**CITY OF NAPLES**

**2020 - 2021 Annual Surface Water and Pump Station Monitoring and Analysis Report**

**FINAL REPORT**

Prepared for

***City of Naples***
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**EXECUTIVE SUMMARY**

Wood conducted water quality sampling at 22 lakes (stormwater ponds) and three pump stations within the City of Naples. Samples were collected monthly from the outfalls from October 2020 through September 2021 and were analyzed for a variety of water quality parameters, including nutrients, chlorophyll-a, copper, and fecal indicator bacteria (*Enterococci* and *Escherichia coli*). A handheld meter was used to monitor field parameters (e.g., water temperature, dissolved oxygen saturation) at each sampling location during collection. The water quality data from 2020 – 2021 was combined with the City of Naples' existing stormwater lake dataset that included water quality data for select lakes beginning in 2014. Data analysis of the 2020-2021 and long-term datasets (2014 – 2021) included calculation of trends and correlations, a multivariate principal components analysis, and an informal impairment assessment of the lakes using non-applicable water quality criteria for the waterbodies receiving stormwater lake discharge.

Major findings include identification of statistically significant trends in the long-term dataset in 12 of the stormwater lakes and three pump stations for nutrients, chlorophyll-a, copper, and fecal indicator bacteria (*Enterococci* and fecal coliform). Most significant trends were decreasing, but increasing trends were identified for nitrate + nitrite, ammonia, and orthophosphate in Alligator Lake, nitrate + nitrite at the Port Royal pump station, orthophosphate in Lake Manor, chlorophyll-a in Devils Lake, and copper in Lake Suzanne. Statistically significant increasing trends for *Enterococci*, the fecal indicator bacteria for marine waters, were identified in Alligator Lake, Sun Lake Terrace, Forest Lake, and South Lake. Statistically significant increasing trends for fecal coliform were identified in Forest Lake, Lake Manor, North Lake, and South Lake. Overall, sampling locations that stood out with the highest average concentrations of nutrients, chlorophyll-a, and fecal indicator bacteria include North Lake, South Lake, Lantern Lake, and the Port Royal Pumping station.

Stormwater lakes were commonly found to have concentration of nutrients, chlorophyll-a, and *Enterococci* in exceedance of water quality criteria in downstream waterbodies, which include the Gordon River, Moorings Bay, and Naples Bay. It is important to note that the regulatory water quality impairment criteria do not apply to stormwater lakes since they are manmade features and are not classified as Waters of the State. Stormwater lakes are designed to receive rainfall runoff containing nutrients and other pollutants. The comparison to downstream water quality criteria is simply a comparison tool and the downstream water quality criteria do not represent target water quality conditions in stormwater lakes.

The observed elevated concentrations and increasing trends only provide a small snapshot into the water quality conditions of the stormwater lakes that are discharging into downstream waterbodies. This information can be used as a preliminary screening tool to assess if there may be a water quality issue at hand in each lake. Generally, in the City of Naples, water quality pollutants can be introduced to the environment via human activities and delivered to surface waters via stormwater. For example, stormwater runoff from lawns can include nutrients from yard waste, pet waste, and fertilizers (however, atmospheric deposition is also a source of nutrients in the environment). Metals can also be introduced to the aquatic environment via human activities (including from roadways and, in the case of copper, algaecide application to surface waters). However, the in-lake concentrations of the water quality parameters measured in the present study are dependent on variables that are not captured in the monthly water quality sampling. These variables include the different watershed characteristics for each lake (including the land use and fertilizer activity) and in-lake processes (for example, in some lakes, sediments may be a source of nutrients). Due to the observed elevated concentrations of certain constituents, coupled with some increasing trends, additional monitoring was recommended to fill certain data gaps and to provide additional information to improve the water quality conditions of the stormwater lakes and receiving water bodies. Recommendations for the City of Naples stormwater lake sampling program include pollutant load modeling, additional sampling at lake inflows, and sediment studies. Additional data gathering will provide the necessary information to propose water quality improvement projects to benefit stormwater lakes and downstream waterbodies. Water quality improvement projects could include low impact development projects to improve water quality within the lake watersheds, sediment inactivation to mitigate the internal cycling load of nutrients, and outreach (e.g., fertilizer education).

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| | |
|---|---|
| AGM | annual geometric mean |
| BAM | Bio-Sorption Activated Media |
| BMP | Best Management Practice |
| Chl-a | chlorophyll-a |
| City | City of Naples |
| Cu | copper |
| DO | dissolved oxygen |
| DOC | dissolved organic carbon |
| *E. coli* | *Escherichia coli* |
| EMC | Event Mean Concentration |
| ENTERO | *Enterococci* |
| FDEP | Florida Department of Environmental Protection |
| FDOT | Florida Department of Transportation |
| FLUCCS | Florida Land Use, Cover and Forms Classification |
| FY | Fiscal Year |
| GIS | geographic information system |
| LID | Low impact development |
| MDL | method detection limit |
| µg/L | micrograms per liter |
| mg/L | milligrams per liter |
| MK | Mann-Kendall |
| ml | milliliter |
| N | nitrogen |
| NELAP | National Laboratory Accreditation Program |
| NH4 | ammonia nitrogen |
| NOAA | National Oceanic and Atmospheric Administration |
| NOx | Nitrate + Nitrite Nitrogen |
| OP | Orthophosphate |
| P | phosphorus |
| PCA | Principal Components Analyses |
| PCU | Platinum cobalt units |
| POR | Period of record |
| p-value | probability value |
| ROW | right-of-way |
| SCADA | Supervisory Control and Data Acquisition |
| SFWMD | South Florida Water Management District |
| SMK | Seasonal Mann-Kendall |
| SOP | Standard Operating Procedures |
| TDML | total maximum daily load |
| TKN | total Kjeldahl nitrogen |
| TN | total nitrogen |
| TOC | total organic carbon |
| TP | total phosphorus |
| TSS | total suspended solids |

| | |
|---|---|
| WBID | Water Body Identification Number |
| Wood | Wood Environment & Infrastructure Solutions, Inc. |

## 1.0 INTRODUCTION

Wood Environment & Infrastructure Solutions, Inc. (Wood) was contracted by the City of Naples (City) to conduct water quality sampling and analysis of the stormwater lakes (ponds) receiving public drainage and the City's pump stations and to prepare an annual report to summarize and interpret the results. The City has a robust stormwater lake sampling program that includes collection of quarterly and monthly water quality data as far back as 2014 for 15 of the lakes within its inventory, including: Devils Lake, Swan Lake, Colonnade Lake, Lake Suzanne, Mandarin Lake, South Lake, Alligator Lake, East Lake, Lantern Lake, Sun Lake Terrace, Fleischmann Lake, Forest Lake, Lake Manor, Half Moon Lake (though not part of the current sampling program and does not receive public drainage), and NCH Lake (does not receive public drainage, samples collected for hospital). The stormwater lakes are a key component in the stormwater system of the City of Naples. These lakes receive stormwater, or rainfall runoff, from surrounding lands before discharging water to downstream receiving waterbodies. When properly maintained, stormwater lakes can provide water quality treatment beneficial to downstream waterbodies and flood control beneficial to the surrounding watershed. The data collected in the sampling program provides for valuable insight into the water quality within the lakes and potential impacts on receiving waterbodies.

This report summarizes the water quality monitoring of the City's stormwater lakes and pump stations through September 2021 (**Task 1.2** – Sample Collection and Laboratory Analysis) and the work completed under **Task 1.3** – Data Analysis, Interpretation, and Reporting. For **Task 1.2**, Wood collected samples at the outflows of 22 stormwater lakes and three pump stations on a monthly frequency for one year (from October 2020 through September 2021) and provided monthly data deliverables. Location information for sampled stormwater lakes and pump stations are presented in **Figure 1-1**, and additional sampling location information is presented in **Table *1-1***. The sample collection schedule was coordinated according to the City's Naples Bay water quality monitoring plan.

This report is being prepared as part of **Task 1.3** and includes an assessment of the water quality data collected from 2020-2021 and data extending back to 2014 to identify trends, potential impairment risks to downstream waterbodies, and to document noteworthy water quality issues within the stormwater lakes. **Section 1** of this report includes information on the land use within the City of Naples and the watersheds of the receiving waterbodies for the City's stormwater lakes. An overview of the water quality assessment statistical analysis methodologies is provided in **Section 2**, and the results of the analyses are summarized in **Section 3**. A summary of select results is provided in **Section 4**. Recommendations for additional study and water quality improvement projects are summarized in **Section 5**.

**Table 1-1.** Stormwater lakes and pump stations monitored from October 2020 – September 2021

| Lake or Pump Station Name | Lake or Pump Station Number | Station ID | Drainage Basin (Rain Gauge) |
|---|---|---|---|
| Lake Diana | 17 | 17B | Gordon River 18-A-12 (#8) |
| NCH Lake | 26 | 26B | |
| Forest Lake | 20 | 20B | |
| Fleischmann Lake (15th Avenue N Lake-WTP) | 19 | 19B | |
| Mandarin Lake | 6 | 6B | |
| Lake Manor | 22 | 22B | |
| Thurner | 16 | 16B | |
| Willow | 21 | 21B | |
| Sun Lake Terrace | 15 | 15B | |
| North Lake | 8 | 8B | Gulf of Mexico 31-A-12 (#7) |
| South Lake | 9 | 9B | |
| Alligator Lake | 10 | 10B | |
| Lake Suzanne | 5 | 5B | Moorings Bay 109-A-12 (#10) |
| Swan Lake | 2 | 2B | |
| Colonnade Lake | 3 | 3B | |
| Lowdermilk | 23 | 23B | |
| Hidden | 4 | 4B | |
| Devils Lake | 1 | 1SE-B | |
| Lantern Lake | 14 | 14B | Naples Bay 92-C-12 (#4) |
| Lake 13 | 13 | 13B | |
| East Lake | 31 | 11B | |
| Spring Lake | 11 | 11C | |
| Port Royal Pump | 14 | 14-Pump | Pump Stations |
| Cove Pump | 11 | 11-Pump | |
| Public Works Pump | PW | PW-Pump | |

