent | Min | 100 | Single Sample | Annual | 24-hr FPC | EFF-01 | See I.A.8 |

**Interim Limits D-002**

| D-002 | Discharge Limitations | | Monitoring Requirements | | |
|---|---|---|---|---|---|
| **Parameters (units)** | **Monthly Avg.** | **Daily Max.** | **Frequency** | **Sample Type** | **SamplePoint** |
| pH (standard units) | NA | range 5.0-8.5 | Continuous | Meter | EFF-01 |

**B. Reuse and Land Application Systems R-001**

| | | | Reclaimed Water Limitations | | Monitoring Requirements | | | |
|---|---|---|---|---|---|---|---|---|
| Parameter | Units | Max/Min | Limit | Statistical Basis | Frequency of Analysis | Sample Type | Monitoring Site Number | Notes |
| Flow to R-001 | MGD | Max<br>Max | 10.0<br>Report | Annual Average<br>Monthly Average | Continuous | Recording Flow Meter with Totalizer | FLW-02 | See I.B.4 |
| Flow (Ground Water) | MGD | Max<br>Max | Report<br>Report | Annual Average<br>Monthly Average | Continuous | Recording Flow Meter with Totalizer | FLW-04 | See IV.19-22 |
| BOD, Carbonaceous 5 day, 20C | mg/L | Max<br>Max<br>Max<br>Max | 20.0<br>30.0<br>45.0<br>60.0 | Annual Average<br>Monthly Average<br>Weekly Average<br>Single Sample | 5 days/week | 24-hr FPC | EFF-01 | |
| Solids, Total Suspended | mg/L | Max | 5.0 | Single Sample | 4 days/week | Grab | EFB-01 | |
| pH | s.u. | Min<br>Max | 6.0<br>8.5 | Single Sample<br>Single Sample | Continuous | Meter | EFF-01 | See I.B.3 |
| Coliform, Fecal | #/100mL | Max | 25 | Single Sample | 4 days/week | Grab | EFF-01 | See IV.19-22 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Coliform, Fecal, % less than detection | percent | Min | 75 | Monthly Total | 4 days/week | Calculated | EFF-01 | See I.B.5 |
| Chlorine, Total Residual (For Disinfection) | mg/L | Min | 1.0 | Single Sample | Continuous | Meter | EFA-01 | See I.B.6 and I.B.9 |
| Turbidity | NTU | Max | Report | Single Sample | Continuous | Meter | EFB-01 | See I.B.7 and I.B.9 |
| Giardia | cysts/100L | Max | Report | Single Sample | Bi-annually; every 2 years | Grab | EFF-01 | See I.B.10 |
| Cryptosporidium | oocysts/100L | Max | Report | Single Sample | Bi-annually; every 2 years | Grab | EFF-01 | See I.B.10 |

## C. Receiving Wetlands Monitoring Stations

| | | | Effluent Limitations | | | | Monitoring Requirements | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Parameter** | **Units** | **Max/Min** | **Annual Average** | **Monthly Average** | **Weekly Average** | **Single Sample** | **Monitoring Frequency** | **Sample Type** | **Monitoring Location Site Number** | **Notes** |
| Water Level at samp. Collection time | NGVD | Maximum | - | - | - | Report | Continuous | Meter | WIM-1A, WIM-1B, WIM-2, WEP-3 | |
| BOD, Carbonaceous 5 day, 20C | MG/L | Maximum | - | - | - | Report | Quarterly | Grab | WIM-1A, WIM-1B, WIM-2, WEP-3 | |
| Solids, Total Suspended | MG/L | Maximum | - | - | - | Report | Quarterly | Grab | WIM-1A, WIM-1B, WIM-2, WEP-3 | |
| pH | SU | Range | - | - | - | Report | Quarterly | Field Probe | WIM-1A, WIM-1B, WIM-2, WEP-3 | |
| Temperature, Water | DEG C | Maximum | - | - | - | Report | Quarterly | Field Thermometer | WIM-1A, WIM-1B, WIM-2, WEP-03 | 48 hr dawn-dusk, max 4 hr intervals * |
| Coliform, Fecal | #/100 ML | Maximum | - | - | - | Report | Quarterly | Grab | WIM-1A, WIM-1B, WIM-2, WEP-3 | |
| Oxygen, Dissolved (DO) | MG/L | Minimum | - | - | - | Report | Quarterly | Field Probe | WIM-1A, WIM-1B, WIM-2, WEP-3 | 48 hr dawn-dusk, max 4 hr intervals * |
| Nitrogen, Total Kjeldahl (as N) | MG/L | Maximum | - | - | - | Report | Quarterly | Grab | WIM-1A, WIM-1B, WIM-2, WEP-3 | |
| Nitrogen, Ammonia, Total (as N) | MG/L | Maximum | - | - | - | Report | Quarterly | Grab | WIM-1A, WIM-1B, WIM-2, WEP-3 | |
| Specific Conductance, Field | UMHO S/CM | Maximum | - | - | - | Report | Quarterly | Field Probe | WIM-1A, WIM-1B, WIM-2, WEP-3 | |
| NO2+NO3, Total 1 DET. (as N) | MG/L | Maximum | - | - | - | Report | Quarterly | Grab | WIM-1A, WIM-1B, WIM-2, WEP-3 | |
| Total Nitrogen (as N) | MG/L | Maximum | 3.0 | - | - | Report | Quarterly | Grab | WEP-3 | |
| Total Nitrogen (as N) | MG/L | Maximum | - | - | - | Report | Quarterly | Grab | WIM-1A, WIM-1B, WIM-2 | |
| Un-ionized Ammonia (as $NH_3$) | MG/L | Maximum | 0.02 | - | - | Report | Quarterly | Calculated | WEP-3 | |
| Phosphorus, Total (as P) | MG/L | Maximum | 0.8 | - | - | Report | Quarterly | Grab | WEP-3 | |
| Phosphorus, Total (as P) | MG/L | Maximum | - | - | - | Report | Quarterly | Grab | WIM-1A, WIM-1B, WIM-2 | |

**C. Receiving Wetlands Monitoring Stations (Cont'd)**

| | | | Effluent Limitations | | | | Monitoring Requirements | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Parameter** | **Units** | **Max/Min** | **Annual Average** | **Monthly Average** | **Weekly Average** | **Single Sample** | **Monitoring Frequency** | **Sample Type** | **Monitoring Location Site Number** | **Notes** |
| Sulfate, Total as SO4 | MG/L | Maximum | - | - | - | Report | Quarterly | Grab | WIM-1A, WIM-1B, WIM-2, WEP-3 | |
| Chlorophyll-A,Phytoplankton,Fluorometric Method | UG/L | Maximum | - | - | - | Report | Quarterly | Grab | WIM-1A, WIM-1B, WIM-2, WEP-3 | |
| Herbaceous Vegetation Sampling | Yes/No | Maximum | - | - | - | Report | Quarterly | Line Intercept Method | WIM-1A, WIM-1B, WIM-2, WEP-3 | |
| Sulfide (Sediment Sampling) | MG/KG | Maximum | - | - | - | Report | Annually | Grab | WIM-1A, WIM-1B, WIM-2, WEP-3 | |
| Woody Vegetation Sampling | Yes/No | Maximum | - | - | - | Report | Annually | Field | WIM-1A, WIM-1B, WIM-2, WEP-3 | |
| Fish Sampling | Yes/No | Maximum | - | - | - | Report | Annually | Field | WIM-1A, WIM-1B, WIM-2, WEP-3 | |
| Threatened And Endangered Plant and Animal Species List | Yes/No | Maximum | - | - | - | Report | Annually | Field | WIM-1A, WIM-1B, WIM-2, WEP-3 | |

## PART I: Continued

| **Receiving Waters:** | **Classification (indicate whether fresh or marine):** |
|---|---|
| 2,900 acre receiving wetlands (Wetland Conservation Area) | Freshwater wetlands system |

**Toxicity Test Requirements (routine and/or additional test language, test species, salinity adjustment, etc.):**
Annual Monitoring
Chronic Whole Effluent Toxicity, 7-Day IC25 (Ceriodaphnia dubia)
Chronic Whole Effluent Toxicity, 7-Day IC25 (Pimephales promelas)

**Administrative or Consent Orders (date executed, specific requirements, interim limit dates-if applicable, etc.):**

AO087NW issued along with FDEP Permit Number FL0021512 on December 5, 2013.

**Specific requirements:**

1. City of Panama City Beach's discharge will not meet the following specific conditions of DEP Permit No: FL0021512-016-DW1P/NR and their related statutes and rules;
    a. Part I.A.1 of the Permit requires reclaimed water discharged to Outfall D-002 to have a pH range between 4.9 and 5.2 standard units (s.u.). This is in accordance with Rule 62-302.530(51)(c), F.A.C., which states that if natural background is less than 6 units, in predominantly fresh waters, the pH shall not vary below natural background or vary more than one unit above natural background of predominantly fresh waters. [62-302.530(51)(c), F.A.C.]
2. Interim Discharge
    a. The Permittee shall not be required to comply with effluent pH requirements of Part I.A.1 of Permit FL0021512-016-DW1P/NR except as required by this Administrative Order. In lieu of Part I.A.1, the Permittee shall comply with the following conditions.
    b. Surface Water Discharges D-002 – Interim Limits
        1) During the period beginning on the issuance date and lasting through the compliance date of this Order, paragraph III.13, the permittee is authorized to discharge from Outfall # D002 to the receiving wetlands. Such discharge shall be limited and monitored by the Permittee per Permit I.A.1 with the following interim limits as specified below:

| **Interim Limits D-002** | | | | | |
|---|---|---|---|---|---|
| **D-002** | **Discharge Limitations** | | **Monitoring Requirements** | | |
| **Parameters (units)** | **Monthly Avg.** | **Daily Max.** | **Frequency** | **Sample Type** | **SamplePoint** |
| pH (standard units) | NA | range 5.0-8.5 | Continuous | Meter | EFF-01 |

**Interim limit dates:** December 1, 2019

**Facility Mixing Zone Details (if applicable):**
Not Applicable

**List Permit Violations (DMR data) and plant upsets that occurred at the plant within the last year:**

| Date | Parameter and Units | Limit | Result |
|---|---|---|---|
| 12/31/2016 | Coliform, Fecal | 4.0 #/100mL | 43 #/100mL |
| 12/31/2016 | Coliform, Fecal | 4.0 #/100mL | 11 #/100mL |
| 12/31/2016 | Nitrogen, Total | 6.0 mg/L | 6.2 mg/L |
| 1/31/2017 | Coliform, Fecal, % less than detection | 75.0% | 33% |
| 4/30/2017 | Coliform, Fecal, % less than detection | 75.0% | 69% |
| 4/30/2017 | Solid, Total Suspended | 5.0 mg/L | 7 mg/L |
| 6/30/2017 | Coliform, Fecal, % less than detection | 75.0 | 53 |
| 6/30/2017 | Coliform, Fecal | 25 #/100mL | 220 #/100mL |
| 7/31/2017 | Coliform, Fecal, % less than detection | 75% | 35% |
| 8/31/2017 | Solids, Total suspended | 5 mg/L | 26 mg/L |
| 8/31/2017 | Nitrogen, Total | 6.0 mg/L | 7.6 mg/L |

**Describe previous FYI and WQBEL study:**
An FYI5 was conducted at this facility on April 22, 2013 and three effluent exceedances in 2012 below were noted in the inspection report.

| Date | Parameters | Permit Limit | Analytical Value |
|---|---|---|---|
| February 29, 2012 | IC25 STATRE 7 DAY CHR CERIODAPHNIA | 100% | 50.2% |
| May 25, 2012 | Total Phosphorus | Weekly 2.0 mg/L | 2.2 mg/L |
| December 31, 2012 | Total Nitrogen | Weekly 6.0 mg/L | 6.1 mg/L |

The Effluent Quality Assessment indicated that the Copper detected in the effluent composite sample exceeded Class III Freshwater Quality Criterion (62-302.530(23) F.A.C.) and the permitted limit. Iron and Lead detected in the Test Site sample exceeded Class III Freshwater Quality Criterion (62-302.530(38) F.A.C. and 62-302.530(39) F.A.C. The nutrient results and the AGP values indicate that the effluent is contributing to nutrient enrichment at the Test Site.

**Describe previous or current Enforcement Actions (including WLs):**
There has been no enforcement cases after the last FYI in 2013.

**Describe any violations or problems noted in previous inspection:**
A CEI was conducted on March 22, 2016 and four effluent exceedances in 2015-2016 below were noted in the inspection report.

| Date | Parameters | Permit Limit | Analytical Value |
|---|---|---|---|
| April 2015 | Phosphorus Maximum | 2.0 mg/L | 2.7 mg/L |
| November 2015 | Phosphorus Maximum | 2.0 mg/L | 2.3 mg/L |
| January 2016 | Total Dissolved Solids Maximum | 5 mg/L | 10 mg/L |
| January 2016 | Fecal Coliform | 75% Minimum | 69% |

**Discuss whether DMR trends within previous five years are improving or declining:**
There had been 13 exceedances in 2016 and 16 exceedances from 2012 to 2015. Based on this information DMR trends are declining.

**Additional Comments (this should include a trend of the Effluent, i.e. if the facility is now Reuse):**
N/A

## PART II: Sampling Event Information

| | |
|---|---|
| **Date(s) sample collected:**<br>01/29/2018 | **Sampler(s):**<br>Lucas Grantham and Mark Sumner |
| **Temperature (Deg C):**<br>19.0 | **pH (SU):**<br>7.2 |
| **Dissolved Oxygen (mg/L):**<br>7.2 | **Conductivity (umhos/cm):** N/A |
| **Total Residual Chlorine (mg/L):** | **Total Residual Chlorine - after Disinfection (mg/L):**<br>1.11 |
| **Method of Chlorination:**<br>Sodium Hypochlorite | **Method of De-chlorination:**<br>Sodium Bisulfite |

**Flow During Sample Collection for each outfall(MGD):**
Flow to R-001: 0.7 MGD
Flow to Wetland: 4.0MGD

**Mean Flow for each outfall for previous 12 months based on sampling date (If samples are taken on more than one day, indicate Mean Flow for each day):** 4.2 MGD

**Describe Discharge during Sampling Event:**
☒ **Continuous** ☐ **Intermittent** ☐ **Seasonal** ☐ **Rainfall Dependent**
☐ **Other, please specify:**

**Describe any conditions, difficulties or abnormal events that occurred during the sample collection and any other additional comments here:**
Effluent samples were collected at the chlorine contact chamber, dechlorination takes place at the wetland disposal site several miles from the plant

## Appendix B

## Explanation of Measurements

Biological assessments are prepared by DEP staff to provide information for review of NPDES permit renewal applications. Biological assessments, in conjunction with other information concerning the subject facility and its receiving-water body, are used to determine appropriate permit conditions. References to Rule 62-302.530, F.A.C., are to the currently applicable surface water quality criteria table with an effective date of 02/17/2016 and a notice identification number of 17115667. New limits for *Escherichia coli* (*E. coli*), enterococci, and total ammonia nitrogen were approved on 07/24/2017**.**

### 1) Quality Assurance and Quality Control

All field and laboratory methods followed DEP Standard Operating Procedures (see https://floridadep.gov/dear/quality-assurance/content/dep-sops and https://floridadep.gov/dear/florida-dep-laboratory/content/dep-laboratory-quality-assurance-manual-and-sops for details) and met DEP quality assurance/quality control standards (see https://floridadep.gov/dear/quality-assurance).

### 2) Chemical Analyses of the Effluent

The effluent was analyzed for nutrients, metals, organic constituents (base, neutral, and acid extractables) and pesticides following DEP SOPs. The results from these analyses were compared with Water Quality Criteria (62-302, F.A.C.) and facility permit limits.

### 3) Toxicity Bioassays

Greater than 50% mortality in an acute toxicity test may constitute an exceedance of 62-302.500(1)a and/or facility permit limits. A 25% inhibition concentration (IC25) is the effluent concentration causing a 25% reduction in a biological response such as biomass or reproduction when compared to a control population. An IC25 of less than 100% in a chronic test may constitute exceedances of 62-302.530(20), 62-302.530(61) and/or facility permit limits. A no observed effect concentration (NOEC) less than 100% effluent in a chronic test may constitute an exceedance of 62-302.530(61) and/or facility permit limits. Standard reference toxicant (SRT) tests are conducted monthly to ensure quality in toxicity testing.

### 4) Bacteriological Testing

High levels of fecal coliform bacteria may constitute an exceedance of 62-302.530(6) and/or facility permit limits. Fecal coliform and enterococci results often are based on colony counts outside the acceptable range (B-qualifier). The dilutions performed on the sample did not yield results within the method acceptable range of 20- 60 colony forming units per plate. The B-qualifier does not affect data quality.

### 5) Habitat Assessment

Habitat assessment is used to evaluate the physical structure and extent of disturbance in a waterbody. Eight aspects are ranked, with 20 possible points for each aspect (QA Rule SOP FT 3100). The Habitat Assessment score includes types and amounts of benthic substrates, water velocity, amount of sand or silt accumulation, extent of artificial channelization, bank stability, and riparian zone width and vegetation type. All scores are summed to yield an overall Habitat Assessment score. Habitat Assessment score ranges from 11-160 and overall habitat quality is assigned to one of four categories: Optimal (120-160 points), Suboptimal (80-119 points), Marginal (40-79 points), and Poor (11-39 points).

### 6) Algal Growth Potential (AGP)

The algal growth potential (AGP) value is the peak growth of the alga within that 14-day period, recorded as mg dry weight/L. AGP results within the range 6.10 to 20.0 mg dry wt/L are suggested to be representative of high productivity for freshwaters (Miller et al. 1978). High AGP values may constitute exceedances of 62-302.530(46), F.A.C., 62-302.530(47)(a), F.A.C. and/or 62-302.530(47)(b), F.A.C..

The concentration of nutrients in a water sample may be used to calculate the expected yield of AGP under the assumption that other required nutrients (e.g. silicon, micronutrients) are present in excess (Miller *et al*. 1978). The expected amount of production is calculated as 38 times the total soluble inorganic nitrogen (nitrate and nitrite plus ammonia) under nitrogen limitation or 430 times the ortho-phosphate (OP) concentration under phosphorus limitation with an error of $\pm$ 20%. When the ratio of nitrogen to phosphorus (N: P) is less than 10:1, nitrogen limitation of algal production is likely. When the N: P ratio is 20:1 or greater, phosphorus limitation is likely (USEPA 2000). For ratios in-between, co-limitation may occur.

Production of lower biomass than expected may be evidence of growth inhibition related to toxic compounds present in the water sample tested and may constitute an exceedance of 62-302.530(61), F.A.C.

**7) Benthic Macroinvertebrate Assemblages**

Benthic macroinvertebrates were collected using two methods. Quantitative samples were collected from Hester-Dendy multi-plate samplers incubated for 28 days. Qualitative collections are made using 20 dipnet sweeps (QA Rule SOP FS7420). Benthic macroinvertebrates were sorted and identified to the lowest practical taxonomic level, usually species.

**Taxa richness:** Taxa richness is the number of distinct macroinvertebrate taxa present in a sample. Stress, habitat destruction and pollution tend to reduce the number of different types of organisms present (Karr and Chu 1998). Decreases in taxa richness related to a facility's effluent may constitute exceedances of 62-302.530(46), F.A.C., 62-302.530(47)(a), F.A.C., 62-302.530(47)(b), F.A.C. and/or 62-302.530(61), F.A.C.

**Percent Contribution of Dominant Taxon:** Percent contribution of the dominant taxon is calculated by dividing the number of individuals in the most abundant taxa by the total number of individuals counted. Percent contribution of the dominant taxon tends to increase with increasing perturbation (Plafkin *et al*., 1989). Increases in the percent contribution of the dominant taxon related to a facility's effluent may constitute exceedances of 62-302.530(46), F.A.C., 62-302.530(47)(a), F.A.C. and/or 62-302.530(47)(b), F.A.C.

**Community Composition:** Shifts in proportions of major groups of organisms downstream of a point source, compared to upstream, control conditions, may indicate negative effects of a discharge (Fore et. al. 2007, Karr and Chu 1998). Shifts in community composition related to a facility's effluent may constitute exceedances of 62-302.530(46) F.A.C., 62-302.530(47)(a), F.A.C., 62-302.530(47)(b), F.A.C. and/or 62-302.530(61), F.A.C.

**Functional Feeding Groups:** Environmental degradation may differentially affect groups of invertebrates based on how the group feeds (e.g. predators, deposit feeders, etc.). In Florida, pollution may be responsible for reducing the numbers of filter feeders and shredders (Fore et. al. 2007). Changes in the proportions of functional feeding groups related to a facility's effluent may constitute exceedances of 62-302.530(46), F.A.C., 62-302.530(47)(a), F.A.C., 62-302.530(47)(b), F.A.C. and/or 62-302.530(61), F.A.C..

**The Stream Condition Index (SCI):** The SCI is a biological assessment tool that measures the degree to which flowing fresh waters support a healthy, well-balanced biological community, as indicated by aquatic, benthic macroinvertebrates. Macroinvertebrate taxonomic and abundance data are used to calculate ten biological metric scores, each of which has been shown to respond predictably to human disturbance (Fore et al. 2007; DEP SOP SCI 1000; DEP-SAS-001/11, incorporated into the Quality Assurance Rule by reference 62-160.210(2)(a), F.A.C.). The points for each of the metric scores (0 to 10) are summed to yield a final SCI score (range 0-100). The ten metrics are percent contribution of Tanytarsini, number of sensitive taxa, percent contribution of very tolerant taxa, number of total taxa, number of Ephemeroptera taxa, number of Trichoptera taxa, percent contribution of the dominant taxon, the percent contribution of suspension and filter feeders, number of long-lived taxa, and number of clinger taxa. As human disturbance increases, it is expected that the number of total taxa, the number of Ephemeroptera taxa, Trichoptera taxa, sensitive taxa, clinger taxa, long-lived taxa, and the percent contribution of Tanytarsini and suspension and filter feeders will decrease while percent contribution of dominant taxon and percent contribution of very tolerant taxa will increase.

The SCI can be used to determine faunal health associated with Chapter 62-302.531, F.A.C. An average SCI score of 40 or higher from at least two temporally independent SCIs, performed at representative locations and times indicates a balanced faunal community. Neither of the two most recent SCI scores should be less than 35. Failure of the SCI indicates that the stream does not meet the Clean Water Act goal of biological integrity, as measured by community structure and function. A failing SCI could be due to water quality problems or other physical disturbance factors such as habitat disruption or hydrologic alterations. While the stressor may not be known, a failed SCI does indicate that fauna is not well-balanced. A failing SCI score, if it is shown to be related to a facility's effluent, may constitute exceedances of 62-302.530(46), F.A.C., 62-302.530(47)(a), F.A.C., 62-302.530(47)(b), F.A.C., or of 62-302.530(61).

**8) Rapid Periphyton Survey**

Rapid Periphyton Survey (RPS) is a rapid method to quantify the extent and abundance of attached algae (periphyton) in a stream or river. A total of 99 points are assessed within a 100m area of sampling reach, 9 equidistant points along 11 cross-section transects spaced 10 m apart, If greater than 20% of sampled points have algal lengths greater than 6mm, a sample is collected and the autecological information associated with the dominant algae is evaluated (see DEP SOP FS 7230 Rapid Periphyton Survey). This method could be used to determine floral health associated with Chapter 62-302.531, F.A.C.

**9) Definition of Qualifiers**

A - Value reported is the mean of two or more determinations
B - Results based on colony counts outside the acceptable range.
I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
J - Estimated value
K - Actual value is known to be less than value given
L - Actual value is known to be greater than value given
N - Presumptive evidence of presence of material.
O - Sampled, but analysis lost or not performed.
Q - Sample held beyond normal holding time.
T - Value reported is less than the criterion of detection.
U - Material was analyzed for but not detected. The reported value is the method detection limit for the sample analyzed.
V - Analyte was detected in both sample and method blank.
X - Too few individuals to calculate SCI value.
Y - The laboratory analysis was from an unpreserved or improperly preserved sample. The data may not be accurate.
Z - Colonies were too numerous to count (TNTC)

**Appendix C**

**Chain of Custody**

**Request Number: RQ-2018-01-22-15**

FYI5 Pananma City Beach WWTP #1 (FL0021512)
Sampling Inspection

**Customer: NW-DIST**

**Project ID: FYI5**

## Florida Department of Environmental Protection
## Central Laboratory Submittal Form

Page 1 of 5

last revised Jan 3, 2018

Requester: Lillian Haynes

Field Report Prepared By: N. Milky

Collected By: Nathan Milky / Mike King

Sampling Agency: FDEP NWROC

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Location: Laird Creek | ☐ Comp ☑ Grab | Collection (comp begin or grab) Date: 1/29/18 Time: 1045 | Eastern Central | Composite end Date | Time | Bottle Group(s) (See pg 2): C / D |
| Field ID: PCB Test | Matrix (type, e.g., Salt, Fresh, etc) | Diss. Oxygen: 7.19 ☐ mg/L ☐ % sat | Total Res. Chlorine (mg/L) | | | |
| WIN/STORET #: 3203013 | Temp (C): 14.17 | pH: 4.83 | Sample Depth: 0.3 ☐ ft ☑ m | Sp. Conductance (umho/cm): 164 | | |
| Latitude ☐ dd ☐ dms | Longitude ☐ dd ☐ dms | Salinity (ppt) | Comments | | | |
| Location | ☐ Comp ☐ Grab | Collection (comp begin or grab) Date Time | Eastern Central | Composite end Date | Time | Bottle Group(s) |
| Field ID | Matrix (type, e.g., Salt, Fresh, etc) | Diss. Oxygen ☐ mg/L ☐ % sat | Total Res. Chlorine (mg/L) | | | |
| WIN/STORET # | Temp (C) | pH | Sample Depth ☐ ft ☐ m | Sp. Conductance (umho/cm) | | |
| Latitude ☐ dd ☐ dms | Longitude ☐ dd ☐ dms | Salinity (ppt) | Comments | | | |
| Location | ☐ Comp ☐ Grab | Collection (comp begin or grab) Date Time | Eastern Central | Composite end Date | Time | Bottle Group(s) |
| Field ID | Matrix (type, e.g., Salt, Fresh, etc) | Diss. Oxygen ☐ mg/L ☐ % sat | Total Res. Chlorine (mg/L) | | | |
| WIN/STORET # | Temp (C) | pH | Sample Depth ☐ ft ☐ m | Sp. Conductance (umho/cm) | | |
| Latitude ☐ dd ☐ dms | Longitude ☐ dd ☐ dms | Salinity (ppt) | Comments | | | |
| Location | ☐ Comp ☐ Grab | Collection (comp begin or grab) Date Time | Eastern Central | Composite end Date | Time | Bottle Group(s) |
| Field ID | Matrix (type, e.g., Salt, Fresh, etc) | Diss. Oxygen ☐ mg/L ☐ % sat | Total Res. Chlorine (mg/L) | | | |
| WIN/STORET # | Temp (C) | pH | Sample Depth ☐ ft ☐ m | Sp. Conductance (umho/cm) | | |
| Latitude ☐ dd ☐ dms | Longitude ☐ dd ☐ dms | Salinity (ppt) | Comments | | | |
| Location | ☐ Comp ☐ Grab | Collection (comp begin or grab) Date Time | Eastern Central | Composite end Date | Time | Bottle Group(s) |
| Field ID | Matrix (type, e.g., Salt, Fresh, etc) | Diss. Oxygen ☐ mg/L ☐ % sat | Total Res. Chlorine (mg/L) | | | |
| WIN/STORET # | Temp (C) | pH | Sample Depth ☐ ft ☐ m | Sp. Conductance (umho/cm) | | |
| Latitude ☐ dd ☐ dms | Longitude ☐ dd ☐ dms | Salinity (ppt) | Comments | | | |

| Relinquished By: | Date/Time | Shipping Method | Number of Coolers Shipped: | Received By: | Date/Time |
|---|---|---|---|---|---|
| [signature] | 1/29/18 | Fed Ex | 2 | [signature] | 1/30/18 10:00 |