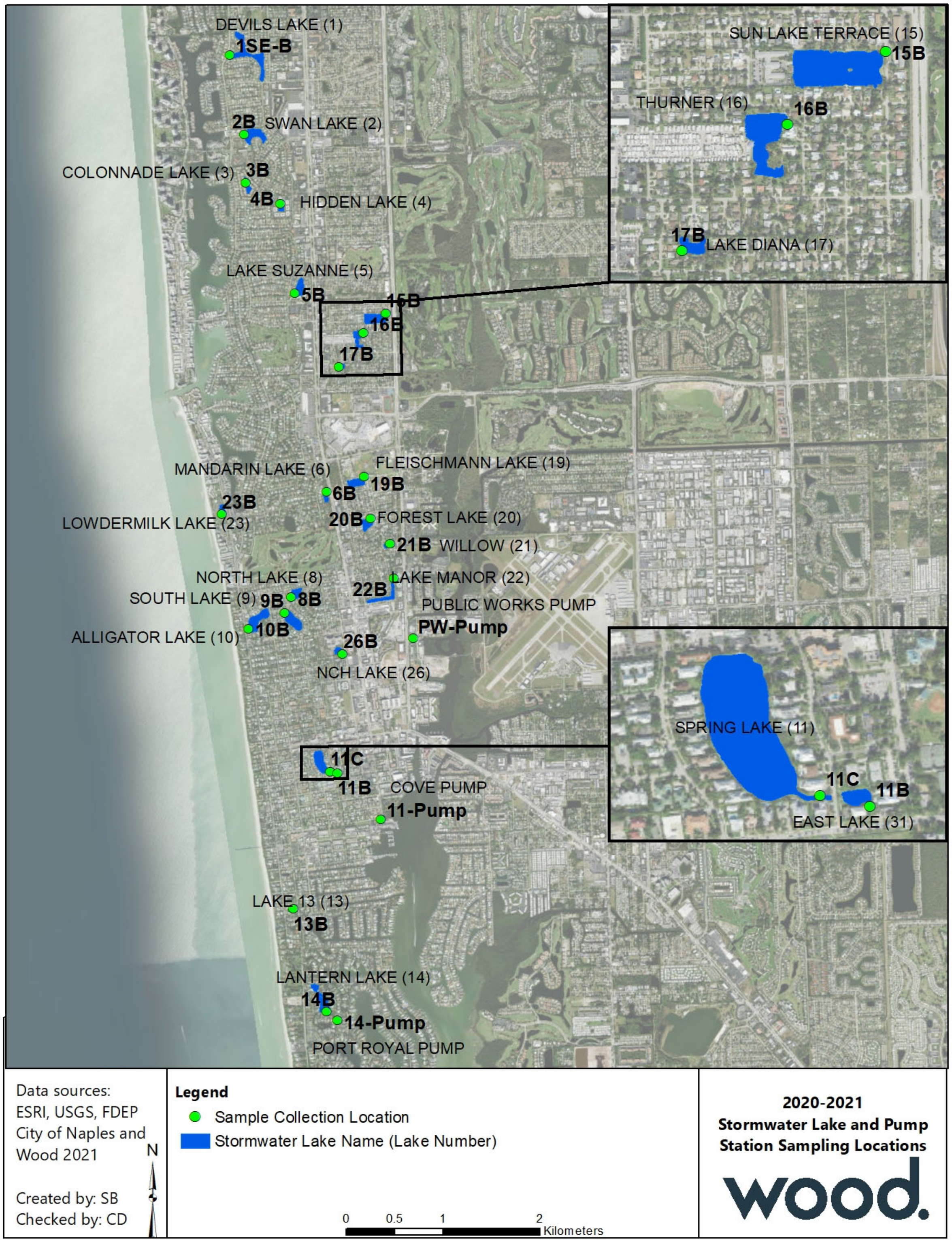



**Figure 1-1.** October 2020-September 2021 Stormwater Lake and Pump Station Outfall Sampling Locations

### 1.1. Background

There are 28 stormwater lakes on the City of Naples stormwater lake inventory (**Figure 1-2**, Wood, 2019). Of these lakes, five are public lakes (public defined as fee simple ownership or Plat dedication and historical use): Mandarin Lake, Fleischmann Lake, Lake Manor, Lowdermilk Lake, and East Lake; these lakes were monitored during the 2020-2021 sampling. The remaining lakes are primarily privately owned, though ownership is undetermined at five lakes (Spring Lake, North Lake, South Lake, Alligator Lake, and Lake Diana). The 22 lakes monitored during 2020-2021 are listed in **Table 1-1**; the lakes not monitored in 2020-2021, but on the City's inventory, include the following privately owned lakes: Halfmoon Lake (Lake 24), Lake 7, Lake 12, Lake 25, Lake 27, and Lake 28. Note that because these privately owned lakes do not receive public drainage, the City has made a concerted effort in recent years to focus sampling efforts to other lakes that receive public drainage.

The City of Naples stormwater lakes are manmade features and were excavated to provide upland fill for the surrounding homes as well as intercept pollutants through the collection and retention of stormwater runoff. Therefore, they are not considered "Waters of the State" by the Florida Department of Environmental Protection (FDEP) and are therefore not subject to regulatory water quality criteria.

In recent years (including 2020-2021), the City's stormwater lakes monitoring program included only samples at the lake outfalls. Previous monitoring efforts included monitoring at both the inflows and outflows of the lakes; influent monitoring has not been conducted since February 2014 (Amec, 2014). Monitoring both the inflow and outflow requires more effort and can be costly but allows for information about in-lake processes (e.g., pollutant removal efficiency or internal loading potential). Additional lake data previously collected, though not updated recently, included data on lake residence time, potential for stratification, sediment accumulation, mass loading of pollutants per lake volume, and absolute mass of pollutants discharged (Amec, 2012; Amec, 2014). Such data requires additional effort to collect, analyze, and interpret. The City's current stormwater lake monitoring program includes sample collection at outfalls only and is focused on maximizing the monitoring frequency (monthly), analytical parameters (16 analytical parameters plus field measurements) and number of monitoring locations (22 lakes and three pump stations).

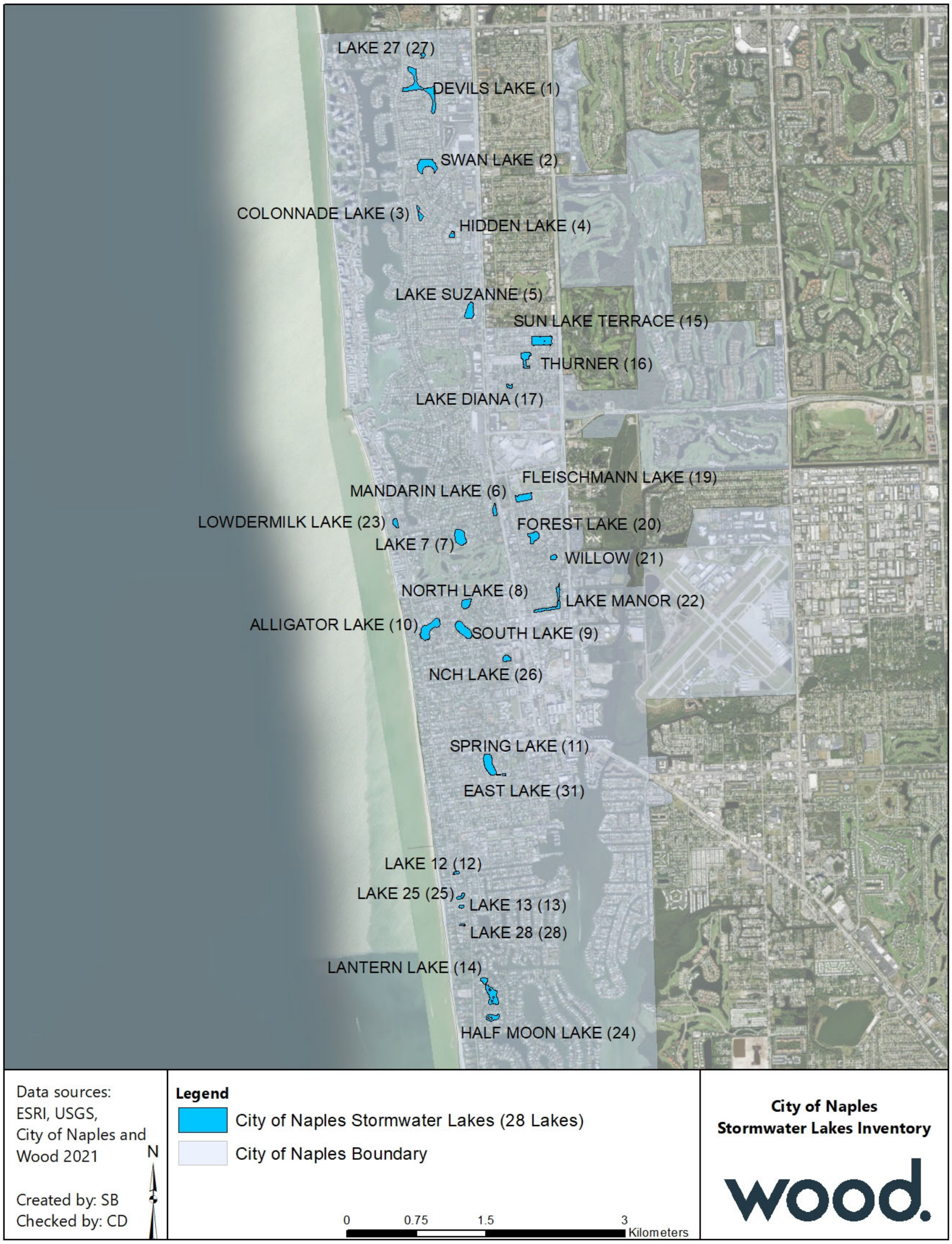



**Figure 1-2.** City of Naples Stormwater Lakes Inventory (Note: inventory includes stormwater lakes that do not receive public drainage)

### 1.2. Watershed Setting

Rainfall runoff is the primary source of water to the stormwater lakes and the water quality of the runoff is largely dependent on the land use in the watershed surrounding the lake. Information about the land use within the City of Naples, land use implications for stormwater quality, and the receiving waterbodies for City stormwater lakes is included below. This land use analysis provides general information about the runoff characteristics in the City and is also a key component of pollutant load modeling, one of the recommendations described in **Section 5.0**. Accurate basin information is necessary for pollutant load modeling and the City is currently conducting basin assessments in select areas which will provide useful information for pollutant load modeling.

#### 1.2.1. Surrounding Land Use

The City of Naples stormwater lakes receive stormwater from both public and private lands within the City of Naples (Wood, 2019). The land use within the City, using the Florida Land Use, Cover and Forms Classification (FLUCCS; FDOT, 1999) with land use data from 2017 – 2019 is included in **Figure 1-3**. The acreages and percent cover of the land uses present within the City are included in **Table 1-2** (showing all land uses, including surface waters) and **Table 1-3** (showing the land uses not including surface waters); both tables are sorted to show the largest areas at the top of the table. The land use acreages and percentages are based on a geographic information system (GIS) analysis of the 2017 – 2019 land use data compiled by the South Florida Water Management District (SFWMD) and downloaded from the FDEP Geospatial Open Data website[1].

The primary developed land uses within the City of Naples are medium density residential, high density residential, recreational, and commercial and services. These land uses are an important consideration because they illustrate the general conditions within the City and because different land use types can generate different concentrations of pollutants and loads to receiving waterbodies. When modeling the pollutant loads from different land uses, an Event Mean Concentration (EMC) is typically used to represent the average concentration of a pollutant in runoff from a specific land use. The EMCs for the medium and high density residential and commercial land uses are included in **Table 1-4**; the EMCs in this table are from the FDEP's Draft Environmental Resource Permit Stormwater Quality Applicant's Handbook (FDEP, 2010) and are based on literature-based runoff characteristics from studies throughout Florida. In contrast to the developed land uses in **Table 1-4**, the EMCs are generally lower from undeveloped or more natural lands. For example, the average EMCs for total nitrogen (TN) and total phosphorus (TP) for undeveloped and forested areas are 1.15 mg/L and 0.055 mg/L, respectively (FDEP, 2007) and the TN and TP EMCs for medium density residential land use are 1.85 mg/L and 0.31 mg/L, respectively (FDEP, 2010). Recreational land use also comprises a high percentage of land within the City, with the majority (approximately 800 acres) as golf courses. Depending on how the golf course is managed, the runoff characteristics at more heavily fertilized courses can be similar to medium density residential (FDEP, 2007). At golf courses that use less fertilizer, runoff nutrient concentrations may be lower, while reclaimed water use can contribute to nutrients in golf course runoff.