**Request Number: RQ-2018-01-22-15**

FYI5 Panamna City Beach WWTP #1 (FL0021512)
Sampling Inspection

**Customer: NW-DIST**

**Project ID: FYI5**

# Florida Department of Environmental Protection
## Central Laboratory Submittal Form



last revised Jan 3, 2018

Requester: Lillian Haynes

Field Report Prepared By:

Collected By:

Sampling Agency:

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Location: Panama City Beach Eff-01 | ☐ Comp ☑ Grab | Collection (comp begin or grab) Date 1/29/2018 Time 10:00AM Eastern Central | Composite end Date 1/29 Time 12:00 AM | Bottle Group(s) (See pg 2): A | | | | | | | |
| Field ID | Matrix (type, e.g., Salt, Fresh, etc): Fresh | Diss. Oxygen: 7.2 ☑ mg/L ☐ % sat | Total Res. Chlorine (mg/L): 1.11 | | | | | | | | |
| WIN/STORET # | Temp (C): 19.0 | pH: 7.2 | Sample Depth: 10 ☑ ft ☐ m | Sp. Conductance (umho/cm): N/A | | | | | | | |
| Latitude ☐ dd ☐ dms | Longitude ☐ dd ☐ dms | Salinity (ppt): N/A | Comments | | | | | | | | |
| Location: Panama City Beach Eff-01 | ☑ Comp ☐ Grab | Collection (comp begin or grab) Date 1/28 Time 12:01 AM Eastern Central | Composite end Date 1/29/18 Time 12:00AM | Bottle Group(s): B | | | | | | | |
| Field ID | Matrix (type, e.g., Salt, Fresh, etc): Fresh | Diss. Oxygen: 7.2 ☑ mg/L ☐ % sat | Total Res. Chlorine (mg/L): 1.11 | | | | | | | | |
| WIN/STORET # | Temp (C): 19.0 | pH: 7.2 | Sample Depth: 10 ☑ ft ☐ m | Sp. Conductance (umho/cm): N/A | | | | | | | |
| Latitude ☐ dd ☐ dms | Longitude ☐ dd ☐ dms | Salinity (ppt): N/A | Comments | | | | | | | | |
| Location: Panama city Beach Eff-01 | ☐ Comp ☑ Grab | Collection (comp begin or grab) Date 1/29/18 Time 10:30 Eastern Central | Composite end Date Time | Bottle Group(s): E | | | | | | | |
| Field ID: Blanks | Matrix (type, e.g., Salt, Fresh, etc) | Diss. Oxygen ☐ mg/L ☐ % sat | Total Res. Chlorine (mg/L) | | | | | | | | |
| WIN/STORET # | Temp (C) | pH | Sample Depth ☐ ft ☐ m | Sp. Conductance (umho/cm) | | | | | | | |
| Latitude ☐ dd ☐ dms | Longitude ☐ dd ☐ dms | Salinity (ppt) | Comments: Insufficient DS for 2 of the samples. Bottles will be left empty | | | | | | | | |
| Location | ☐ Comp ☐ Grab | Collection (comp begin or grab) Date Time Eastern Central | Composite end Date Time | Bottle Group(s) | | | | | | | |
| Field ID | Matrix (type, e.g., Salt, Fresh, etc) | Diss. Oxygen ☐ mg/L ☐ % sat | Total Res. Chlorine (mg/L) | | | | | | | | |
| WIN/STORET # | Temp (C) | pH | Sample Depth ☐ ft ☐ m | Sp. Conductance (umho/cm) | | | | | | | |
| Latitude ☐ dd ☐ dms | Longitude ☐ dd ☐ dms | Salinity (ppt) | Comments | | | | | | | | |

| Relinquished By: | Date/Time | Shipping Method | Number of Coolers Shipped: | Received By: SR | Date/Time 1-30-18 10:00 |
|---|---|---|---|---|---|

2 bioassay jugs 1.30.18 1050 Drew Fikken DF

**Request Number: RQ-2018-01-22-15**

FYI5 Pananma City Beach WWTP #1 (FL0021512)
Sampling Inspection

**Customer: NW-DIST**

**Project ID: FYI5**

# Florida Department of Environmental Protection
## Central Laboratory Submittal Form

last revised Jan 3, 2018

Requester: Lillian Haynes

Field Report Prepared By: Lucas Grantham

Collected By: Panama City Beach WWTP

Sampling Agency: FDEP

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Location: PCB EFF-01 | ☑ Comp ☐ Grab | Collection (comp begin or grab) Date 1/30 Time 12:00 AM | Eastern Central | Composite end Date 1/31 Time 12:00 N | Bottle Group(s) (See pg 2): B |
| Field ID | Matrix (type, e.g., Salt, Fresh, etc) | Diss. Oxygen 4.75 ☑ mg/L ☐ % sat | Total Res. Chlorine (mg/L) 0.89 | |
| WIN/STORET # | Temp (C) 17.9 | pH 7.15 | Sample Depth ☐ ft ☐ m | Sp. Conductance (umho/cm) | |
| Latitude ☐ dd ☐ dms | Longitude ☐ dd ☐ dms | Salinity (ppt) | Comments | |
| Location: PCB EFF-01 [redacted] | ☐ Comp ☐ Grab | Collection (comp begin or grab) Date 1/31/18 Time 9:49 | Eastern Central | Composite end Date Time | Bottle Group(s): A |
| Field ID | Matrix (type, e.g., Salt, Fresh, etc) | Diss. Oxygen ☐ mg/L ☐ % sat | Total Res. Chlorine (mg/L) | |
| WIN/STORET # | Temp (C) | pH | Sample Depth ☐ ft ☐ m | Sp. Conductance (umho/cm) | |
| Latitude ☐ dd ☐ dms | Longitude ☐ dd ☐ dms | Salinity (ppt) | Comments | |
| Location | ☐ Comp ☐ Grab | Collection (comp begin or grab) Date Time | Eastern Central | Composite end Date Time | Bottle Group(s) |
| Field ID | Matrix (type, e.g., Salt, Fresh, etc) | Diss. Oxygen ☐ mg/L ☐ % sat | Total Res. Chlorine (mg/L) | |
| WIN/STORET # | Temp (C) | pH | Sample Depth ☐ ft ☐ m | Sp. Conductance (umho/cm) | |
| Latitude ☐ dd ☐ dms | Longitude ☐ dd ☐ dms | Salinity (ppt) | Comments | |
| Location | ☐ Comp ☐ Grab | Collection (comp begin or grab) Date Time | Eastern Central | Composite end Date Time | Bottle Group(s) |
| Field ID | Matrix (type, e.g., Salt, Fresh, etc) | Diss. Oxygen ☐ mg/L ☐ % sat | Total Res. Chlorine (mg/L) | |
| WIN/STORET # | Temp (C) | pH | Sample Depth ☐ ft ☐ m | Sp. Conductance (umho/cm) | |
| Latitude ☐ dd ☐ dms | Longitude ☐ dd ☐ dms | Salinity (ppt) | Comments | |

| Relinquished By: | Date/Time | Shipping Method | Number of Coolers Shipped: | Received By: | Date/Time |
|---|---|---|---|---|---|
| | | | | [redacted] | 02/01/18 @ 9:50 |

[redacted] Filled out by TB

Q Bioassay Fuge 2-1-18 1025 m Faircloth

**Request Number: RQ-2018-01-22-15**

FYI5 Pananma City Beach WWTP #1 (FL0021512)
Sampling Inspection

**Customer: NW-DIST**

**Project ID: FYI5**

# Florida Department of Environmental Protection
## Central Laboratory Submittal Form

last revised Jan 3, 2018

Requester: Lillian Haynes

Collected By: Lucas Grantham

Field Report Prepared By: Lucas Grantham

Sampling Agency: FDEP

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Location: PCB EFF-01 | | | ☒ Comp ☐ Grab | Collection (comp begin or grab) Date 12:1e 2/1/18 Time 12:00 am Eastern Central | | Composite end Date 2/2/18 Time 12:00 am | | | Bottle Group(s) (See pg 2): B | |
| Field ID | | | Matrix (type, e.g., Salt, Fresh, etc): Fresh | | Diss. Oxygen: 8.5 ☒ mg/L ☐ % sat | | Total Res. Chlorine (mg/L): 1.67 | | | |
| WIN/STORET # | | | Temp (C): 19.0 | pH: 7.2 | Sample Depth: N/A ☐ ft ☐ m | | Sp. Conductance (umho/cm): N/A | | | |
| Latitude ☐ dd ☐ dms | | Longitude ☐ dd ☐ dms | Salinity (ppt) | Comments: 4.89 mg/L @ 12 am 2/2/18 | | | | | | |
| Location | | | ☐ Comp ☐ Grab | Collection (comp begin or grab) Date Time Eastern Central | | Composite end Date Time | | | Bottle Group(s) | |
| Field ID | | | Matrix (type, e.g., Salt, Fresh, etc) | | Diss. Oxygen ☐ mg/L ☐ % sat | | Total Res. Chlorine (mg/L) | | | |
| WIN/STORET # | | | Temp (C) | pH | Sample Depth ☐ ft ☐ m | | Sp. Conductance (umho/cm) | | | |
| Latitude ☐ dd ☐ dms | | Longitude ☐ dd ☐ dms | Salinity (ppt) | Comments | | | | | | |
| Location | | | ☐ Comp ☐ Grab | Collection (comp begin or grab) Date Time Eastern Central | | Composite end Date Time | | | Bottle Group(s) | |
| Field ID | | | Matrix (type, e.g., Salt, Fresh, etc) | | Diss. Oxygen ☐ mg/L ☐ % sat | | Total Res. Chlorine (mg/L) | | | |
| WIN/STORET # | | | Temp (C) | pH | Sample Depth ☐ ft ☐ m | | Sp. Conductance (umho/cm) | | | |
| Latitude ☐ dd ☐ dms | | Longitude ☐ dd ☐ dms | Salinity (ppt) | Comments | | | | | | |
| Location | | | ☐ Comp ☐ Grab | Collection (comp begin or grab) Date Time Eastern Central | | Composite end Date Time | | | Bottle Group(s) | |
| Field ID | | | Matrix (type, e.g., Salt, Fresh, etc) | | Diss. Oxygen ☐ mg/L ☐ % sat | | Total Res. Chlorine (mg/L) | | | |
| WIN/STORET # | | | Temp (C) | pH | Sample Depth ☐ ft ☐ m | | Sp. Conductance (umho/cm) | | | |
| Latitude ☐ dd ☐ dms | | Longitude ☐ dd ☐ dms | Salinity (ppt) | Comments | | | | | | |

| Relinquished By: | Date/Time | Shipping Method | Number of Coolers Shipped: | Received By: | Date/Time |
|---|---|---|---|---|---|
| Lucas Grantham | 02/02/18 10:32 am | Fed-Ex | 2 | | 2.3.18 0903 |

Cooler 1 1.3 / 0.6

Cooler 2 0.5

The Water Spigot
5806 E. Hwy. 22 * Panama City, FL 32404
(850) 871-1900 * Fax (850) 871-9303
Email:trishj-waterspigot@comcast.net

№ 64826

# CHAIN OF CUSTODY RECORD

Company Name / Plant: FDEP
Company Address: 160 W Gart St
City, State, Zip: Pensacola, FL 32502
Sent Report To: Nathan Mulkey
Copy To DEP / DOH (circle one): Yes ☑ No ☐
Email Address ☑ Yes ☐ No: nathan.mulkey@dep.state.fl.us
Phone #: 8505950626
Fax #:
Fax Results ____ Yes X No

# OF CONTAINERS

Project Name: FY15 Panama City Beach WWTP#1
Lab Dispose ☑
Return to Client ☐
Other ☐

Sample #: JAN29-015
Container #:
Check If Rush:
Special Instructions:
P.O. #: RQ-2018-01-22-15

Analysis Requested

| Sampling Date | Sampling Time | Type Comp | Type Grab | Matrix Water | Matrix Sludge | Matrix W. Water | Matrix Soil | Sample Site (Be Specific) | Preservatives | Containers | Enviro via membrane | Fecal Coliform via membrane | 0118 – 3383 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1/29/18 | 1045 | | X | X | | | | PCB Test | | | 1 | 1 | 1 |

Field Data: Temp. | CL2 | pH

Preservative Codes:
A - Ammonium Chloride
C - Cool Only
H - Hydrochloric Acid
M - Monochloracetic Acid
N - Nitric Acid
OH - Sodium Hydroxide
S - Sulfuric Acid
T - Sodium Thiosulfate
Z - Zinc Acetate

Container Codes:
V - VOA vial
G - glass
P - plastic
M - micro bag/cup
O - Other

| | | Date | Time |
|---|---|---|---|
| Sampled By & Title | [signature] FDEP | 1/29/18 | |
| Received By | | | |
| Received By | | | |
| Received By | | | |
| Received in Lab By | [signature] | 1-29-18 | 1440 |

| | | |
|---|---|---|
| Relinquished By | [signature] | Date / Time 1-29-18 |
| Relinquished By | | Date / Time |
| Relinquished By | | Date / Time |
| Shipped VIA | UPS BUS (HAND) FED EX OTHER | |
| Remarks | | Temp. Received in Lab: 1.6 |

Distribution: Original - LAB Yellow - CLIENT

## Appendix D

## Physical/Chemical and Habitat Assessment field sheets

**DEP Form FD 9000-3 Physical/Chemical Characterization Field Sheet**

SAMPLE ID _____ ORG ID 21FLPNS LATITUDE 30.31282
COUNTY Bay STORET # 32030131 LONGITUDE 85.92606
DATE 1/29/18 TIME 1045 SAMPLING AGENCY FDEP NWROC
SITE NAME Laird Creek
FIELD ID/NAME PCB Test RECEIVING BODY OF WATER ICW

**RIPARIAN ZONE / STREAM FEATURES**

**PREDOMINANT LAND-USE IN WATERSHED** (specify relative percent in each category):
Forest/Natural ☑ Silviculture ☑ Field/Pasture ☐ Agricultural ☑ Residential ☐ Commercial ☐ Industry ☐ Other (Specify) ☐

**Landscape Development Intensity Index (LDI)**

Local Watershed Erosion (select one): ☐ None ☐ Slight ☐ Moderate ☑ Heavy
Local Watershed NPS Pollution: ☐ No evidence ☐ Slight ☑ Moderate ☐ Heavy

**Typical Width (m) Depth (m)/Velocity (m/sec) Transect**
4.7 m wide
.5 m/s 1/2 | .5 m/s 1/2 | .5 m/s 1/2
.5 m deep | .5 m deep | .5 m deep

**Width of Riparian Vegetation (m) on Each Buffer Side**
Left Bank: 1 Right Bank: 15

**Hydrologic Modification Score** (per FT 3101)

**High Water Mark:** ____ (m) + ____ (above present water level) = ____ (present depth) (above bed)

**Artificially Impounded** ☑ Yes ☐ No

**Artificially Channelized:** ☐ No ☐ Some recovery ☑ Mostly recovered, more sinuous ☐ Recent, severe

**Canopy Cover %** ☐ Open ☑ Lightly Shaded (11-45%) ☐ Heavily Shaded ☐ Moderate Shaded (46-80%)

**SEDIMENT / SUBSTRATE**

**Sediment Oils** ☑ Absent ☐ Slight ☐ Moderate ☐ Profuse

**Sediment Odors** ☑ Normal ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Anaerobic ☐ Other (Specify):

**Smothering of Substrates**
Sand Smothering: None ☐ Slight ☑ Moderate ☐ Severe ☐
Silt Smothering: None ☐ Slight ☑ Moderate ☐ Severe ☐
Algae Smothering: None ☑ Slight ☐ Moderate ☐ Severe ☐

**SUBSTRATE TYPE**
Assessment Tool: ☑ SCI ☑ RPS ☑ LVS ☐ LCI ☐ BioRecon

| | % Coverage | INVERT # Times Sampled | PERI # Times Sampled |
|---|---|---|---|
| Woody Debris (Snags) | | | |
| Undercut Banks / Roots | | | |
| Leaf Packs or Mat ..... | | | |
| Aquatic Vegetation ..... | | | |
| Rock or Shell Rubble.. | | | |
| Sand..... | | | |
| Mud / Muck / Silt ..... | | | |
| Other ..... | | | |
| Other ..... | | | |

**ABUNDANCE**

| | Not Obs. | Rare | Common | Abundant |
|---|---|---|---|---|
| Periphyton: | ☑ | ☐ | ☐ | ☐ |
| Fish: | ☐ | ☑ | ☐ | ☐ |
| Aquatic Plants: | ☑ | ☐ | ☐ | ☐ |
| Iron/Sulfur Bacteria: | ☑ | ☐ | ☐ | ☐ |

**WATER QUALITY**

| | Depth (M) | Temp. (°C) | pH (SU) | D.O. (MG/L) | D.O. Sat (%) | Cond. (UMHO/CM) | Salinity (PPT) | SECCHI (M) |
|---|---|---|---|---|---|---|---|---|
| Top: | 0.3 | 14.17 | 4.83 | 7.19 | 70.1 | 164 | 0.08 | 0.5 |
| Mid: | | | | | | | | ☐ VOB |
| Bottom | | | | | | | | TOTAL DEPTH |

**Meter ID:** 132237 TOTAL DEPTH 0.7

**Water Odors** Normal ☑ Petroleum ☐ Sewage ☐ Chemical ☐ Other ☐

**Water Surface Oils** Normal ☐ Sheen ☐ Globs ☐ Slick ☐ Other ☑ Foam

Water Sample Taken? ☑ Yes ☐ No
Sample Preserved? ☑ Yes ☐ No
Lot Number:_____ Exp:_____

**Color** Tannic ☑ Green (Algae) ☐ Clear ☐ Other (Specify) ☐

Algae Sample Taken? ☐ Yes ☑ No
Sample Preserved? ☐ Yes ☐ No
Lot Number:_____ Exp:_____

**Clarity** Clear ☑ Slightly Turbid ☐ Turbid ☐ Opaque ☐

**System Type:** Stream ☑ Lake ☐ Wetland ☐ Estuary ☐ Other(Specify) ☐

**AMBIENT FIELD CONDITIONS / NOTES:**
Zinc Acetate - ZA 7732040 7/21/18
Sulfuric Acid - SA 7233030 08/21/18
Nitric Acid - NA 7226050 08/14/18
☑ The antecedent hydrologic conditions have been met to my best knowledge.

**SAMPLING TEAM** Nathan Mulky / Mike King SIGNATURE: DATE: 1/29/18

62-160.800, F.A.C. Revision Date: March 1, 2014

## DEP Form FD 9000-5 Stream/River Habitat Assessment Field Sheet

| SAMPLING AGENCY: | | STORET STATION NUMBER: | DATE (MM/DD/YY): | RECEIVING BODY OF WATER: |
|---|---|---|---|---|
| FDEP NWROC | | 32030131 | 01/29/18 | ICW |
| REMARKS: | COUNTY: | LOCATION: | | FIELD ID/NAME: |
| FY15 PCB WMTP#1 | Bay | Laird Creek | | PCB Test |

| Habitat Parameter | Optimal | Suboptimal | Marginal | Poor |
|---|---|---|---|---|
| Primary Habitat Components<br>**Substrate Diversity** 10 | Four or more major productive habitats present [snags, tree roots, aquatic vegetation, leaf packs (partially decayed), rock]<br>20 19 18 17 16 | Three major productive habitats present. Adequate habitat. Some substrates may be new fall (fresh leaves or snags)<br>15 14 13 12 11 | Two major productive habitats present. Less than desirable habitat, frequently disturbed or removed<br>10 9 8 7 6 | One or less major productive habitat. Lack of habitat is obvious, substrates unstable or smothered<br>5 4 3 2 1 |
| **Substrate Availability** 7 | Greater than 30% major productive habitat present at site<br>20 19 18 17 16 | 16% to 30% major productive habitat, by aerial extent<br>15 14 13 12 11 | 6% to 15% major productive habitat<br>10 9 8 7 6 | Less than 5% major productive habitat<br>5 4 3 2 1 |
| **Water Velocity** 20 | Max. observed at typical transect: > 0.25 m/sec. But < 1 m/sec<br>≥0.33 0.31 0.29 0.27 >0.25<br>20 19 18 17 16 | Max. observed at typical transect: >0.1 to 0.25 m/sec<br>0.25 0.21 0.17 0.13 >0.1<br>15 14 13 12 11 | Max. observed at typical transect: 0.05 to 0.1 m/sec<br>0.1 0.09 0.07 0.06 0.05<br>10 9 8 7 6 | Max. observed at typical transect: <0.05 m/sec; or spate occuring: > 1 m/sec<br><0.05 0.04 0.03 0.01 <0.01<br>5 4 3 2 1 |
| **Habitat Smothering** 16<br>Primary Score 53 | Adequate number of stable pools (1-2 per 12 times width) and <25% of habitats affected by sand, silt, or algae.<br>20 19 18 17 16 | Adequate number of stable pools (1-2 per 12 times width) and >25% of habitats affected by sand, silt, or algae.<br>15 14 13 12 11 | Does not have required number of stable pools (1-2 per 12 x width) and/or has shallow pools (<2 x prevailing depth).<br>10 9 8 7 6 | Stable pools are absent. Most habitats affected by sand, silt, or algae accumulation.<br>5 4 3 2 1 |
| Secondary Habitat Components<br>**Artificial Channelization** 14 | Expected sinuosity given the stream width. No evidence of dredging or artificial straightening. No spoil banks.<br>20 19 18 17 16 | Good sinuosity within old channelized area. Evidence of dredging in the past (>25 yrs) but mostly recovered.<br>15 14 13 12 11 | Straightened with trapezoidal cross section, but has a small degree of sinuosity developed within channelized area.<br>10 9 8 7 6 | Straightened or engineered by dredging, has trapezoidal or box cut cross section, lacks required pools. May have spoil banks.<br>5 4 3 2 1 |
| **Bank Stability**<br>Right Bank 5<br>Left Bank 3 | Bankfull ≥ 60% of bank height. Slope of bank ≤ 60° from bankful to top of bank. Bankfull is within or above the root zone with few raw, eroded areas.<br>10 9 | Only meets 2 of the 3 requirements for optimal bank stability.<br>8 7 6 | Only meets 1 of the 3 requirements for optimal bank stability.<br>5 4 | Bankfull < 60% of bank height. Slope of bank > 60°. Bankfull is below the root zone with raw, eroded areas.<br>3 2 1 |
| **Riparian Buffer Zone Width**<br>Right Bank 8<br>Left Bank 1 | Width of vegetation greater than 18 m<br>10 9 | Width of vegetation >12 to 18m<br>8 7 6 | Width of vegetation 6 to 12 m. human activities close to system<br>5 4 | Less than 6 m of buffer zone due to intensive human activities<br>3 2 1 |
| **Riparian Zone Vegetation Quality**<br>Right Bank 5<br>Left Bank 3<br>Secondary Score 39 | Over 80% of riparian surfaces consist of normal, expected plant community for given sunlight & habitat conditions (e.g., native plants; tree, shrub, and forbs represented, if appropriate). Minimal disturbance.<br>10 9 | >50% to 80% of riparian zone is undisturbed (normal, expected plant community for given sunlight & habitat conditions). Some disruption in community observed.<br>8 7 6 | 25% to 50% of riparian zone is undisturbed (normal, expected plant community for given sunlight & habitat conditions). Disruption obvious.<br>5 4 | Less than 25% of riparian zone is undisturbed (normal, expected plant community for given sunlight & habitat conditions).<br>3 2 1 |

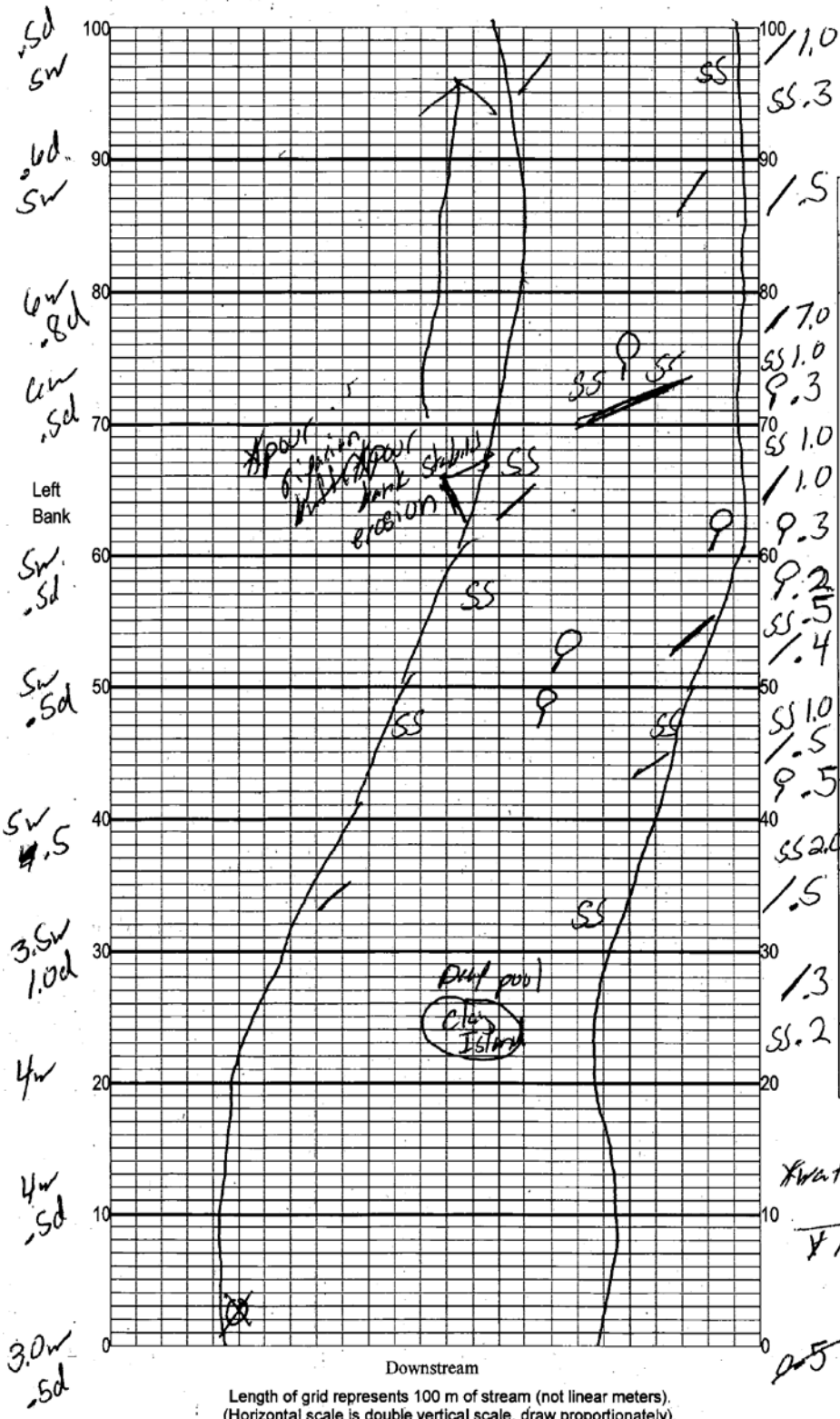
92 **TOTAL SCORE**

| Date: | Analyst: | Signature: |
|---|---|---|
| 1/29/18 | Nathan Mulkey | |

62-160.800, F.A.C.

Revision Date: March 1, 2014

**DEP Form FD 9000-4 Stream/River Habitat Assessment Sketch Sheet**




Length of grid represents 100 m of stream (not linear meters).
(Horizontal scale is double vertical scale, draw proportionately).

Location: Laird Creek

Date: 1/29/18

Sampler: Nathan Mulkey

100 m: Latitude 30.31194
Longitude 85.92580

0 m: Latitude 30.31282
Longitude 85.92606

| Substrates: Code key, draw proportionate habitat abundance. | % |
|---|---|
| Snags | 4 |
| Roots/undercut banks | 2.1 |
| Leaf Packs (or mats) | 0.4 |
| Aquatic Macrophytes | |
| ~~Rock~~ Clay | |
| | |
| Pools (total # observed = ; # range expected = ) | |

Average width 4.7 m
Average depth 0.6 m

Velocity measured at 70 meter mark.

WQ & chemistry taken at 10 meter mark.