It is important to note that the land uses contributing to each of the City's lakes will differ according to the land uses present within the lake's sub-basin. Although the City is dominated by residential lands, lakes will differ in their individual land uses, for example, some lakes may receive stormwater from primarily

[1]FDEP Geospatial Open Data FLUCCS Data, available at: https://geodata.dep.state.fl.us/datasets/FDEP::statewide-land-use-land-cover/about.

undeveloped areas, or primarily from recreational areas. In addition, the EMCs from FDEP (2010) are useful for comparison across different land uses but do not represent site-specific conditions. Site-specific EMCs can be developed using stormwater sampling.

The contributing land uses can provide managers information on the primary runoff characteristics and potential pollutant sources within the watershed and the types of water quality improvement projects that may be implemented. For example, the City has large areas of residential and golf course areas, and the application of fertilizer has been recognized as an important source of nitrogen (N) and phosphorus (P) pollution in urban areas, via stormwater runoff (Souto et al., 2019; Yang and Toor, 2016; Yang and Toor, 2017; Krimsky et al., 2021). The City of Naples has already implemented a fertilizer ordinance[2] and developed web-based outreach materials including a fertilizer calculator that can assist residents, along with brochures emphasizing how everyone can do their part to minimize fertilizer impacts to surrounding waterways. Landscape companies are also required to complete the Green Industries Best Management Practices certification provided through the State—an initiative that was started within the City of Naples' and grew statewide based on these efforts.

**Table 1-2.** City of Naples Land Use (All Mapped Areas)

| FLUCCS Code Level 2 | FLUCCS Description | Acres | Percent of Total |
|---:|---|---:|---:|
| 1200 | Residential Medium Density | 2,748.70 | 29% |
| 5100 | Streams and Waterways | 1,533.86 | 16% |
| 1300 | Residential High Density | 1,043.68 | 11% |
| 1800 | Recreational | 1,020.96 | 11% |
| 1400 | Commercial and Services | 838.38 | 9% |
| 8100 | Transportation | 712.63 | 7% |
| 6100 | Wetland Hardwood Forests | 669.34 | 7% |
| 5300 | Reservoirs | 254.32 | 3% |
| 1100 | Residential Low Density | 182.33 | 2% |
| 1700 | Institutional | 171.84 | 2% |
| 3200 | Shrub and Brushland | 96.03 | 1% |
| 1900 | Open Land | 80.21 | 1% |
| 4100 | Upland Coniferous Forests | 73.15 | 1% |
| 4300 | Upland Mixed Forests | 52.57 | 1% |
| 5700 | Oceans Seas and Gulfs | 45.74 | 0.5% |
| 8300 | Utilities | 29.89 | 0.3% |
| 4200 | Upland Hardwood Forests | 23.96 | 0.2% |
| 6300 | Wetland Forested Mixed | 18.27 | 0.2% |
| 6400 | Vegetated Non-Forested Wetlands | 12.67 | 0.1% |
| 5400 | Bays and Estuaries | 9.74 | 0.1% |
| 6200 | Wetland Coniferous Forests | 8.00 | 0.1% |
| **Total** | | **9,626.24** | **100%** |

[2] Fertilizer Use and Maintenance of Landscapes, City of Naples, available at: https://www.naplesgov.com/fertilizer, accessed 2021-07-23.

**Table 1-3.** City of Naples Land Use (Not Including Surface Waters)

| FLUCCS Code Level 2 | FLUCCS Description | Acres | Percent of Total |
|---|---|---|---|
| 1200 | Residential Medium Density | 2,748.70 | 35% |
| 1300 | Residential High Density | 1,043.68 | 13% |
| 1800 | Recreational | 1,020.96 | 13% |
| 1400 | Commercial and Services | 838.38 | 11% |
| 8100 | Transportation | 712.63 | 9% |
| 6100 | Wetland Hardwood Forests | 669.34 | 9% |
| 1100 | Residential Low Density | 182.33 | 2% |
| 1700 | Institutional | 171.84 | 2% |
| 3200 | Shrub and Brushland | 96.03 | 1% |
| 1900 | Open Land | 80.21 | 1% |
| 4100 | Upland Coniferous Forests | 73.15 | 1% |
| 4300 | Upland Mixed Forests | 52.57 | 1% |
| 8300 | Utilities | 29.89 | 0% |
| 4200 | Upland Hardwood Forests | 23.96 | 0% |
| 6300 | Wetland Forested Mixed | 18.27 | 0% |
| 6400 | Vegetated Non-Forested Wetlands | 12.67 | 0% |
| 6200 | Wetland Coniferous Forests | 8.00 | 0% |
| **Total** | | **7,782.59** | 100% |

**Table 1-4.** Select EMCs for Residential and Commercial Land Uses (FDEP, 2010)

| FLUCCS Code Level 2 | Land Use | EMC (mg/L) | | | |
|---|---|---|---|---|---|
| | | TN | TP | TSS | Cu |
| 1200 | Residential Medium Density (Single-Family) | 1.85 | 0.31 | 37.5 | 0.016 |
| 1300 | Residential High Density (Multi-Family) | 1.91 | 0.48 | 77.8 | 0.009 |
| 1400 | Commercial (range represents low and high intensity) | 0.93 - 2.48 | 0.16 - 0.23 | 57.5 - 69.7 | 0.015 - 0.018 |

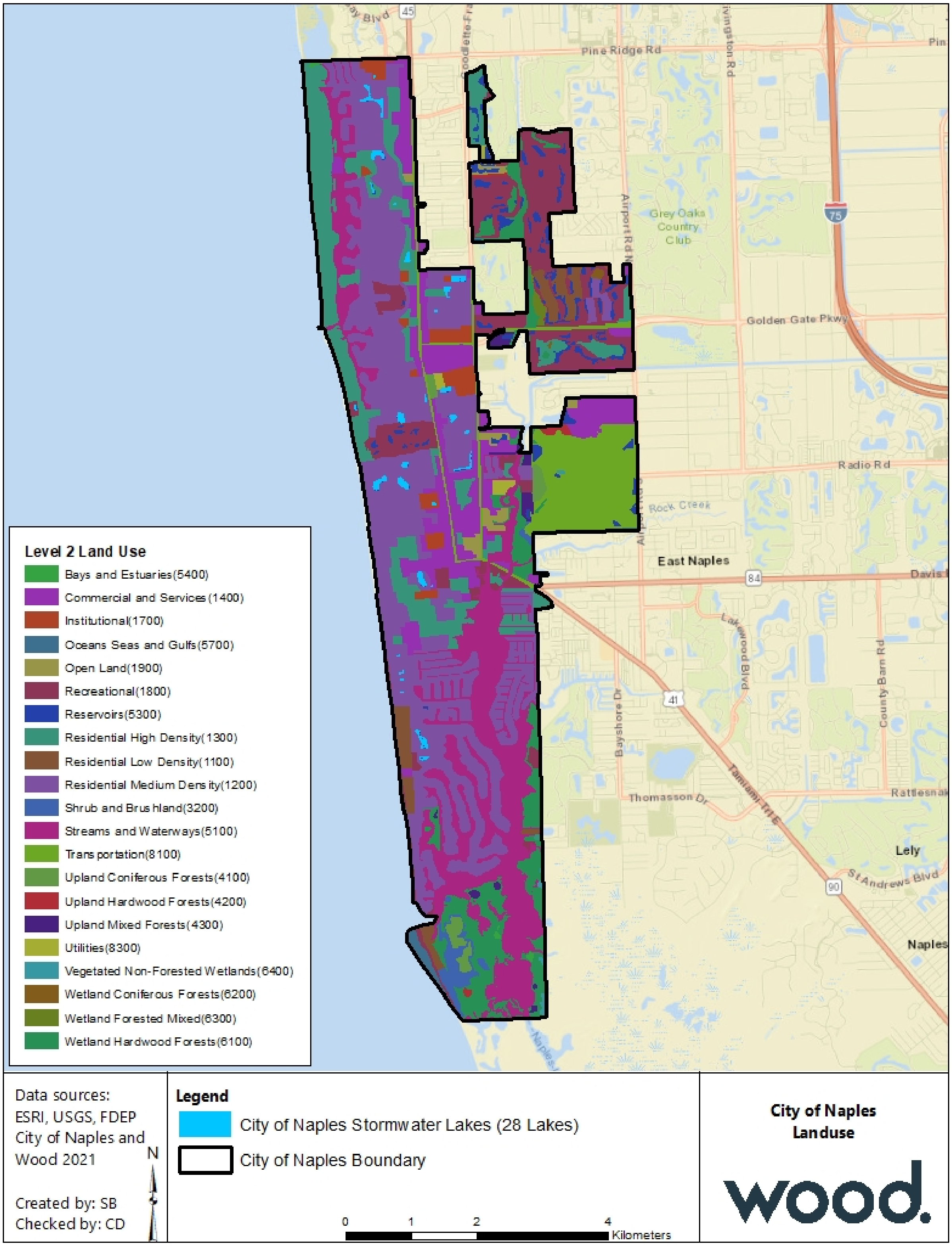



**Figure 1-3.** City of Naples Land Use (FLUCCS Level 2)

### 1.2.2. Downstream Waterbodies

The stormwater lakes (**Table 1-1**) discharge primarily to the following natural receiving waterbodies: Gordon River, Naples Bay, and Moorings Bay (**Figure 1-4**; Cardno, 2020). Three lakes also discharge directly to the Gulf of Mexico. The FDEP waterbody class, FDEP Draft (FDEP 2021a) and FDEP Verified (FDEP 2021b) impairment status of Gordon River, Naples Bay, and Moorings Bay are included below and summarized in **Table 1-5**:

- Gordon River: The Gordon River is divided into two Water Body Identification (WBID) areas: the Extension (the upstream, freshwater portion WBID 3278K) and the Marine Segment (WBID 3278R5). The Gordon River (marine) is a Class III waterbody, meaning it should support fish consumption, recreation, propagation and maintenance of a healthy, well-balanced population of fish and wildlife. The marine segment is on the Verified Impaired List (FDEP 2021b) for copper (Cu), iron, dissolved oxygen (DO), *Enterococci*, chlorophyll-a (Chl-a), TN, and TP. According to the Draft Impaired List (FDEP 2021a), the marine segment is no longer impaired for Cu. The freshwater segment is on the Verified Impaired List for *Escherichia coli* (*E. coli*). As the farther downstream segment, this report will primarily reference the marine segment.
- Naples Bay: Naples Bay (WBID 3278R4) is a Class II waterbody, meaning it is a coastal water with a designated use of shellfish propagation or harvesting. Historically, this waterbody, at the time of designation, likely supported shellfish harvesting. Naples Bay is currently on the Verified Impaired List (FDEP 2021b) for Cu, iron, fecal coliform, and Chl-a. According to the Draft Impaired List (FDEP 2021a), the waterbody is also impaired for *Enterococci*.
- Moorings Bay: Moorings Bay (WBID 3278Q2) is another Class II waterbody, and is currently on the Verified Impaired List (FDEP 2021b) for TP. According to the Draft Impaired List (FDEP 2021a), the waterbody is also impaired for TN.

The waterbody Class is significant because, as described below, there are specific regulatory water quality criteria according to the waterbody Class. The FDEP uses statewide water quality criteria to conduct impairment assessments and identify waterbodies with concentrations of pollutants that are exceeding regulatory criteria. These regulatory criteria are included in **Table 1-6**. The impairments are significant because when a waterbody is listed as impaired and if a Total Maximum Daily Load (TMDL) is established, the entities (or municipalities) contributing to the impairment are responsible for implementing pollutant load reduction projects.