Habitat Smothering:
Note areas (on map) where sand or silt is smothering substrates, limiting habitability.

Bank Stability:
Note areas (on map) with unstable, eroding banks.

Riparian Buffer Width:
Note areas (on map) where natural vegetation is altered or eliminated.

Plants observed / other notes:

*water very tannic, difficult to observe
* large amounts of habitat
Peat substrate
Clay entire stretch

1 = 11.2 9 = 1
SS = 6

282

62-160.800, F.A.C

Revision Date: March 1, 2014

## DEP FORM FD 9000-25 Rapid Periphyton Survey Field Sheet

Site: Laird Creek | County: Bay | Date: 7/29/18 | Investigators: Nathan Mulkey

STORET Station Number: 32030131

| Transect (m) | Point 1=right 9=left | Algal Thickness Rank (N-6, X) | Estimated | Canopy Cover |
|---|---|---|---|---|
| 0 | 1 | X | | |
| | 2 | | | |
| | 3 | | | |
| | 4 | | | |
| | 5 | | | 15 |
| | 6 | | | |
| | 7 | | | |
| | 8 | | | |
| | 9 | | | |
| 10 | 1 | X | | |
| | 2 | | | |
| | 3 | | | |
| | 4 | | | |
| | 5 | | | 12 |
| | 6 | | | |
| | 7 | | | |
| | 8 | | | |
| | 9 | | | |
| 20 | 1 | X | | |
| | 2 | | | |
| | 3 | | | |
| | 4 | | | |
| | 5 | | | 22 |
| | 6 | | | |
| | 7 | | | |
| | 8 | | | |
| | 9 | | | |
| 30 | 1 | X | | |
| | 2 | | | |
| | 3 | | | |
| | 4 | | | |
| | 5 | | | 38 |
| | 6 | | | |
| | 7 | | | |
| | 8 | | | |
| | 9 | | | |
| 40 | 1 | N | ✓ | |
| | 2 | | | |
| | 3 | | | |
| | 4 | | | |
| | 5 | | | 40 |
| | 6 | | | |
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| | 8 | | | |
| | 9 | | | |
| 50 | 1 | X | | |
| | 2 | | | |
| | 3 | | | |
| | 4 | | | |
| | 5 | | | 66 |
| | 6 | | | |
| | 7 | | | |
| | 8 | | | |
| | 9 | | | |
| 60 | 1 | X | | |
| | 2 | | | |
| | 3 | | | |
| | 4 | | | |
| | 5 | | | 12 |
| | 6 | | | |
| | 7 | | | |
| | 8 | | | |
| | 9 | | | |
| 70 | 1 | X | | |
| | 2 | | | |
| | 3 | | | |
| | 4 | | | |
| | 5 | | | 6 |
| | 6 | | | |
| | 7 | | | |
| | 8 | | | |
| | 9 | | | |
| 80 | 1 | X | | |
| | 2 | | | |
| | 3 | | | |
| | 4 | | | |
| | 5 | | | 16 |
| | 6 | | | |
| | 7 | | | |
| | 8 | | | |
| | 9 | | | |
| 90 | 1 | X | | |
| | 2 | | | |
| | 3 | | | |
| | 4 | | | |
| | 5 | | | 20 |
| | 6 | | | |
| | 7 | | | |
| | 8 | | | |
| | 9 | | | |
| 100 | 1 | X | | |
| | 2 | | | |
| | 3 | | | |
| | 4 | | | |
| | 5 | | | 10 |
| | 6 | | | |
| | 7 | | | |
| | 8 | | | |
| | 9 | | | |

| | |
|---|---|
| Secchi depth | 0.5 |
| Estimated? | |

| | |
|---|---|
| # points ranked 4-6 | 0 |
| total points assessed | 99 |
| % points ranked 4-6 | 0 |

| Check accompanying data collected at same site/date. | |
|---|---|
| Algal mat sample | |
| Linear Veg Survey | X |
| Habitat Assessment | X |
| SCI/Biorecon | X |
| Water sample | X |
| RQ- | |

| Algal Thickness Rank | |
|---|---|
| N | rough, no algae, slimy, algae up to 1mm |
| 3 | >1mm - 6mm |
| 4 | >6mm - 20mm |
| 5 | >20mm - 10 cm |
| 6 | >10 cm |

Record "N" and check "Estimated" for points deeper than the Secchi depth; algae are presumed absent. Check "Estimated" if thickness estimated for deep points which can be seen but not reached.

Record "X" for points shallower than Secchi depth for which substrate cannot be seen or reached with the hand. No estimated rank.

Record canopy cover as the number of small densiometer quadrants (out of 96) that HAVE canopy cover. Measure facing upstream at point 4, 5, or 6.

Collect algal mat sample following DEP SOP FS 7240 if the percentage of total sampled points with a thickness rank of 4, 5, or 6 is >20%.

62-160.800, F.A.C.

Revision Date: March 1, 2014

## DEP FORM FD 9000-32: LINEAR VEGETATION SURVEY FIELD SHEET

Waterbody: Laird Creek | Date: 11/29/18 | County: Bay | Storet Number: 3203131

Analyst: MIKE KIM | Signature:

Comments: Emergent veg

Instructions: Note taxa growing in the water with a checkmark if present, "D" if dominant, and "C" if codominant (dominance only if 1 $m^2$ of taxa present). Note in the boxes below if no dominant are selected, and note total macrophyte abundance rank for each section. Only the most common taxa are listed, so use blank spaces for additional taxa names.

| HERBACEOUS SPECIES | Meter Mark 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 | 70-80 | 80-90 | 90-100 | Specimen collected (check) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Alternanthera philoxeroides | | | | | | | | | | | |
| Bacopa caroliniana | | | | | | | | | | | |
| Bacopa monneri | | | | | | | | | | | |
| Bidens mitis | | | | | | | | | | | |
| Boehmeria cylindrica | | | | | | | | | | | |
| Centella asiatica | | | | | | | | | | | |
| Ceratophyllum demersum | | | | | | | | | | | |
| Chara | | | | | | | | | | | |
| Cicuta maculata | | | | | | | | | | | |
| Cladium jamaicense | | | | | | | | | | | |
| Colocasia esculenta | | | | | | | | | | | |
| Commelina diffusa | | | | | | | | | | | |
| Commelina virginica | | | | | | | | | | | |
| Crinum americanum | | | | | | | | | | | |
| Diodia virginiana | | | | | | | | | | | |
| Eichhornia crassipes | | | | | | | | | | | |
| Eleocharis (wispy viviparous) | | | | | | | | | | | |
| Hydrilla verticillata | | | | | | | | | | | |
| Hydrocotle | | | | | | | | | | | |
| Hygrophila polysperma | | | | | | | | | | | |
| Hymenocallis | | | | | | | | | | | |
| Lachnanthes caroliniana | | | | | | | | | | | |
| Landoltia punctata | | | | | | | | | | | |
| Lemna | | | | | | | | | | | |
| Limnophila sessiflora | | | | | | | | | | | |
| Ludwigia leptocarpa | | | | | | | | | | | |
| Ludwigia palustris | | | | | | | | | | | |
| Ludwigia peruviana | | | | | | | | | | | |
| Ludwigia repens | | | | | | | | | | | |
| Luziola fluitans | | | | | | | | | | | |
| | | | | | | | | | | | |
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| | | | | | | | | | | | |
| | | | | | | | | | | | |
| **If no Dominant or Co-Dominant were selected, indicate with "X"** | | | | | | | | | | | |
| **Indicate % cover macrophytes per section** | | | | | | | | | | | |
| **0-5% Macrophyte Coverage** | | | | | | | | | | | |
| **>5 and ≤10% Macrophyte Coverage** | | | | | | | | | | | |
| **>10 and ≤25% Macrophyte Coverage** | | | | | | | | | | | |
| **>25 and ≤50% Macrophyte Coverage** | | | | | | | | | | | |
| **> 50% Macrophyte Coverage** | | | | | | | | | | | |

| HERBACEOUS SPECIES | Meter Mark 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 | 70-80 | 80-90 | 90-100 | Specimen collected (check) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Micranthemum glomeratum | | | | | | | | | | | |
| Micranthemum umbrosum | | | | | | | | | | | |
| Myriophyllum aquaticum | | | | | | | | | | | |
| Najas guadelupensis | | | | | | | | | | | |
| Nuphar luteum | | | | | | | | | | | |
| Orontium aquaticum | | | | | | | | | | | |
| Panicum hemitomon | | | | | | | | | | | |
| Panicum repens | | | | | | | | | | | |
| Panicum rigidulum | | | | | | | | | | | |
| Pistia stratioides | | | | | | | | | | | |
| Polygonum glabra | | | | | | | | | | | |
| Polygonum hydropiperoides | | | | | | | | | | | |
| Polygonum punctatum | | | | | | | | | | | |
| Pontedaria cordata | | | | | | | | | | | |
| Potamogeton illinoensis | | | | | | | | | | | |
| Ruellia simplex | | | | | | | | | | | |
| Sacciolepis striata | | | | | | | | | | | |
| Sagittaria kurziana | | | | | | | | | | | |
| Sagittaria lancifolia | | | | | | | | | | | |
| Sagittaria latifolia | | | | | | | | | | | |
| Salvinia minima | | | | | | | | | | | |
| Samolus parviflora | | | | | | | | | | | |
| Saururus cernuus | | | | | | | | | | | |
| Sparganium americanum | | | | | | | | | | | |
| Typha | | | | | | | | | | | |
| Vallisneria americana | | | | | | | | | | | |
| Zizania aquatica | | | | | | | | | | | |

## Appendix E

## Chemical analysis of effluent and receiving water

| Date Sampled | UDL | Component | Result | Units | MDL | PQL |
|---|---|---|---|---|---|---|
| 1/29/2018 | Effluent Comp | Biochemical Oxygen Demand-5 Day,N-Inhib | 0.27 IQ | mg/L | 0.2 | 2 |
| 1/29/2018 | Effluent Comp | Bioassay-Chron-Def-FW-C.dubia, IC25 | No Result Q | IC25 | | |
| 1/29/2018 | Effluent Comp | Bioassay-Chronic-Scrn-FW-Fish, IC25 | No Result Q | IC25 | | |
| 1/29/2018 | Effluent Comp | Bioassay-Chronic-Scrn-FW-C.dubia, IC25 | No Result | IC25 | | |
| 1/29/2018 | Effluent Comp | Bioassay-Chronic-Scrn-FW-C.dubia, NOEC | No Result | NOEC | | |
| 1/29/2018 | Effluent Comp | Bioassay-Chron-Def-FW-Fish, IC25 | No Result Q | IC25 | | |
| 1/29/2018 | Effluent Comp | Bioassay-Chronic-Scrn-FW-Fish, NOEC | No Result Q | NOEC | | |
| 1/29/2018 | Effluent Comp | Bioassay-Chron-Def-FW-Fish, NOEC | No Result Q | NOEC | | |
| 1/29/2018 | Effluent Comp | Bioassay-Chron-Def-FW-C.dubia, NOEC | No Result Q | NOEC | | |
| 1/29/2018 | Effluent Comp | Hardness | 79.9 | mg/L | 0.35 | 1.4 |
| 1/29/2018 | Effluent Comp | Potassium | 11.0 | mg/L | 0.3 | 1.2 |
| 1/29/2018 | Effluent Comp | Arsenic | 0.32 | ug/L | 0.05 | 0.2 |
| 1/29/2018 | Effluent Comp | Copper | 6.36 | ug/L | 0.2 | 0.8 |
| 1/29/2018 | Effluent Comp | Silver | 0.010 U | ug/L | 0.01 | 0.04 |
| 1/29/2018 | Effluent Comp | Aluminum | 52 | ug/L | 3 | 12 |
| 1/29/2018 | Effluent Comp | Nickel | 2.85 | ug/L | 0.2 | 0.8 |
| 1/29/2018 | Effluent Comp | Selenium | 0.20 U | ug/L | 0.2 | 0.8 |
| 1/29/2018 | Effluent Comp | Iron | 53 I | ug/L | 30 | 120 |
| 1/29/2018 | Effluent Comp | Lead | 0.11 I | ug/L | 0.05 | 0.2 |
| 1/29/2018 | Effluent Comp | Magnesium | 4.07 | mg/L | 0.04 | 0.16 |
| 1/29/2018 | Effluent Comp | Calcium | 25.3 | mg/L | 0.075 | 0.3 |
| 1/29/2018 | Effluent Comp | Sodium | 57.6 | mg/L | 0.5 | 2 |
| 1/29/2018 | Effluent Comp | Chromium | 0.41 I | ug/L | 0.4 | 1.6 |
| 1/29/2018 | Effluent Comp | Cadmium | 0.020 U | ug/L | 0.02 | 0.08 |
| 1/29/2018 | Effluent Comp | Zinc | 85 | ug/L | 5 | 20 |
| 1/29/2018 | Effluent Comp | NO2NO3-N | 1.3 | mg N/L | 0.04 | 0.1 |
| 1/29/2018 | Effluent Comp | Kjeldahl Nitrogen | 1.3 | mg N/L | 0.08 | 0.2 |
| 1/29/2018 | Effluent Comp | Ammonia-N | 0.032 | mg N/L | 0.002 | 0.005 |
| 1/29/2018 | Effluent Comp | Organic Carbon | 7.8 | mg C/L | 1 | 2 |
| 1/29/2018 | Effluent Comp | TSS | 2 U | mg/L | 2 | 10 |
| 1/29/2018 | Effluent Comp | Total-P | 0.25 | mg P/L | 0.005 | 0.05 |
| 1/29/2018 | Effluent Comp | pH | 7.2 | | | |
| 1/29/2018 | Effluent Comp | Dissolved Oxygen | 7.2 | mg/L | | |