**Table 1-5.** Impairments in Downstream Waterbodies

| Waterbody | WBID | Parameter | Current Status[1] | Draft Status[2] |
|---|---|---|---|---|
| **Gordon River (Marine Segment)** | 3278R5 | Copper | Impaired | Delist (Not Impaired) |
| | | Dissolved Oxygen (Percent Saturation) | Impaired | Impaired |
| | | *Enterococci* | Impaired | Impaired |
| | | Nutrients (Chlorophyll-a) | Impaired | Impaired |
| | | Nutrients (Total Nitrogen) | Impaired | Impaired |
| | | Nutrients (Total Phosphorus) | Impaired | Impaired |
| | | Iron | Impaired | Impaired |
| **Gulf of Mexico (Collier County)** | 8062 | -- | -- | -- |
| **Moorings Bay System** | 3278Q2 | Nutrients (Total Nitrogen) | Not Impaired | List (Impaired) |
| | | Nutrients (Total Phosphorus) | Impaired | Impaired |
| **Naples Bay (Coastal Segment)** | 3278R4 | Copper | Impaired | Impaired |
| | | *Enterococci* | Not Impaired | List (Impaired) |
| | | Fecal Coliform | Impaired | Impaired |
| | | Iron | Impaired | Impaired |
| | | Nutrients (Chlorophyll-a) | Impaired | Impaired |

[1]- Status on FDEP's "Verified Impaired List" (FDEP 2021b).
[2] – Status on FDEP's "Biennial Assessment 2020-2022 Drafts Lists" (FDEP 2021a)

**Table 1-6.** Criteria for Downstream Waterbodies

| Downstream Waterbody | Parameter | Criteria | unit | Individual Samples / AGMs[1] |
|---|---|---|---|---|
| **Gordon River** | Copper | 3.7 | µg/L | Individual Samples |
| | *Enterococci* | 130 | #/100mL | Individual Samples |
| | Dissolved Oxygen Saturation | 42 | % | Individual Samples |
| | Chlorophyll-a | 4.3 | µg/L | AGM |
| | Total Nitrogen | 0.57 | mg/L | AGM |
| | Total Phosphorus | 0.045 | mg/L | AGM |
| **Gulf of Mexico** | Copper | 3.7 | µg/L | Individual Samples |
| | *Enterococci* | 130 | #/100mL | Individual Samples |
| | Dissolved Oxygen Saturation | 42 | % | Individual Samples |
| | Chlorophyll-a | 3.1 | µg/L | AGM |
| | Total Nitrogen | 0.25 | mg/L | AGM |
| | Total Phosphorus | 0.032 | mg/L | AGM |
| **Moorings Bay** | Copper | 3.7 | µg/L | Individual Samples |
| | *Enterococci* | 130 | #/100mL | Individual Samples |
| | Dissolved Oxygen Saturation | 42 | % | Individual Samples |
| | Chlorophyll-a | 8.1 | µg/L | AGM |
| | Total Nitrogen | 0.85 | mg/L | Individual Samples |
| | Total Phosphorus | 0.04 | mg/L | Individual Samples |
| **Naples Bay** | Copper | 3.7 | µg/L | Individual Samples |
| | *Enterococci* | 130 | #/100mL | Individual Samples |
| | Dissolved Oxygen Saturation | 42 | % | Individual Samples |
| | Chlorophyll-a | 4.3 | µg/L | AGM |
| | Total Nitrogen | 0.57 | mg/L | AGM |
| | Total Phosphorus | 0.045 | mg/L | AGM |

[1]-AGM = Annual Geometric Mean

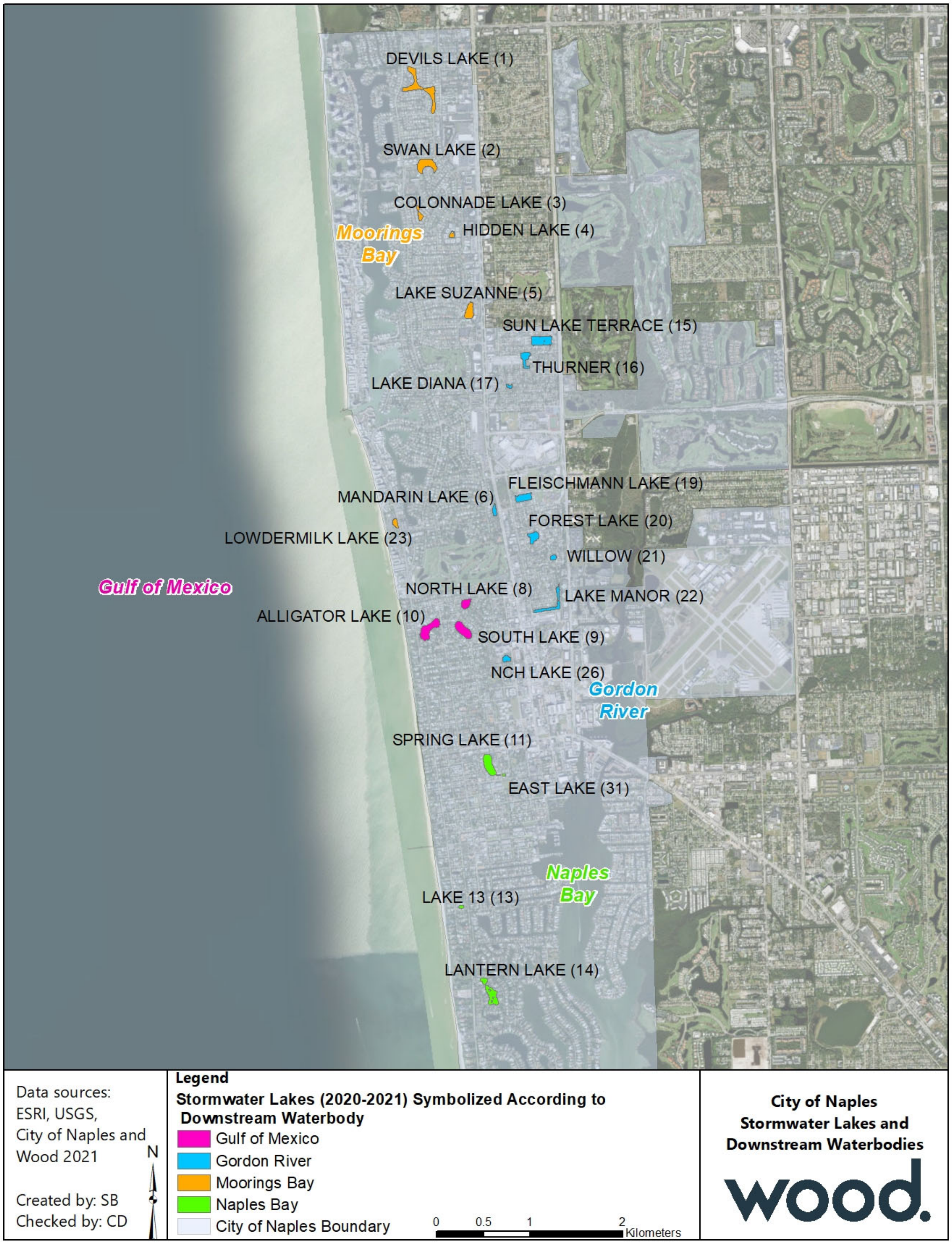



**Figure 1-4.** City of Naples Stormwater Lakes and Downstream Receiving Waterbodies

## 2.0 METHODOLOGY

Exploratory statistical data analyses were conducted to gain an understanding of the monitored water quality parameters and to assess relationships between water quality parameters (e.g., nutrients, chlorophyll-a, etc.) and among different lakes within the stormwater system. Additionally, monthly and annual loading of total nitrogen and total phosphorus from the City's pump stations were calculated using concentration and flow data provided by the City.

Statistical analyses of the stormwater lake data were conducted on two datasets: (1) the water quality data collected by Wood during the 2020 – 2021 monitoring program, and (2) the extended dataset provided by the City of Naples for the stormwater lake monitoring program, which includes water quality data beginning in December 2014. Briefly, water quality samples are collected by filling laboratory-supplied bottles, preserved as needed, with surface water at the sample location. These samples are delivered on ice to a National Environmental Laboratory Accreditation Program (NELAP) certified laboratory for chemical analysis within the method required holding times. Calibrated handheld meters were used to measure temperature, DO, conductivity, salinity, and pH at the sample location at the time of sample collection. All sampling, field measurements, and shipping followed FDEP Standard Operating Procedures (SOP)s.

### 2.1. Water Quality Data Collection and Processing

Wood conducted stormwater lake and pump station water quality monitoring from October 2020 through September 2021. Water quality data collected by Wood (October 2020 through September 2021) and data provided by the City of Naples (from 2014 to September 2020) were combined into one database. The parameters included in this database are listed in **Table 2-1**. **Appendix A** provides a complete visualization of the periods of record (POR) for select water quality parameters for each sample station in the database. The POR is the length of time for which water quality is available for a given lake. The POR can differ among lakes as lakes are added or removed from the sampling program. Data were reviewed for outliers and measurement units were checked for consistency and, if different, standardized to the same scale. Data qualifiers assigned by the analytical laboratory were reviewed; results reported at below the method detection limit (MDL) that were "U" qualified were adjusted to ½ of the MDL for statistical analysis. This standard approach of adjusting "U" data by ½ is consistent with FDEP methodology. Because bacterial data ranged over several orders of magnitude, these data were $\log10(x+1)$ transformed for some graphical presentations.

**Table 2-1.** Water Quality Parameters

| Parameter | Water Quality Significance |
|---|---|
| **Laboratory Analysis** | |
| Total Nitrogen (TN) | Contributes to algal growth |
| Total Kjeldahl Nitrogen (TKN) | Organic and ammonium fractions of total nitrogen |
| Nitrate + Nitrite Nitrogen (NOx) | Inorganic component of TN; can indicate fertilizer or waste sources |
| Ammonia Nitrogen (NH4) | Additional inorganic component of TN |
| Total Phosphorus (TP) | Contributes to algal growth |
| Orthophosphate (OP) | Dissolved inorganic fraction of TP |
| Chlorophyll a (Chl-a) | Measure of algae biomass |
| Copper (Cu) | Can be toxic to aquatic organisms |
| Total Hardness | Amount of calcium and magnesium; buffering capacity of water, and used in calculating copper criteria |
| *E. coli* | Indicator of potential fecal contamination |
| *Enterococci* | Indicator of potential fecal contamination |
| Fecal coliform[a] | Indicator of potential fecal contamination |
| Total Organic Carbon (TOC) | Measure of organic material |
| Dissolved Organic Carbon (DOC) | Measure of dissolved organic material |
| Color | Indicator of water clarity |
| Turbidity | Indicator of water clarity |
| Total Suspended Solids (TSS) | Indicator of water clarity |
| **Field-Measured** | |
| Dissolved Oxygen (DO) | Essential to aquatic life; often limiting in water. |
| pH | Measure of how acidic or basic water is. |
| Specific Conductance | Ability of water to conduct electricity; indicator of amount of dissolved substances in water. |
| Salinity | Measure of the amount of dissolved salts in water. |
| Temperature | Measured in field. |

Note: [a]: Fecal coliform was not included in the 2020-2021 sampling program because it is no longer used by FDEP as a regulatory criterion; in freshwater Class III waterbodies, the current regulated bacteria is *E. coli*. It has been included in the 2021-2022 sampling program.

Rainfall data were obtained from two sources. For use in analyses on the full POR (2014-2021), rainfall data from Naples, Florida were obtained from the Climate Data Online Portal from the National Oceanic and Atmospheric Administration (NOAA) National Centers for Environmental Information. The daily rainfall data were obtained from station USW000012897 (Latitude: 26.155º, Longitude: -81.7752º). Rainfall data used in analysis of the 2020-2021 dataset were provided by the City of Naples from the City's Supervisory Control and Data Acquisition (SCADA) rainfall monitoring network. The SCADA network includes 10 rain gauges throughout the City that provide daily rainfall totals. The rain gauges are listed in **Table 2-2. Figure 2-1** shows the location of the City's SCADA gauges and the NOAA rainfall station.

**Table 2-2.** City of Naples SCADA Rainfall Gauges.

| Rainfall Gauge | Station ID | Location |
|---|---|---|
| 39-A-12 (#1) | 39 | 4225 Gordon Dr. |
| 109-A-12 (#10) | 109 | Seagate School |
| 93-C-12 (#2) | 93 | PR Station |
| 35-A-12 (#3) | 35 | Broad & Gulfshore |
| 92-C-12 (#4) | 92 | Cove Station |
| 61-A-12 (#5) | 61 | Sandpiper |
| 130-C-12 (#6) | 130 | PW Station |
| 31-A-12 (#7) | 31 | 1578 Gulfshore N. |
| 18-A-12 (#8) | 18 | 28th Ave & 12th |
| 23-A-12 (#9) | 23 | 3377 Gulfshore |

Statistical testing revealed that the rainfall totals among the stations were not significantly different. Therefore, a central rain gauge was assigned to each receiving waterbody and used in the statistical significance testing for the sampling stations upstream of the receiving waterbody (**Table 1-1**).

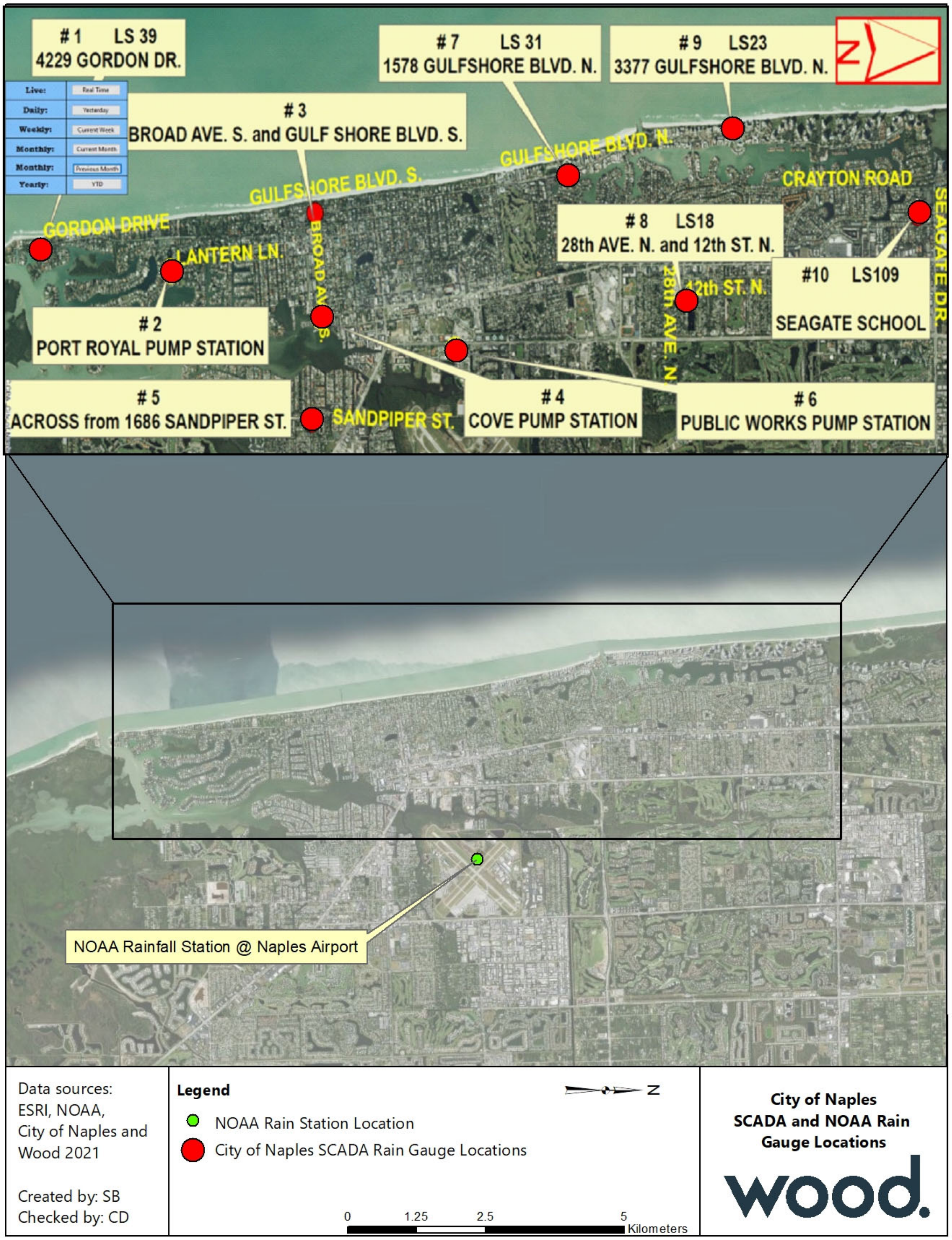



**Figure 2-1.** City of Naples SCADA and NOAA Rain Gauge Locations

### 2.2. Summary of Water Quality Data

Summary statistics for each water quality parameter were calculated for all 2020-2021 sampled lakes and pump stations and include the average, median, minimum, maximum, and standard deviation values, as well as for the POR and number of observations (count). Summary statistics for Cu, nutrient parameters, Chl-a and bacteria parameters are included in **Section 3.2** and summary statistics for all other water quality parameters are included in **Appendix B**. Additionally, a preliminary comparison of select water quality parameters among lakes was conducted using box plots. Parameters selected for box plot comparisons were Cu, Chl-a, nutrients (TN, NH4, TKN, NOx, TP, OP), and fecal indicator bacteria (*Enterococci, E. coli*, fecal coliform). In the box plots, the middle line represents median, upper and lower lines represent $25^{th}$ and $75^{th}$ percentile, and whiskers (straight lines) represent 1.5 x interquartile ranges. Points outside the whiskers are values higher or lower than the 1.5 x interquartile range.

### 2.3. Watershed Figures

For consistency with previous annual reports and to allow for a temporal comparison, select figures were replicated for TN, TP, Chl-a, *Enterococci*, and Cu for the monitoring period (2020-2021). Three figures were made for each parameter: one figure showing the lakes discharging to Moorings Bay, one showing the lakes discharging to the Gordon River, and one figure showing lakes discharging to Naples Bay and the Gulf of Mexico. Total monthly precipitation was also displayed on the figure using the representative station; for the Naples Bay/Gulf of Mexico figures, the representative Naples Bay precipitation station was used. The analytes selected for these figures are a subset of the analytes regulated in the downstream waterbodies. These figures represent visualizations of the data over time; statistical trend analysis was conducted separately, as described below, including statistical significance testing for changes in parameters over time and correlation with precipitation.

### 2.4. Trend Analysis

Statistical trend analysis was conducted to assess if concentrations of water quality parameters were significantly increasing or decreasing over time. The non-parametric Mann-Kendall test was used to test for trends. The water quality data were first checked for serial correlation. If there was no evidence of serial correlation then the Mann-Kendall (MK) test was used to test for significant trends. If there was evidence of serial correlation, the data were analyzed using the Seasonal Mann-Kendall (SMK) test. Trends were considered statistically significant at a p-value of less than 0.05, however, it should be noted that ecological effects can occur at levels above and below the 0.05 p-value. In addition to trends of raw data, trends in annual maximum Chl-a were tested to support the investigation into lake health discussed in **Section 2.7.2**.

### 2.5. Correlation Analysis

While trend analyses assess the changes in individual water quality parameters over time, correlation analysis explores the relationships of water quality parameters to each other. To explore these relationships between water quality parameters, the non-parametric Spearman correlation analysis was employed. Spearman's rho correlations were calculated using the monthly data from the stormwater lakes and pump stations (sampled in 2020-2021). Parameters included in the correlation analysis are listed in **Table 2-1**. Significant results ($p < 0.05$) were plotted on a correlation matrix using the "rstatix" package from R (Kassambara, 2021). Correlations are used to assess the strength of relationships between parameters. A strong correlation does not imply that an increase (or decrease) in one parameter causes an increase (or decrease) in another parameter since correlation does not imply causation. It does, however, suggest that the values may be behaving similarly, which warrants further attention.

Correlations were conducted on two datasets: (1) the full POR for stormwater lake data and using the NOAA station rainfall, and (2) the 2020-2021 stormwater lake data and using the City's SCADA rainfall data (see **Table 1-1** for gauge information).

### 2.6. Multivariate Analyses

A multivariate approach was used to simultaneously explore differences in water quality among the stormwater lakes. The analyses included hierarchical cluster analysis, Principal Components Analysis (PCA) and an ordination plot based on PCA values. These analyses require complete data (i.e., no missing data) for all parameters. The analyses were conducted on two sets of data. The first was for lakes with complete data for the POR from September 2014 through September 2021. This included 16 lakes, with 14 water quality parameters (**Table 2-3**). The second set of analyses included 22 lakes sampled by Wood, from October 2020 through September 2021, with 18 water quality parameters (**Table 2-3**). Different water quality parameters were used in the two datasets because of changes in monitoring and collinearity (further explained in the paragraph below) between parameters that was more evident in the longer-term dataset.

**Table 2-3.** Principal Components Analysis Datasets

| PCA Dataset | Lakes | Parameters |
|---|---|---|
| Full POR (September 2014 through September 2021) | Devils Lake (1SE-B), Swan Lake (2B), Colonnade Lake (3B), Lake Suzanne (5B), Mandarin Lake (6B), South Lake (9B), Alligator Lake (10B), East Lake (11B), Lantern Lake (14B), Lake Terrace (15B), Fleischmann Lake (19B), Forest Lake (20B), Sun Willow (21B), Lake Manor (22B), Lowdermilk (23B), NCH Lake (26B) | pH, TN, temperature, DO (mg/L), turbidity, TSS, Cu, Chl-a, specific conductance, NOx, OP, *Enterococci*, NH4, and TP |
| Wood Sampling Period (October 2020 through September 2021 | Devils Lake (1SE-B), Swan Lake (2B), Colonnade Lake (3B), Hidden Lake (4B), Lake Suzanne (5B), Mandarin Lake (6B), North Lake (8B), South Lake (9B), Alligator Lake (10B), East Lake (11B), Spring Lake (11C), Lake 13 (13B), Lantern Lake (14B), Sun Lake Terrace (15B), Thurner (16B), Lake Diana (17B), Fleischmann Lake (19B), Forest Lake (20B), Willow (21B), Lake Manor (22B), Lowdermilk Lake (23B), NCH Lake (26B) | pH, TN, temperature, DO (mg/L), turbidity, TSS, Cu, Chl-a, specific conductance, NOx, OP, *Enterococci*, NH4, TP, TOC, color, *E. coli*, and calcium |

Because of the large number (n > 15) of lakes, and sampling events (monthly), Wood averaged the water quality parameters for each lake. This method is recommended with large datasets to discern patterns in the data (Clarke et al., 2014). Next, these data were examined for collinearity, as highly correlated parameters can result in spurious results. Highly correlated results will tend to overfit the model. The assumption is that the variables are independent. Thus highly correlated parameters affect the interpretation of the model because they undermines the significance of the independent variables. For example, these highly correlated parameters can include expected correlations like precipitation and salinity – with increasing freshwater rainfall, the salinity in the waterbody decreases. Salinity and specific conductance are also highly correlated because both measure the concentration of salts in the water sample. Parameters that were highly correlated (Pearson, $r > 0.7$) were removed. Distribution plots of the remaining parameters were examined, and data that were not normally distributed were log ($x$+1) transformed to satisfy the assumptions needed to perform these statistical tests. Next, these data were placed on the same scale (a requirement for this analyses), by normalizing to a mean of 0 and standard deviation of 1. Then, a resemblance matrix was created from these data for each lake and each parameter using Euclidean distances. To test for significant differences in groups of stormwater lakes, Wood used the Euclidean-based matrix to conduct a hierarchical cluster analysis, using group averages, with 999 permutations, and a significance level of 5%. This routine places lakes into groups with most similar water quality and tests for significant differences among these groups. Euclidean distances among parameters and among lakes were also used to conduct the PCA. Principal Component Scores were then used to create a PCA ordination plot to visualize differences among lakes on a 2-dimensional scale. Lakes determined to be significantly different based on the hierarchical clustering were coded different colors on the PCA plot. Vectors representing influential parameters were also plotted to further aid in visualization of the differences among lakes.