| Date Sampled | UDL | Component | Result | Units | MDL | PQL |
|---|---|---|---|---|---|---|
| 1/29/2018 | Effluent Comp | Sample Depth | 10 | ft | | |
| 1/29/2018 | Effluent Comp | Temperature | 19.0 | C | | |
| 1/29/2018 | Effluent Comp | Total Residual Chlorine | 1.11 | mg/L | | |
| 1/29/2018 | Effluent Grab | Temperature | 19.0 | C | | |
| 1/29/2018 | Effluent Grab | O-Phosphate-P | 0.27 | mg P/L | 0.004 | 0.01 |
| 1/29/2018 | Effluent Grab | Kjeldahl Nitrogen | 1.2 | mg N/L | 0.08 | 0.2 |
| 1/29/2018 | Effluent Grab | NO2NO3-N | 0.59 | mg N/L | 0.004 | 0.01 |
| 1/29/2018 | Effluent Grab | Organic Carbon | 7.8 A | mg C/L | 1 | 2 |
| 1/29/2018 | Effluent Grab | Ammonia-N | 0.053 | mg N/L | 0.002 | 0.005 |
| 1/29/2018 | Effluent Grab | Total-P | 0.38 | mg P/L | 0.005 | 0.05 |
| 1/29/2018 | Effluent Grab | Sulfide | 2.0 Q | mg/L | 1 | 1 |
| 1/29/2018 | Effluent Grab | MCPP | 0.0020 UJ | ug/L | 0.002 | 0.008 |
| 1/29/2018 | Effluent Grab | Malathion | 0.010 U | ug/L | 0.01 | 0.04 |
| 1/29/2018 | Effluent Grab | Metalaxyl | 0.040 U | ug/L | 0.04 | 0.16 |
| 1/29/2018 | Effluent Grab | Metolachlor | 0.060 U | ug/L | 0.06 | 0.24 |
| 1/29/2018 | Effluent Grab | Norflurazon | 0.030 U | ug/L | 0.03 | 0.12 |
| 1/29/2018 | Effluent Grab | Carbamazepine | 0.076 | ug/L | 0.0004 | 0.0016 |
| 1/29/2018 | Effluent Grab | Azinphos Methyl | 0.020 U | ug/L | 0.02 | 0.08 |
| 1/29/2018 | Effluent Grab | Demeton | 0.024 U | ug/L | 0.024 | 0.096 |
| 1/29/2018 | Effluent Grab | Phorate | 0.0050 U | ug/L | 0.005 | 0.02 |
| 1/29/2018 | Effluent Grab | Diazinon | 0.010 U | ug/L | 0.01 | 0.04 |
| 1/29/2018 | Effluent Grab | Hexazinone | 0.030 U | ug/L | 0.03 | 0.12 |
| 1/29/2018 | Effluent Grab | Naled | 0.040 U | ug/L | 0.04 | 0.16 |
| 1/29/2018 | Effluent Grab | Prometon | 0.020 U | ug/L | 0.02 | 0.08 |
| 1/29/2018 | Effluent Grab | Prometryn | 0.020 U | ug/L | 0.02 | 0.08 |
| 1/29/2018 | Effluent Grab | Bentazon | 8.4E-04 IJ | ug/L | 0.0008 | 0.0032 |
| 1/29/2018 | Effluent Grab | 2,4-D | 0.0020 UJ | ug/L | 0.002 | 0.008 |
| 1/29/2018 | Effluent Grab | Butylate | 0.020 U | ug/L | 0.02 | 0.08 |
| 1/29/2018 | Effluent Grab | Triclopyr | 0.0040 UJ | ug/L | 0.004 | 0.016 |
| 1/29/2018 | Effluent Grab | Atrazine | 0.010 U | ug/L | 0.01 | 0.04 |
| 1/29/2018 | Effluent Grab | Bromacil | 0.040 U | ug/L | 0.04 | 0.16 |
| 1/29/2018 | Effluent Grab | Chlorpyrifos Methyl | 0.010 U | ug/L | 0.01 | 0.04 |
| 1/29/2018 | Effluent Grab | Metribuzin | 0.020 U | ug/L | 0.02 | 0.08 |
| 1/29/2018 | Effluent Grab | Mevinphos | 0.010 U | ug/L | 0.01 | 0.04 |
| 1/29/2018 | Effluent Grab | Acetaminophen | 0.0080 U | ug/L | 0.008 | 0.032 |
| 1/29/2018 | Effluent Grab | Fenamiphos | 0.030 U | ug/L | 0.03 | 0.12 |
| 1/29/2018 | Effluent Grab | Parathion Ethyl | 0.020 U | ug/L | 0.02 | 0.08 |
| 1/29/2018 | Effluent Grab | Alachlor | 0.060 U | ug/L | 0.06 | 0.24 |

| Date Sampled | UDL | Component | Result | Units | MDL | PQL |
|---|---|---|---|---|---|---|
| 1/29/2018 | Effluent Grab | Ametryn | 0.010 U | ug/L | 0.01 | 0.04 |
| 1/29/2018 | Effluent Grab | Atrazine Desethyl | 0.010 U | ug/L | 0.01 | 0.04 |
| 1/29/2018 | Effluent Grab | Atrazine Desisopropyl | 0.029 U | ug/L | 0.029 | 0.12 |
| 1/29/2018 | Effluent Grab | Parathion Methyl | 0.010 U | ug/L | 0.01 | 0.04 |
| 1/29/2018 | Effluent Grab | Disulfoton | 0.0050 UJ | ug/L | 0.005 | 0.02 |
| 1/29/2018 | Effluent Grab | Ethion | 0.010 U | ug/L | 0.01 | 0.04 |
| 1/29/2018 | Effluent Grab | Ethoprop | 0.0050 U | ug/L | 0.005 | 0.02 |
| 1/29/2018 | Effluent Grab | Simazine | 0.010 U | ug/L | 0.01 | 0.04 |
| 1/29/2018 | Effluent Grab | Sucralose | 68 | ug/L | 0.1 | 0.4 |
| 1/29/2018 | Effluent Grab | Chlorpyrifos Ethyl | 0.010 U | ug/L | 0.01 | 0.04 |
| 1/29/2018 | Effluent Grab | Fonofos | 0.010 U | ug/L | 0.01 | 0.04 |
| 1/29/2018 | Effluent Grab | 2,4,6-Trichlorophenol | 0.98 U | ug/L | 0.98 | 3.9 |
| 1/29/2018 | Effluent Grab | 2,4-Dimethylphenol | 9.8 U | ug/L | 9.8 | 39 |
| 1/29/2018 | Effluent Grab | 2-Chloronaphthalene | 0.98 U | ug/L | 0.98 | 3.9 |
| 1/29/2018 | Effluent Grab | 4-Nitrophenol | 15 U | ug/L | 15 | 59 |
| 1/29/2018 | Effluent Grab | Benzidine | 98 UJ | ug/L | 98 | 390 |
| 1/29/2018 | Effluent Grab | Phenanthrene | 0.20 U | ug/L | 0.2 | 0.78 |
| 1/29/2018 | Effluent Grab | 2,4-Dichlorophenol | 0.98 U | ug/L | 0.98 | 3.9 |
| 1/29/2018 | Effluent Grab | 3,3'-Dichlorobenzidine | 39 U | ug/L | 39 | 160 |
| 1/29/2018 | Effluent Grab | 4-Bromophenyl phenyl ether | 0.98 U | ug/L | 0.98 | 3.9 |
| 1/29/2018 | Effluent Grab | Acenaphthene | 0.20 U | ug/L | 0.2 | 0.78 |
| 1/29/2018 | Effluent Grab | Acenaphthylene | 0.20 U | ug/L | 0.2 | 0.78 |
| 1/29/2018 | Effluent Grab | Anthracene | 0.20 U | ug/L | 0.2 | 0.78 |
| 1/29/2018 | Effluent Grab | Di-n-butyl phthalate | 0.98 U | ug/L | 0.98 | 3.9 |
| 1/29/2018 | Effluent Grab | Chrysene | 0.20 U | ug/L | 0.2 | 0.78 |
| 1/29/2018 | Effluent Grab | Di-n-octyl phthalate | 0.98 U | ug/L | 0.98 | 3.9 |
| 1/29/2018 | Effluent Grab | Hexachlorocyclopentadiene | 2.9 U | ug/L | 2.9 | 12 |
| 1/29/2018 | Effluent Grab | N-Nitrosodiphenylamine/ Diphenylamine | 2.9 U | ug/L | 2.9 | 12 |
| 1/29/2018 | Effluent Grab | Phenol | 0.98 U | ug/L | 0.98 | 3.9 |
| 1/29/2018 | Effluent Grab | Benzo(g,h,i)perylene | 0.20 U | ug/L | 0.2 | 0.78 |
| 1/29/2018 | Effluent Grab | Bis(2-chloroethoxy)methane | 0.98 U | ug/L | 0.98 | 3.9 |
| 1/29/2018 | Effluent Grab | Hexachlorobenzene | 0.98 U | ug/L | 0.98 | 3.9 |
| 1/29/2018 | Effluent Grab | Isophorone | 0.98 U | ug/L | 0.98 | 3.9 |
| 1/29/2018 | Effluent Grab | N-Nitrosodi-n-propylamine | 2.0 U | ug/L | 2 | 7.8 |
| 1/29/2018 | Effluent Grab | Nitrobenzene | 2.0 U | ug/L | 2 | 7.8 |
| 1/29/2018 | Effluent Grab | 2,6-Dinitrotoluene | 0.98 U | ug/L | 0.98 | 3.9 |
| 1/29/2018 | Effluent Grab | 2-Methyl-4,6-dinitrophenol | 2.9 U | ug/L | 2.9 | 12 |
| 1/29/2018 | Effluent Grab | 2-Nitrophenol | 0.98 U | ug/L | 0.98 | 3.9 |

| Date Sampled | UDL | Component | Result | Units | MDL | PQL |
|---|---|---|---|---|---|---|
| 1/29/2018 | Effluent Grab | Benzo(a)anthracene | 0.20 U | ug/L | 0.2 | 0.78 |
| 1/29/2018 | Effluent Grab | Bis(2-chloroethyl)ether | 0.98 U | ug/L | 0.98 | 3.9 |
| 1/29/2018 | Effluent Grab | Indeno(1,2,3-cd)pyrene | 0.20 U | ug/L | 0.2 | 0.78 |
| 1/29/2018 | Effluent Grab | Pyrene | 0.20 U | ug/L | 0.2 | 0.78 |
| 1/29/2018 | Effluent Grab | 1,4-Dioxane | 0.72 | ug/L | 0.02 | 0.08 |
| 1/29/2018 | Effluent Grab | 1,2,4-Trichlorobenzene | 0.98 U | ug/L | 0.98 | 3.9 |
| 1/29/2018 | Effluent Grab | 2,4-Dinitrotoluene | 0.98 U | ug/L | 0.98 | 3.9 |
| 1/29/2018 | Effluent Grab | Benzo(b)fluoranthene | 0.20 U | ug/L | 0.2 | 0.78 |
| 1/29/2018 | Effluent Grab | Diethyl phthalate | 0.98 U | ug/L | 0.98 | 3.9 |
| 1/29/2018 | Effluent Grab | Fluorene | 0.20 U | ug/L | 0.2 | 0.78 |
| 1/29/2018 | Effluent Grab | Hexachloroethane | 2.9 U | ug/L | 2.9 | 12 |
| 1/29/2018 | Effluent Grab | N-Nitrosodimethylamine | 2.0 U | ug/L | 2 | 7.8 |
| 1/29/2018 | Effluent Grab | Naphthalene | 0.20 U | ug/L | 0.2 | 0.78 |
| 1/29/2018 | Effluent Grab | Pentachlorophenol | 0.98 U | ug/L | 0.98 | 3.9 |
| 1/29/2018 | Effluent Grab | Benzo(k)fluoranthene | 0.20 U | ug/L | 0.2 | 0.78 |
| 1/29/2018 | Effluent Grab | Bis(2-chloroisopropyl)ether | 2.9 U | ug/L | 2.9 | 12 |
| 1/29/2018 | Effluent Grab | Bis(2-ethylhexyl)phthalate | 2.0 U | ug/L | 2 | 7.8 |
| 1/29/2018 | Effluent Grab | Dimethyl phthalate | 0.98 U | ug/L | 0.98 | 3.9 |
| 1/29/2018 | Effluent Grab | Hexachlorobutadiene | 2.9 U | ug/L | 2.9 | 12 |
| 1/29/2018 | Effluent Grab | 2-Chlorophenol | 0.98 U | ug/L | 0.98 | 3.9 |
| 1/29/2018 | Effluent Grab | 4-Chloro-3-methylphenol | 0.98 U | ug/L | 0.98 | 3.9 |
| 1/29/2018 | Effluent Grab | Butyl benzyl phthalate | 0.98 U | ug/L | 0.98 | 3.9 |
| 1/29/2018 | Effluent Grab | Fluoranthene | 0.20 U | ug/L | 0.2 | 0.78 |
| 1/29/2018 | Effluent Grab | 2,4-Dinitrophenol | 15 U | ug/L | 15 | 59 |
| 1/29/2018 | Effluent Grab | 4-Chlorophenyl phenyl ether | 2.0 U | ug/L | 2 | 7.8 |
| 1/29/2018 | Effluent Grab | Benzo(a)pyrene | 0.20 U | ug/L | 0.2 | 0.78 |
| 1/29/2018 | Effluent Grab | Dibenzo(a,h)anthracene | 0.20 U | ug/L | 0.2 | 0.78 |
| 1/29/2018 | Effluent Grab | Dissolved Oxygen | 7.2 | mg/L | | |
| 1/29/2018 | Effluent Grab | Sample Depth | 10 | ft | | |
| 1/29/2018 | Effluent Grab | pH | 7.2 | | | |
| 1/29/2018 | Effluent Grab | Fecal Coliforms-Membrane Filter | 2 U | cfu/100 mL | 2 | 2 |
| 1/29/2018 | Blank | Lead | 0.050 U | ug/L | 0.05 | 0.2 |
| 1/29/2018 | Blank | Chromium | 0.40 U | ug/L | 0.4 | 1.6 |
| 1/29/2018 | Blank | Copper | 2.97 | ug/L | 0.2 | 0.8 |
| 1/29/2018 | Blank | Zinc | 5.0 U | ug/L | 5 | 20 |
| 1/29/2018 | Blank | Cadmium | 0.020 U | ug/L | 0.02 | 0.08 |
| 1/29/2018 | Blank | Potassium | 0.30 U | mg/L | 0.3 | 1.2 |
| 1/29/2018 | Blank | Calcium | 0.29 I | mg/L | 0.075 | 0.3 |