## 2.7. Impairment Assessment

An informal impairment assessment was conducted to identify potential impacts to downstream waterbodies and in-lake health, as described below.

### 2.7.1. Potential Impacts to Downstream Waters

It is important to note that the FDEP water quality impairment criteria do not apply to stormwater lakes since they are manmade features and are not classified as Waters of the State. Stormwater lakes are designed to receive rainfall runoff containing nutrients and other pollutants and exceedances are expected when comparing the stormwater lakes to downstream criteria which apply to more natural waterbodies that were not designed and constructed to intercept stormwater runoff from developed lands. The comparison to downstream water quality criteria is simply a comparison tool and the downstream water quality criteria do not represent target water quality conditions in stormwater lakes.

The informal impairment assessment was conducted by comparing water quality in stormwater lakes (e.g., individual samples or annual geometric mean [AGM] concentrations) against impairment criteria applicable to downstream waterbodies. The stormwater lakes and the downstream waterbodies are displayed in **Figure 1-4**. The downstream waterbody criteria are described in **Section 1.2.2**; with regulatory criteria included in **Table 1-6**. The percent of the number of samples from the stormwater lakes that exceeded the regulatory criteria for the downstream waterbody was calculated. Since only one month of data was collected in 2014, that year was excluded from parameters evaluated as AGMs. Parameters were selected based on current impairments and data availability.

### 2.7.2. Potential Impacts to Lake Health

Florida's longer growing season and higher temperatures lead to seasonal fluctuations of benthic and suspended algae, including naturally occurring cyanobacteria in freshwater. These naturally occurring algae can proliferate, or bloom, under certain conditions (including increased nutrients, higher temperatures, and reduced water flow[3]). In surface waters, Chl-a concentrations are analyzed to measure the amount of algae in the water.

FDEP has established an impairment threshold of 20 µg/L for Chl-a, measured as an annual geometric mean, for natural lakes with long-term geometric mean color greater than 40 platinum cobalt units (PCU, FDEP 2013).[4] This value is similar to what Hoyer et al. (2004) found (17 µg/L as a mean) above which surveyed residents identified substantial reduction in aesthetic enjoyment due to algae levels. As described earlier, the regulatory criteria do not apply to stormwater lakes, and given their position on the landscape and purpose of intercepting pollutants in stormwater runoff, many stormwater lakes have elevated nutrients which can contribute to increased concentrations of algae.

To identify which of the studied waterbodies may have the greatest tendency towards higher algae concentrations, they were ranked based on 1) number of years where AGMs exceeded the 20 µg/L Chl-a threshold and 2) the maximum Chl-a AGM. Additionally, the maximum recorded Chl-a value was included to identify waterbodies that have experienced higher concentrations of algae. Since only one month of data was collected in 2014, that year was excluded from analysis. For this analysis, the full period of record dataset was used (rather than the dataset encompassing only the October 2021 – September 2021).

Additionally, to identify future management considerations, a dataset of the maximum individual Chl-a values from each lake in each year was constructed. Trend analysis was performed on this dataset following procedures in **Section 2.4**.

Copper-based algaecides are used to control algae in stormwater lakes and preserve aesthetics (Willis and Bishop 2016). However, this can lead to cyclical water quality management issues including reductions in benthic DO as dead algae are consumed by bacteria and additional blooms due to the release of nutrients from algal decomposition. Copper can also enter stormwater lakes from other sources including fertilizers, fungicides, and automobile brake pads (Lifset et al. 2012). Copper entering stormwater lakes can accumulate in sediments, aquatic plants and fish (Campbell 1994, Rader et al. 2019, Lusk and Chapman 2020).

Although copper is a naturally occurring micronutrient, elevated concentrations can be toxic to aquatic taxa due to chronic (long-term) and acute (short-term) exposure (EPA, 2007). Toxicity of copper is determined by its bioavailability, which is affected by several factors including dissolved organic carbon (DOC), hardness, temperature, and pH (Flemming and Trevors 1989, EPA 2007, Craven et al. 2012, Wagner et al. 2017).

Florida's water quality criteria for copper were developed by the EPA using toxicity studies. For freshwater, the copper criterion is based on hardness and can vary from 2.85 µg/L when hardness ≤ 25 mg/L $CaCO_3$ to 30.50 µg/L when hardness ≥ 400 mg/L $CaCO_3$. For marine waters, the copper criterion is 3.7 µg/L. The cutoff

[3] FDEP's Freshwater Algal Blooms Frequently Asked Questions, available at: https://floridadep.gov/sites/default/files/freshwater-algal-bloom-faqs_2019.pdf, accessed 2021-12-22.

[4] The Chl-a criteria changes based on the lake color. The criteria of 20 ug/L is applicable to freshwater lakes with long term geometric mean color of 40 PCU. Although the Chl-a criteria do not apply to stormwater lakes, based on the stormwater lake color (Appendix A), the criteria of 20 ug/L is the comparable freshwater lake criteria comparison.

between marine and freshwater is based on specific conductance where values < 4,580 µmhos/cm are freshwater and ≥ 4,580 µmhos/cm are marine. And as described earlier, these regulatory criteria do not apply to stormwater lakes, which are designed to intercept stormwater runoff containing pollutants. The comparisons of stormwater lake water quality data to FDEP natural waterbody criteria is a comparison tool and does not represent goal or target conditions for stormwater lakes.

Copper concentrations in samples collected over the past year were compared to the copper criteria based on specific conductance and (if applicable) hardness values. The number of exceedances of the copper criteria were then used to calculate percent exceedances for each waterbody. Additionally, results were evaluated by month to evaluate if there were seasonal changes in copper exceedances.

### 2.8. Pump Station Nutrient Loading Estimates

Estimates of monthly and annual loading of TN and TP from the City's pump stations were calculated using pump station sample concentrations and pump operation data provided by the City. The pump operation data provided by the City included total monthly pump run times and maximum pumping capacities (in gallons per minute) for each pump. Pump operation data was used to estimate a potential water volume for each pump. These volumes were multiplied by monthly concentrations to estimate loads for TP, TN, TSS, Cu.

## 3.0 RESULTS

### 3.1. Precipitation

The long-term NOAA rainfall data from gauge USW000012897 is shown in **Figure 3-1.** The year 2017, with a markedly higher amount of rainfall, is the year that the City was hit by Hurricane Irma. While most of the annual rainfall amounts have been higher than the long-term average (1942 through 2020), the annual total from 2020 was lower. City of Naples SCADA precipitation daily totals are included in **Figure 3-2**. In a statistical comparison of the rainfall at the SCADA gauges, rainfall was not significantly different among the stations.

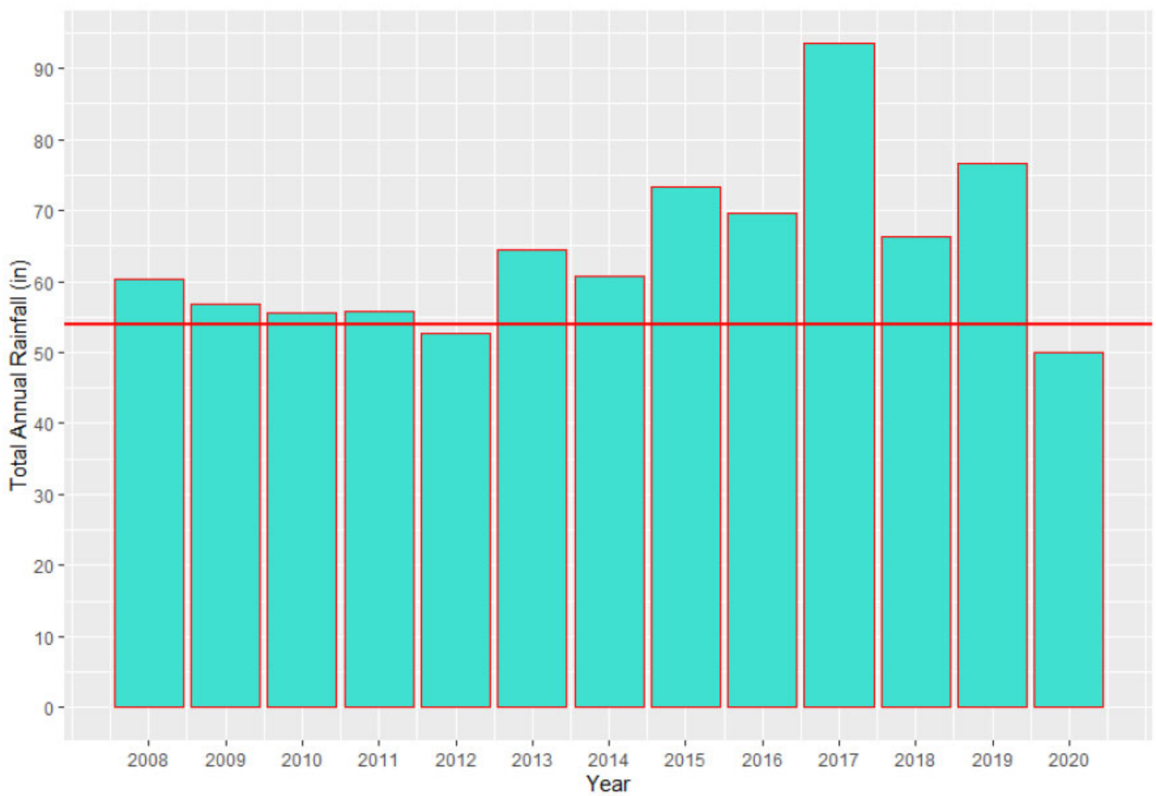



**Figure 3-1**. Total annual rainfall (bars) and long-term average (1942 through 2020, indicated by red line) rainfall from station USW000012897

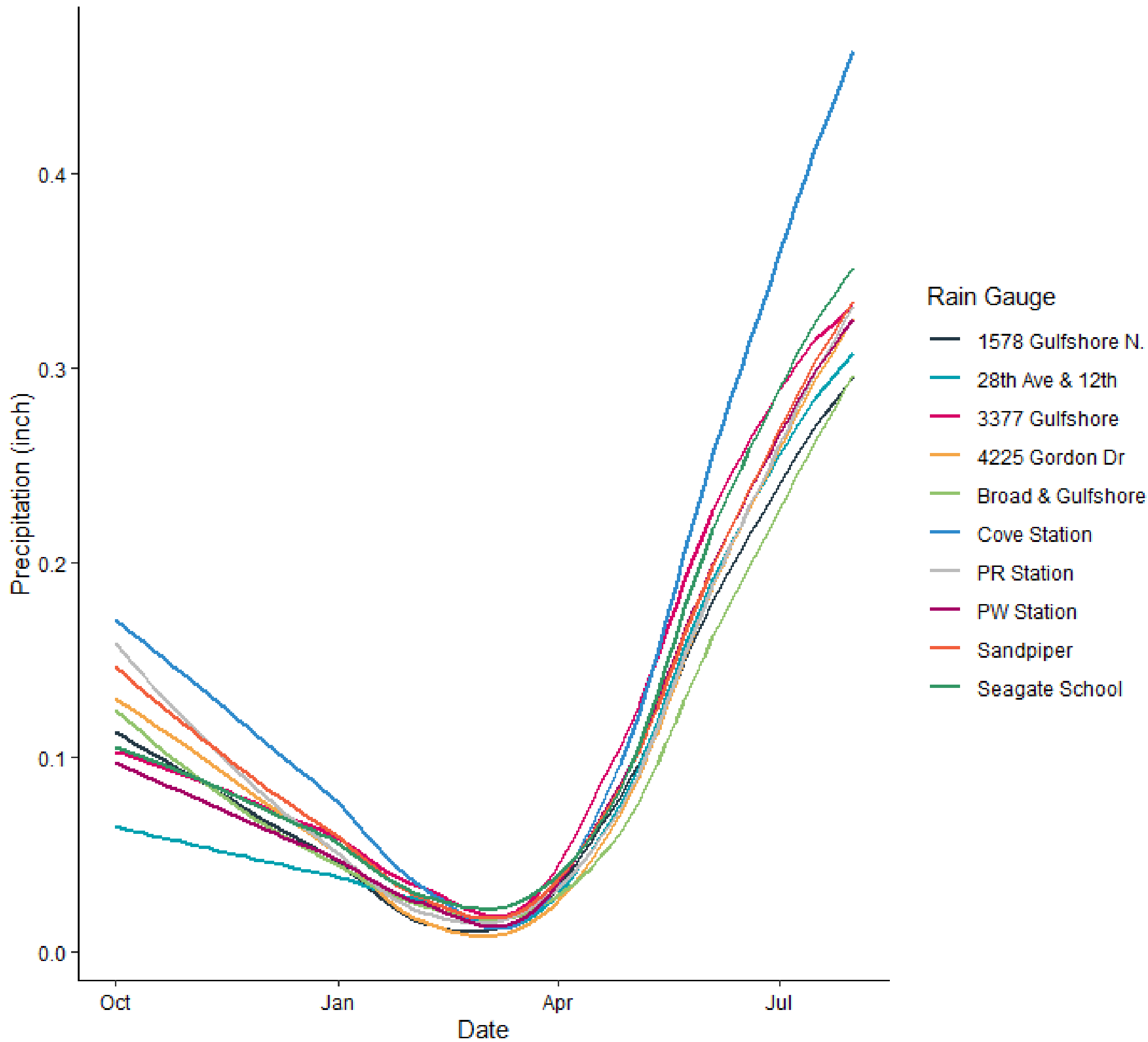



**Figure 3-2.** City of Naples Stormwater SCADA Daily Precipitation Totals (October 2020-September 2021)

### 3.2. Summary of Water Quality Data

Water quality summary statistics for the available POR for all lakes and pump stations, as well as a comparison of lakes using box plots, is presented here for the following parameters: Chl-a, Cu, *Enterococci*, *E. coli*, TN, NH4, TKN, NOx, TP, and OP. Summary statistics for all other water quality parameters sampled are available in **Appendix B.** Overall, sampling locations that stood out with the highest average concentrations of nutrients, Chl-a, and fecal indicator bacteria included Half Moon Lake, North Lake, South Lake, Lantern Lake, and the Port Royal Pumping station. Other lakes stood out when considering individual parameters, as described below. Aside from fecal indicator bacteria, there was little variability among most lakes outside of the top five lakes for each parameter.

For quick reference, the box plots in this section display the highest values at the top of the plot and are sorted from highest to lowest (decreasing down the plot) concentration.

The summary statistics for Chl-a for all sampled lakes are presented in **Table 3-1** and the Chl-a box plot comparison of lakes is presented in **Figure 3-3**. Half Moon Lake had the highest average Chl-a concentrations for the long-term POR dataset, but was not included in the 22 lakes sampled by Wood during the 2020-2021 sampling effort because it does not receive public drainage. Aside from Half Moon Lake, the lakes with the five highest average Chl-a concentrations during their sampled POR are North Lake, South Lake, Lantern Lake, Spring Lake, and Lake 13; all these lakes drain directly to either Naples Bay or the Gulf of Mexico. South Lake also had the highest maximum sample at 1018 µg/L.

The summary statistics for Cu are presented in **Table *3-2***, and the Cu box plot comparison of the lakes is presented in **Figure 3-4**. NCH Lake and Devils Lake are the two outliers with the highest average Cu concentrations among sampled lakes. The Cu data for NCH Lake and Devils Lake also exhibit a large degree of variability compared to most other sampled lakes. As a reminder, NCH Lake does not receive public drainage. NCH Lake also historically received copper sulfate treatment and the City educated the lake owner on the benefits to discontinuing use of copper sulfate treatment.

The summary statistics for *E. coli* are presented in **Table *3-3***, and the *E. coli* box plot comparison of lakes is presented in **Figure 3-5**. It should be noted that only the 2020-2021 samples make up the POR for *E. coli* since fecal coliform was sampled in previous years.[5] The lakes with the five highest average *E. coli* concentrations are Lake 13, Sun Lake Terrace, Lake Diana, Hidden Lake, and North Lake. All lakes but one (Devils Lake) had concentrations higher than 100 counts/100mL. The sampled data are quite variable for most lakes, and there is not a significant degree of separation among lakes outside of the top five.

The summary statistics for *Enterococci* are presented in **Table *3-4***, and the *Enterococci* box plot comparison of lakes is presented in **Figure 3-6.** All three pump stations (Cove Pump, Port Royal Pump, and Public Works Pump) sampled have average *Enterococci* concentrations over 1000 counts/100mL, and the Fleischmann Lake, North Lake, and NCH Lake are among the lakes with the highest *Enterococci* concentrations. Similar to *E. coli,* the *Enterococci* data are largely spread out at all sampling locations.

The summary statistics for TN are presented in **Table *3-5***, and the TN box plot comparison of lakes is presented in **Figure 3-7**. Half Moon Lake had the highest average TN concentrations but was not included in the 22 lakes sampled for 2020-2021 because it does not receive public drainage. Aside from Half Moon Lake, the lakes with the five highest average TN concentrations are North Lake, South Lake, Fleischmann Lake, Forest Lake and Lantern Lake.

The summary statistics for NH4 are presented in **Table *3-6***, and the NH4 box plot comparison of lakes is presented in **Figure 3-8**. The three pump stations had the highest average NH4 concentrations among all sampling locations, followed by Half Moon Lake, Lowdermilk Lake, and Lake 13. Most lakes have relatively low average NH4 concentrations with occasional high outliers.

The summary statistics for TKN are presented in **Table *3-7***, and the TKN box plot comparison of lakes is presented in **Figure 3-9**. The TKN data follows a similar distribution among and within lakes as TN. The

[5] Fecal coliform was not included in the 2020-2021 sampling program because it is no longer used by FDEP as a regulatory criterion; in freshwater Class III waterbodies, the current regulated bacteria is *E. coli*. It has been included in the 2021-2022 sampling program.

highest average TKN concentrations outside of Half Moon Lake were found in North Lake, South Lake, Forest Lake, Lantern Lake, Fleischmann Lake, and Port Royal pumping station.

The summary statistics for NOx are presented in **Table *3-8***, and the NOx box plot comparison of lakes is presented in **Figure 3-10**. Average NOx concentrations were highest at the three pump station sampling locations, followed by Lake Suzanne, Half Moon Lake, Hidden Lake, and Devils Lake. There is little differentiation among most other sampled lakes.

The summary statistics for TP are presented in **Table 3-9**, and the TP box plot comparison of lakes is presented in **Figure 3-11**. There is little differentiation or variability in average TP concentrations among the sampled lakes. Aside from Half Moon Lake, Lantern Lake and Port Royal pump station stood out with the highest average TP concentrations.

The summary statistics for OP are presented in **Table *3-10***, and the OP box plot comparison of lakes is presented in **Figure 3-12**. The OP data follows a similar distribution among and within lakes as TP, with the highest average concentrations outside of Half Moon Lake found in Lantern Lake and the Port Royal pump station.

**Table 3-1.** Chlorophyll-a Period of Record Summary Statistics by Sampling Location

| Lake Name | Station ID | POR Start | POR End | Count | Chlorophyll-a Concentration (µg/L) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Average | Median | Min. | Max. | Standard Dev. |
| Alligator Lake | 10B | Dec-14 | Sep-21 | 37 | 23.93 | 18.30 | 0.62 | 91.50 | 21.21 |
| East Lake | 11B | Dec-14 | Sep-21 | 37 | 29.34 | 20.60 | 0.13 | 136.00 | 30.84 |
| Spring Lake | 11C | Oct-20 | Sep-21 | 12 | 75.59 | 37.75 | 9.04 | 323.00 | 101.89 |
| Lake 13 | 13B | Oct-20 | Sep-21 | 12 | 58.31 | 52.70 | 6.36 | 177.00 | 49.71 |
| Lantern Lake | 14B | Dec-14 | Sep-21 | 37 | 63.27 | 51.40 | 1.93 | 266.00 | 47.04 |
| Sun Lake Terrace | 15B | Dec-14 | Sep-21 | 43 | 14.77 | 12.60 | 0.13 | 41.00 | 9.96 |
| Thurner | 16B | Oct-20 | Sep-21 | 12 | 31.14 | 25.50 | 18.40 | 51.40 | 12.76 |
| Lake Diana | 17B | Oct-20 | Sep-21 | 12 | 39.43 | 35.60 | 23.30 | 83.20 | 16.95 |
| Fleischmann Lake | 19B | Dec-14 | Sep-21 | 72 | 37.64 | 30.05 | 2.45 | 252.00 | 34.41 |
| Devils Lake | 1SE-B | Dec-14 | Sep-21 | 67 | 6.00 | 4.41 | 0.13 | 36.90 | 6.22 |
| Forest Lake | 20B | Dec-14 | Sep-21 | 67 | 54.04 | 30.80 | 0.13 | 511.00 | 68.99 |
| Willow | 21B | Oct-20 | Sep-21 | 12 | 22.15 | 16.35 | 4.37 | 63.00 | 20.32 |
| Lake Manor | 22B | Dec-14 | Sep-21 | 67 | 15.77 | 15.20 | 2.01 | 54.80 | 10.66 |
| Lowdermilk | 23B | Oct-20 | Sep-21 | 12 | 20.02 | 10.10 | 2.28 | 124.00 | 33.59 |
| NCH Lake | 26B | Dec-14 | Sep-21 | 67 | 48.23 | 29.70 | 11.00 | 779.00 | 93.72 |
| Swan Lake | 2B | Dec-14 | Sep-21 | 61 | 33.79 | 28.30 | 0.13 | 135.00 | 27.25 |
| Colonnade Lake | 3B | Dec-14 | Sep-21 | 67 | 39.30 | 19.30 | 4.65 | 492.00 | 70.45 |
| Hidden | 4B | Oct-20 | Sep-21 | 12 | 23.50 | 26.15 | 5.02 | 38.00 | 12.04 |
| Lake Suzanne | 5B | Dec-14 | Sep-21 | 67 | 35.03 | 22.40 | 0.67 | 290.00 | 49.13 |
| Mandarin Lake | 6B | Dec-14 | Sep-21 | 43 | 22.18 | 17.00 | 1.24 | 80.00 | 16.44 |
| North Lake | 8B | Oct-17 | Sep-21 | 48 | 88.06 | 67.10 | 25.90 | 249.00 | 57.46 |
| South Lake | 9B | Dec-14 | Sep-21 | 67 | 66.78 | 46.00 | 3.29 | 1018.00 | 124.28 |