| Date Sampled | UDL | Component | Result | Units | MDL | PQL |
|---|---|---|---|---|---|---|
| 1/29/2018 | Blank | Selenium | 0.20 U | ug/L | 0.2 | 0.8 |
| 1/29/2018 | Blank | Hardness | 0.99 I | mg/L | 0.35 | 1.4 |
| 1/29/2018 | Blank | Silver | 0.010 U | ug/L | 0.01 | 0.04 |
| 1/29/2018 | Blank | Nickel | 0.20 U | ug/L | 0.2 | 0.8 |
| 1/29/2018 | Blank | Arsenic | 0.050 U | ug/L | 0.05 | 0.2 |
| 1/29/2018 | Blank | Sodium | 0.61 I | mg/L | 0.5 | 2 |
| 1/29/2018 | Blank | Magnesium | 0.064 I | mg/L | 0.04 | 0.16 |
| 1/29/2018 | Blank | Iron | 30 U | ug/L | 30 | 120 |
| 1/29/2018 | Blank | Aluminum | 30 | ug/L | 3 | 12 |
| 1/29/2018 | Blank | Color (true) | 2.5 U | PCU | 2.5 | 6 |
| 1/29/2018 | Blank | Chloride | 0.20 U | mg Cl/L | 0.2 | 0.5 |
| 1/29/2018 | Blank | Organic Carbon | 0.50 U | mg C/L | 0.5 | 1 |
| 1/29/2018 | Blank | Sulfate | 0.20 U | mg SO4/L | 0.2 | 0.5 |
| 1/29/2018 | Blank | Kjeldahl Nitrogen | 0.080 U | mg N/L | 0.08 | 0.2 |
| 1/29/2018 | Blank | Fluoride | 0.035 U | mg F/L | 0.035 | 0.1 |
| 1/29/2018 | Blank | Total Alkalinity | 0.65 U | mg CaCO3/L | 0.65 | 2.5 |
| 1/29/2018 | Blank | Turbidity | 0.10 U | NTU | 0.1 | 0.13 |
| 1/29/2018 | Blank | Total-P | 0.004 I | mg P/L | 0.002 | 0.005 |
| 1/29/2018 | Blank | NO2NO3-N | 0.004 U | mg N/L | 0.004 | 0.01 |
| 1/29/2018 | Blank | Ammonia-N | 0.002 U | mg N/L | 0.002 | 0.005 |
| 1/29/2018 | Blank | Sulfide | 1.0 UQ | mg/L | 1 | 1 |
| 1/29/2018 | Blank | Acetaminophen | 0.0080 U | ug/L | 0.008 | 0.032 |
| 1/29/2018 | Blank | Bentazon | 8.0E-04 U | ug/L | 0.0008 | 0.0032 |
| 1/29/2018 | Blank | Parathion Methyl | 0.0097 U | ug/L | 0.0097 | 0.039 |
| 1/29/2018 | Blank | Carbamazepine | 4.0E-04 U | ug/L | 0.0004 | 0.0016 |
| 1/29/2018 | Blank | Atrazine Desisopropyl | 0.0097 U | ug/L | 0.0097 | 0.039 |
| 1/29/2018 | Blank | Norflurazon | 0.029 U | ug/L | 0.029 | 0.12 |
| 1/29/2018 | Blank | Parathion Ethyl | 0.019 U | ug/L | 0.019 | 0.078 |
| 1/29/2018 | Blank | Phorate | 0.0049 U | ug/L | 0.0049 | 0.019 |
| 1/29/2018 | Blank | Prometon | 0.019 U | ug/L | 0.019 | 0.078 |
| 1/29/2018 | Blank | Prometryn | 0.019 U | ug/L | 0.019 | 0.078 |
| 1/29/2018 | Blank | Chlorpyrifos Ethyl | 0.0097 U | ug/L | 0.0097 | 0.039 |
| 1/29/2018 | Blank | Demeton | 0.023 U | ug/L | 0.023 | 0.093 |
| 1/29/2018 | Blank | Disulfoton | 0.0049 U | ug/L | 0.0049 | 0.019 |
| 1/29/2018 | Blank | Fenamiphos | 0.029 U | ug/L | 0.029 | 0.12 |
| 1/29/2018 | Blank | Metalaxyl | 0.039 U | ug/L | 0.039 | 0.16 |
| 1/29/2018 | Blank | Ametryn | 0.0097 U | ug/L | 0.0097 | 0.039 |
| 1/29/2018 | Blank | Chlorpyrifos Methyl | 0.0097 U | ug/L | 0.0097 | 0.039 |

| Date Sampled | UDL | Component | Result | Units | MDL | PQL |
|---|---|---|---|---|---|---|
| 1/29/2018 | Blank | Diazinon | 0.0097 U | ug/L | 0.0097 | 0.039 |
| 1/29/2018 | Blank | Mevinphos | 0.0097 U | ug/L | 0.0097 | 0.039 |
| 1/29/2018 | Blank | Sucralose | 0.010 U | ug/L | 0.01 | 0.04 |
| 1/29/2018 | Blank | Atrazine | 0.0097 U | ug/L | 0.0097 | 0.039 |
| 1/29/2018 | Blank | Bromacil | 0.039 U | ug/L | 0.039 | 0.16 |
| 1/29/2018 | Blank | Butylate | 0.019 U | ug/L | 0.019 | 0.078 |
| 1/29/2018 | Blank | Fonofos | 0.0097 U | ug/L | 0.0097 | 0.039 |
| 1/29/2018 | Blank | Metolachlor | 0.058 U | ug/L | 0.058 | 0.23 |
| 1/29/2018 | Blank | Metribuzin | 0.019 U | ug/L | 0.019 | 0.078 |
| 1/29/2018 | Blank | Naled | 0.039 U | ug/L | 0.039 | 0.16 |
| 1/29/2018 | Blank | 2,4-D | 0.0020 U | ug/L | 0.002 | 0.008 |
| 1/29/2018 | Blank | MCPP | 0.0020 U | ug/L | 0.002 | 0.008 |
| 1/29/2018 | Blank | Triclopyr | 0.0040 U | ug/L | 0.004 | 0.016 |
| 1/29/2018 | Blank | Alachlor | 0.058 U | ug/L | 0.058 | 0.23 |
| 1/29/2018 | Blank | Azinphos Methyl | 0.019 U | ug/L | 0.019 | 0.078 |
| 1/29/2018 | Blank | Ethoprop | 0.0049 U | ug/L | 0.0049 | 0.019 |
| 1/29/2018 | Blank | Hexazinone | 0.029 U | ug/L | 0.029 | 0.12 |
| 1/29/2018 | Blank | Malathion | 0.0097 U | ug/L | 0.0097 | 0.039 |
| 1/29/2018 | Blank | Simazine | 0.0097 U | ug/L | 0.0097 | 0.039 |
| 1/29/2018 | Blank | Atrazine Desethyl | 0.0097 U | ug/L | 0.0097 | 0.039 |
| 1/29/2018 | Blank | Ethion | 0.0097 U | ug/L | 0.0097 | 0.039 |
| 1/29/2018 | Blank | 2,4-Dichlorophenol | 1.0 U | ug/L | 1 | 4.1 |
| 1/29/2018 | Blank | Phenanthrene | 0.21 U | ug/L | 0.21 | 0.82 |
| 1/29/2018 | Blank | 4-Chloro-3-methylphenol | 1.0 U | ug/L | 1 | 4.1 |
| 1/29/2018 | Blank | Acenaphthylene | 0.21 U | ug/L | 0.21 | 0.82 |
| 1/29/2018 | Blank | Diethyl phthalate | 1.0 U | ug/L | 1 | 4.1 |
| 1/29/2018 | Blank | Hexachlorocyclopentadiene | 3.1 U | ug/L | 3.1 | 12 |
| 1/29/2018 | Blank | Naphthalene | 0.21 U | ug/L | 0.21 | 0.82 |
| 1/29/2018 | Blank | Benzo(g,h,i)perylene | 0.21 U | ug/L | 0.21 | 0.82 |
| 1/29/2018 | Blank | Bis(2-chloroisopropyl)ether | 3.1 U | ug/L | 3.1 | 12 |
| 1/29/2018 | Blank | Hexachlorobutadiene | 3.1 U | ug/L | 3.1 | 12 |
| 1/29/2018 | Blank | Hexachloroethane | 3.1 U | ug/L | 3.1 | 12 |
| 1/29/2018 | Blank | Pyrene | 0.21 U | ug/L | 0.21 | 0.82 |
| 1/29/2018 | Blank | 2-Chlorophenol | 1.0 U | ug/L | 1 | 4.1 |
| 1/29/2018 | Blank | Fluorene | 0.21 U | ug/L | 0.21 | 0.82 |
| 1/29/2018 | Blank | Dibenzo(a,h)anthracene | 0.21 U | ug/L | 0.21 | 0.82 |
| 1/29/2018 | Blank | Chrysene | 0.21 U | ug/L | 0.21 | 0.82 |
| 1/29/2018 | Blank | Benzidine | 100 U | ug/L | 100 | 410 |

| Date Sampled | UDL | Component | Result | Units | MDL | PQL |
|---|---|---|---|---|---|---|
| 1/29/2018 | Blank | 3,3'-Dichlorobenzidine | 41 U | ug/L | 41 | 160 |
| 1/29/2018 | Blank | 2,6-Dinitrotoluene | 1.0 U | ug/L | 1 | 4.1 |
| 1/29/2018 | Blank | 2,4-Dinitrophenol | 15 U | ug/L | 15 | 62 |
| 1/29/2018 | Blank | 2-Methyl-4,6-dinitrophenol | 3.1 U | ug/L | 3.1 | 12 |
| 1/29/2018 | Blank | Dimethyl phthalate | 1.0 U | ug/L | 1 | 4.1 |
| 1/29/2018 | Blank | 2-Chloronaphthalene | 1.0 U | ug/L | 1 | 4.1 |
| 1/29/2018 | Blank | 4-Chlorophenyl phenyl ether | 2.1 U | ug/L | 2.1 | 8.2 |
| 1/29/2018 | Blank | 4-Nitrophenol | 15 U | ug/L | 15 | 62 |
| 1/29/2018 | Blank | Acenaphthene | 0.21 U | ug/L | 0.21 | 0.82 |
| 1/29/2018 | Blank | Benzo(a)anthracene | 0.21 U | ug/L | 0.21 | 0.82 |
| 1/29/2018 | Blank | Benzo(b)fluoranthene | 0.21 U | ug/L | 0.21 | 0.82 |
| 1/29/2018 | Blank | Benzo(k)fluoranthene | 0.21 U | ug/L | 0.21 | 0.82 |
| 1/29/2018 | Blank | Indeno(1,2,3-cd)pyrene | 0.21 U | ug/L | 0.21 | 0.82 |
| 1/29/2018 | Blank | N-Nitrosodi-n-propylamine | 2.1 U | ug/L | 2.1 | 8.2 |
| 1/29/2018 | Blank | 1,2,4-Trichlorobenzene | 1.0 U | ug/L | 1 | 4.1 |
| 1/29/2018 | Blank | 4-Bromophenyl phenyl ether | 1.0 U | ug/L | 1 | 4.1 |
| 1/29/2018 | Blank | Anthracene | 0.21 U | ug/L | 0.21 | 0.82 |
| 1/29/2018 | Blank | Fluoranthene | 0.21 U | ug/L | 0.21 | 0.82 |
| 1/29/2018 | Blank | Isophorone | 1.0 U | ug/L | 1 | 4.1 |
| 1/29/2018 | Blank | N-Nitrosodimethylamine | 2.1 U | ug/L | 2.1 | 8.2 |
| 1/29/2018 | Blank | 2,4-Dinitrotoluene | 1.0 U | ug/L | 1 | 4.1 |
| 1/29/2018 | Blank | Bis(2-chloroethoxy)methane | 1.0 U | ug/L | 1 | 4.1 |
| 1/29/2018 | Blank | Bis(2-ethylhexyl)phthalate | 2.1 U | ug/L | 2.1 | 8.2 |
| 1/29/2018 | Blank | Hexachlorobenzene | 1.0 U | ug/L | 1 | 4.1 |
| 1/29/2018 | Blank | N-Nitrosodiphenylamine/ Diphenylamine | 3.1 U | ug/L | 3.1 | 12 |
| 1/29/2018 | Blank | 2,4-Dimethylphenol | 10 U | ug/L | 10 | 41 |
| 1/29/2018 | Blank | 2-Nitrophenol | 1.0 U | ug/L | 1 | 4.1 |
| 1/29/2018 | Blank | Benzo(a)pyrene | 0.21 U | ug/L | 0.21 | 0.82 |
| 1/29/2018 | Blank | Bis(2-chloroethyl)ether | 1.0 U | ug/L | 1 | 4.1 |
| 1/29/2018 | Blank | Butyl benzyl phthalate | 1.0 U | ug/L | 1 | 4.1 |
| 1/29/2018 | Blank | Di-n-butyl phthalate | 1.0 U | ug/L | 1 | 4.1 |
| 1/29/2018 | Blank | Di-n-octyl phthalate | 1.0 U | ug/L | 1 | 4.1 |
| 1/29/2018 | Blank | Nitrobenzene | 2.1 U | ug/L | 2.1 | 8.2 |
| 1/29/2018 | Blank | Pentachlorophenol | 1.0 U | ug/L | 1 | 4.1 |
| 1/29/2018 | Blank | Phenol | 1.0 U | ug/L | 1 | 4.1 |
| 1/29/2018 | Blank | 1,4-Dioxane | 0.020 U | ug/L | 0.02 | 0.08 |
| 1/29/2018 | Blank | 2,4,6-Trichlorophenol | 1.0 U | ug/L | 1 | 4.1 |
| 1/29/2018 | Test Site | Enterococci-Membrane Filter | 560 | cfu/100 mL | 10 | 10 |

| Date Sampled | UDL | Component | Result | Units | MDL | PQL |
|---|---|---|---|---|---|---|
| 1/29/2018 | Test Site | Fecal Coliforms-Membrane Filter | 833 B | cfu/100 mL | 1.64 | 1.64 |
| 1/29/2018 | Test Site | Algal Growth Potential | 2.04 | mg DryWt/L | 0.3 | 0.9 |
| 1/29/2018 | Test Site | Chlorophyll-a, Corrected | 2.4 A | ug/L | 0.61 | 1.9 |
| 1/29/2018 | Test Site | Biochemical Oxygen Demand-5 Day,N-Inhib | 3.2 A | mg/L | 0.2 | 2 |
| 1/29/2018 | Test Site | Phaeophytin-a | 0.58 I | ug/L | 0.44 | 1.3 |
| 1/29/2018 | Test Site | Chlorophyll-a, Uncorrected | 2.9 A | ug/L | 0.44 | 1.3 |
| 1/29/2018 | Test Site | Nickel | 1.09 | ug/L | 0.2 | 0.8 |
| 1/29/2018 | Test Site | Silver | 0.010 U | ug/L | 0.01 | 0.04 |
| 1/29/2018 | Test Site | Arsenic | 0.30 | ug/L | 0.05 | 0.2 |
| 1/29/2018 | Test Site | Aluminum | 686 | ug/L | 3 | 12 |
| 1/29/2018 | Test Site | Sodium | 26.5 | mg/L | 0.5 | 2 |
| 1/29/2018 | Test Site | Copper | 0.22 I | ug/L | 0.2 | 0.8 |
| 1/29/2018 | Test Site | Hardness | 12.8 | mg/L | 0.35 | 1.4 |
| 1/29/2018 | Test Site | Iron | 670 | ug/L | 30 | 120 |
| 1/29/2018 | Test Site | Potassium | 3.5 | mg/L | 0.3 | 1.2 |
| 1/29/2018 | Test Site | Cadmium | 0.020 U | ug/L | 0.02 | 0.08 |
| 1/29/2018 | Test Site | Lead | 0.58 | ug/L | 0.05 | 0.2 |
| 1/29/2018 | Test Site | Zinc | 5.0 U | ug/L | 5 | 20 |
| 1/29/2018 | Test Site | Chromium | 0.65 I | ug/L | 0.4 | 1.6 |
| 1/29/2018 | Test Site | Magnesium | 1.22 | mg/L | 0.04 | 0.16 |
| 1/29/2018 | Test Site | Selenium | 0.20 U | ug/L | 0.2 | 0.8 |
| 1/29/2018 | Test Site | Calcium | 3.11 | mg/L | 0.075 | 0.3 |
| 1/29/2018 | Test Site | Fluoride | 0.067 I | mg F/L | 0.035 | 0.1 |
| 1/29/2018 | Test Site | Total-P | 0.048 | mg P/L | 0.002 | 0.005 |
| 1/29/2018 | Test Site | Chloride | 31 | mg Cl/L | 0.2 | 0.5 |
| 1/29/2018 | Test Site | NO2NO3-N | 0.12 | mg N/L | 0.004 | 0.01 |
| 1/29/2018 | Test Site | Kjeldahl Nitrogen | 0.99 | mg N/L | 0.08 | 0.2 |
| 1/29/2018 | Test Site | Color (true) | 330 | PCU | 12 | 30 |
| 1/29/2018 | Test Site | Organic Carbon | 29 | mg C/L | 0.5 | 1 |
| 1/29/2018 | Test Site | Turbidity | 7.5 | NTU | 0.1 | 0.13 |
| 1/29/2018 | Test Site | Sulfate | 13 | mg SO4/L | 0.2 | 0.5 |
| 1/29/2018 | Test Site | Total Alkalinity | 1.4 I | mg CaCO3/L | 0.65 | 2.5 |
| 1/29/2018 | Test Site | O-Phosphate-P | 0.020 | mg P/L | 0.004 | 0.01 |
| 1/29/2018 | Test Site | TSS | 11 | mg/L | 2 | 10 |
| 1/29/2018 | Test Site | Ammonia-N | 0.014 | mg N/L | 0.002 | 0.005 |
| 1/29/2018 | Test Site | Sulfide | 3.2 Q | mg/L | 1 | 1 |
| 1/29/2018 | Test Site | Sucralose | 24 | ug/L | 0.01 | 0.04 |
| 1/29/2018 | Test Site | Dibenzo(a,h)anthracene | 0.20 U | ug/L | 0.2 | 0.78 |

| Date Sampled | UDL | Component | Result | Units | MDL | PQL |
|---|---|---|---|---|---|---|
| 1/29/2018 | Test Site | Diethyl phthalate | 0.98 U | ug/L | 0.98 | 3.9 |
| 1/29/2018 | Test Site | Fluoranthene | 0.20 U | ug/L | 0.2 | 0.78 |
| 1/29/2018 | Test Site | Fluorene | 0.20 U | ug/L | 0.2 | 0.78 |
| 1/29/2018 | Test Site | 2,4-Dimethylphenol | 9.8 U | ug/L | 9.8 | 39 |
| 1/29/2018 | Test Site | 2-Chlorophenol | 0.98 U | ug/L | 0.98 | 3.9 |
| 1/29/2018 | Test Site | Bis(2-chloroisopropyl)ether | 2.9 U | ug/L | 2.9 | 12 |
| 1/29/2018 | Test Site | Phenanthrene | 0.20 U | ug/L | 0.2 | 0.78 |
| 1/29/2018 | Test Site | 1,2,4-Trichlorobenzene | 0.98 U | ug/L | 0.98 | 3.9 |
| 1/29/2018 | Test Site | 2,4-Dinitrophenol | 15 U | ug/L | 15 | 59 |
| 1/29/2018 | Test Site | Di-n-butyl phthalate | 0.98 U | ug/L | 0.98 | 3.9 |
| 1/29/2018 | Test Site | Di-n-octyl phthalate | 0.98 U | ug/L | 0.98 | 3.9 |
| 1/29/2018 | Test Site | Naphthalene | 0.20 U | ug/L | 0.2 | 0.78 |
| 1/29/2018 | Test Site | 2,6-Dinitrotoluene | 0.98 U | ug/L | 0.98 | 3.9 |
| 1/29/2018 | Test Site | 2-Chloronaphthalene | 0.98 U | ug/L | 0.98 | 3.9 |
| 1/29/2018 | Test Site | 2-Methyl-4,6-dinitrophenol | 2.9 U | ug/L | 2.9 | 12 |
| 1/29/2018 | Test Site | 3,3'-Dichlorobenzidine | 39 U | ug/L | 39 | 160 |
| 1/29/2018 | Test Site | 4-Bromophenyl phenyl ether | 0.98 U | ug/L | 0.98 | 3.9 |
| 1/29/2018 | Test Site | 4-Chlorophenyl phenyl ether | 2.0 U | ug/L | 2 | 7.8 |
| 1/29/2018 | Test Site | Benzo(k)fluoranthene | 0.20 U | ug/L | 0.2 | 0.78 |
| 1/29/2018 | Test Site | Hexachloroethane | 2.9 U | ug/L | 2.9 | 12 |
| 1/29/2018 | Test Site | Nitrobenzene | 2.0 U | ug/L | 2 | 7.8 |
| 1/29/2018 | Test Site | Phenol | 0.98 U | ug/L | 0.98 | 3.9 |
| 1/29/2018 | Test Site | 4-Nitrophenol | 15 U | ug/L | 15 | 59 |
| 1/29/2018 | Test Site | Acenaphthene | 0.20 U | ug/L | 0.2 | 0.78 |
| 1/29/2018 | Test Site | Anthracene | 0.20 U | ug/L | 0.2 | 0.78 |
| 1/29/2018 | Test Site | Benzo(a)pyrene | 0.20 U | ug/L | 0.2 | 0.78 |
| 1/29/2018 | Test Site | Bis(2-ethylhexyl)phthalate | 2.0 U | ug/L | 2 | 7.8 |
| 1/29/2018 | Test Site | Chrysene | 0.20 U | ug/L | 0.2 | 0.78 |
| 1/29/2018 | Test Site | Hexachlorobenzene | 0.98 U | ug/L | 0.98 | 3.9 |
| 1/29/2018 | Test Site | N-Nitrosodiphenylamine/ Diphenylamine | 2.9 U | ug/L | 2.9 | 12 |
| 1/29/2018 | Test Site | 4-Chloro-3-methylphenol | 0.98 U | ug/L | 0.98 | 3.9 |
| 1/29/2018 | Test Site | Acenaphthylene | 0.20 U | ug/L | 0.2 | 0.78 |
| 1/29/2018 | Test Site | Benzidine | 98 U | ug/L | 98 | 390 |
| 1/29/2018 | Test Site | Benzo(b)fluoranthene | 0.20 U | ug/L | 0.2 | 0.78 |
| 1/29/2018 | Test Site | Bis(2-chloroethyl)ether | 0.98 U | ug/L | 0.98 | 3.9 |
| 1/29/2018 | Test Site | Hexachlorocyclopentadiene | 2.9 U | ug/L | 2.9 | 12 |
| 1/29/2018 | Test Site | Indeno(1,2,3-cd)pyrene | 0.20 U | ug/L | 0.2 | 0.78 |
| 1/29/2018 | Test Site | 2,4-Dichlorophenol | 0.98 U | ug/L | 0.98 | 3.9 |

| Date Sampled | UDL | Component | Result | Units | MDL | PQL |
|---|---|---|---|---|---|---|
| 1/29/2018 | Test Site | 2,4-Dinitrotoluene | 0.98 U | ug/L | 0.98 | 3.9 |
| 1/29/2018 | Test Site | 2-Nitrophenol | 0.98 U | ug/L | 0.98 | 3.9 |
| 1/29/2018 | Test Site | Benzo(g,h,i)perylene | 0.20 U | ug/L | 0.2 | 0.78 |
| 1/29/2018 | Test Site | Dimethyl phthalate | 0.98 U | ug/L | 0.98 | 3.9 |
| 1/29/2018 | Test Site | Hexachlorobutadiene | 2.9 U | ug/L | 2.9 | 12 |
| 1/29/2018 | Test Site | Isophorone | 0.98 U | ug/L | 0.98 | 3.9 |
| 1/29/2018 | Test Site | N-Nitrosodimethylamine | 2.0 U | ug/L | 2 | 7.8 |
| 1/29/2018 | Test Site | Pentachlorophenol | 0.98 U | ug/L | 0.98 | 3.9 |
| 1/29/2018 | Test Site | Pyrene | 0.20 U | ug/L | 0.2 | 0.78 |
| 1/29/2018 | Test Site | Benzo(a)anthracene | 0.20 U | ug/L | 0.2 | 0.78 |
| 1/29/2018 | Test Site | Butyl benzyl phthalate | 0.98 U | ug/L | 0.98 | 3.9 |
| 1/29/2018 | Test Site | N-Nitrosodi-n-propylamine | 2.0 U | ug/L | 2 | 7.8 |
| 1/29/2018 | Test Site | 1,4-Dioxane | 0.076 I | ug/L | 0.02 | 0.08 |
| 1/29/2018 | Test Site | 2,4,6-Trichlorophenol | 0.98 U | ug/L | 0.98 | 3.9 |
| 1/29/2018 | Test Site | Bis(2-chloroethoxy)methane | 0.98 U | ug/L | 0.98 | 3.9 |
| 1/29/2018 | Test Site | Sample Depth | 0.3 | m | | |
| 1/29/2018 | Test Site | Temperature | 14.17 | C | | |
| 1/29/2018 | Test Site | Dissolved Oxygen | 7.19 | mg/L | | |
| 1/29/2018 | Test Site | pH | 4.83 | | | |
| 1/31/2018 | Effluent Comp | pH | 7.15 | | | |
| 1/31/2018 | Effluent Comp | Dissolved Oxygen | 8.75 | mg/L | | |
| 1/31/2018 | Effluent Comp | Temperature | 17.9 | C | | |
| 1/31/2018 | Effluent Grab | Algal Growth Potential | 80.8 | mg DryWt/L | 0.3 | 0.9 |
| 1/31/2018 | Effluent Grab | Chlorophyll-a, Corrected | 0.55 U | ug/L | 0.55 | 1.7 |
| 1/31/2018 | Effluent Grab | Phaeophytin-a | 0.40 U | ug/L | 0.4 | 1.2 |
| 1/31/2018 | Effluent Grab | Chlorophyll-a, Uncorrected | 0.40 U | ug/L | 0.4 | 1.2 |
| 1/31/2018 | Effluent Grab | Fluoride | 0.69 | mg F/L | 0.035 | 0.1 |
| 1/31/2018 | Effluent Grab | Turbidity | 1.4 | NTU | 0.1 | 0.13 |
| 1/31/2018 | Effluent Grab | Sulfate | 33 | mg SO4/L | 0.4 | 1 |
| 1/31/2018 | Effluent Grab | Color (true) | 14 | PCU | 2.5 | 6 |
| 1/31/2018 | Effluent Grab | Chloride | 99 | mg Cl/L | 0.4 | 1 |
| 1/31/2018 | Effluent Grab | Total Alkalinity | 84 | mg CaCO3/L | 0.65 | 2.5 |

**Appendix F**
**EPA End Sheet**

## The Bioassay of the Panama City Beach WWTF effluent sampled on January 29, 2018, NPDES #FL0021512

Fill Out This Section For All Surface Water Discharger Inspections (CEI, CSI, CBI, PAI, XSI-RI Optional)

| Transaction Code | NPDES NUMBER | YR/MO/DA | Insp Type | Inspector | Fac Type |
|---|---|---|---|---|---|
| 1 N 2 5 | 3 FL0021512 | 11 12 180129 | # B | # S | # 1 |

Remarks

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## The Priority Pollutants Analysis for Panama City Beach WWTF effluent sampled on January 29, 2018, NPDES #FL0021512

Fill Out This Section For All Surface Water Discharger Inspections(CEI, CSI, CBI, PAI, XSI-RI Optional)

| Transaction Code | NPDES NUMBER | YR/MO/DA | Insp Type | Inspector | Fac Type |
|---|---|---|---|---|---|
| 1 N 2 5 | 3 FL0021512 | 11 12 180129 | # X | # S | # 1 |

Remarks

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## Biological Analyses of the Panama City Beach WWTF effluent sampled on January 29, 2018, NPDES #FL0021512

Fill Out This Section For All Surface Water Discharger Inspections(CEI, CSI, CBI, PAI, XSI-RI Optional)

| Transaction Code | NPDES NUMBER | YR/MO/DA | Insp Type | Inspector | Fac Type |
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Remarks