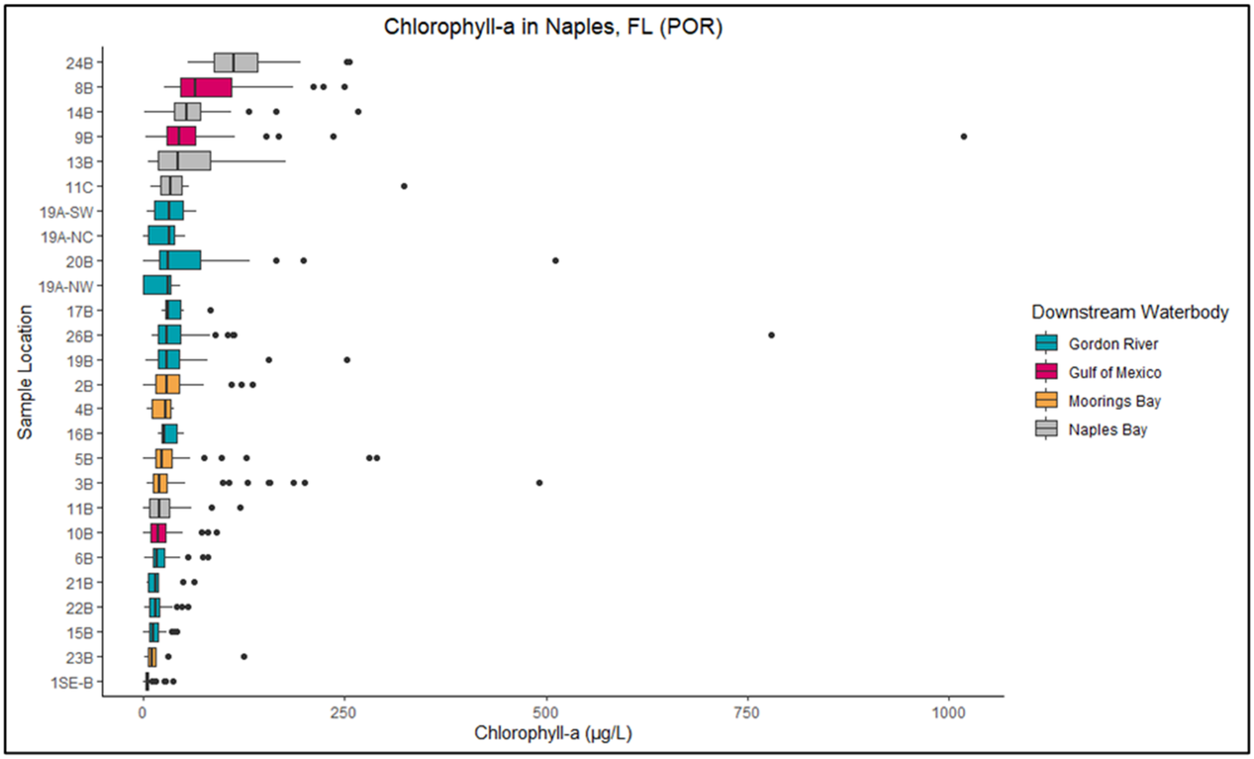



**Figure 3-3**. Chlorophyll-a Box Plots by Sampling Location, Available Period of Record. (Note: Included in box plot are results from the following stations not included in the current sampling program: 19A-SW, 19A-NC, 19A-NW, 24B)

**Table 3-2.** Copper Period of Record Summary Statistics by Sampling Location

| Lake Name | Station ID | POR Start | POR End | Count | Copper Concentration (µg/L) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Average | Median | Min. | Max. | Standard Dev. |
| Alligator Lake | 10B | Dec-14 | Sep-21 | 37 | 2.52 | 1.43 | 0.14 | 22.30 | 4.61 |
| East Lake | 11B | Dec-14 | Sep-21 | 37 | 5.59 | 4.50 | 0.17 | 33.00 | 5.84 |
| Spring Lake | 11C | Oct-20 | Sep-21 | 12 | 6.14 | 6.30 | 0.17 | 12.20 | 4.05 |
| Cove Pump | 11-Pump | Dec-14 | Sep-21 | 36 | 2.57 | 1.83 | 0.17 | 15.50 | 2.77 |
| Lake 13 | 13B | Oct-20 | Sep-21 | 12 | 0.71 | 0.76 | 0.14 | 1.20 | 0.39 |
| Lantern Lake | 14B | Dec-14 | Sep-21 | 37 | 6.53 | 3.07 | 0.14 | 99.30 | 16.14 |
| Port Royal Pump | 14-Pump | Dec-14 | Sep-21 | 36 | 5.13 | 2.34 | 0.12 | 46.00 | 8.74 |
| Sun Lake Terrace | 15B | Dec-14 | Sep-21 | 43 | 7.37 | 4.65 | 0.17 | 65.70 | 10.31 |
| Thurner | 16B | Oct-20 | Sep-21 | 12 | 5.78 | 4.63 | 0.17 | 12.90 | 4.38 |
| Lake Diana | 17B | Oct-20 | Sep-21 | 12 | 1.23 | 1.08 | 0.17 | 3.36 | 0.95 |
| Fleischmann Lake | 19B | Dec-14 | Sep-21 | 72 | 1.18 | 0.87 | 0.17 | 7.40 | 1.34 |
| Devils Lake | 1SE-B | Dec-14 | Sep-21 | 67 | 43.63 | 14.80 | 0.17 | 1160.00 | 142.07 |
| Forest Lake | 20B | Dec-14 | Sep-21 | 67 | 1.15 | 0.83 | 0.17 | 8.00 | 1.19 |
| Willow | 21B | Oct-20 | Sep-21 | 12 | 1.15 | 1.12 | 0.17 | 2.32 | 0.71 |
| Lake Manor | 22B | Dec-14 | Sep-21 | 67 | 2.04 | 1.36 | 0.14 | 25.60 | 3.48 |
| Lowdermilk | 23B | Oct-20 | Sep-21 | 12 | 2.98 | 0.95 | 0.14 | 10.20 | 3.61 |
| NCH Lake | 26B | Dec-14 | Sep-21 | 67 | 65.31 | 43.70 | 7.24 | 436.00 | 67.07 |
| Swan Lake | 2B | Dec-14 | Sep-21 | 61 | 7.21 | 4.12 | 0.17 | 59.40 | 10.43 |
| Colonnade Lake | 3B | Dec-14 | Sep-21 | 67 | 4.47 | 3.92 | 0.17 | 23.60 | 3.53 |
| Hidden | 4B | Oct-20 | Sep-21 | 12 | 8.46 | 7.64 | 0.17 | 23.60 | 5.80 |
| Lake Suzanne | 5B | Dec-14 | Sep-21 | 67 | 7.96 | 4.82 | 0.17 | 42.80 | 8.44 |
| Mandarin Lake | 6B | Dec-14 | Sep-21 | 43 | 3.31 | 0.92 | 0.17 | 86.20 | 13.06 |
| North Lake | 8B | Oct-17 | Sep-21 | 48 | 6.13 | 2.94 | 0.17 | 43.10 | 9.12 |
| South Lake | 9B | Dec-14 | Sep-21 | 67 | 7.31 | 5.39 | 0.17 | 47.20 | 8.05 |
| Public Works Pump | PW-Pump | Dec-14 | Sep-21 | 36 | 4.23 | 3.21 | 0.14 | 21.40 | 3.86 |

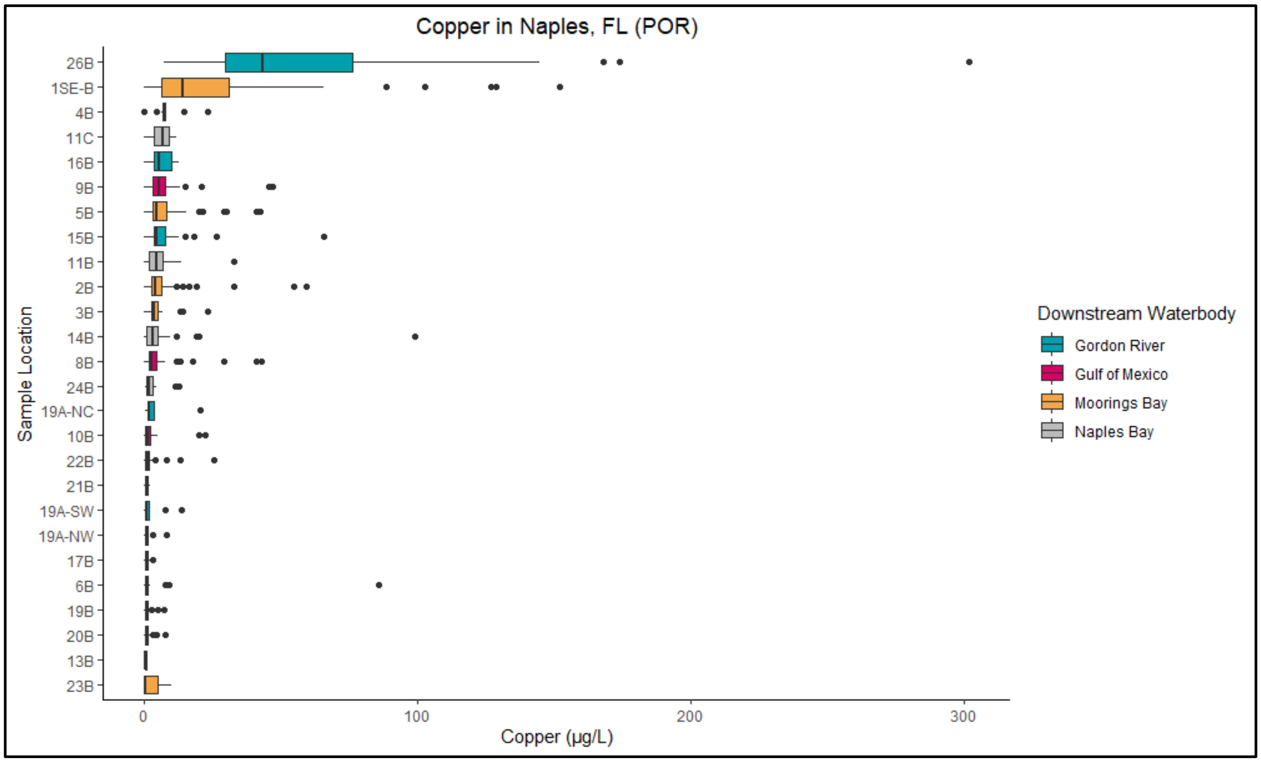



**Figure 3-4**. Copper Box Plots by Sampling Location, Available Period of Record (Note: Included in box plot are results from the following stations not included in the current sampling program: 19A-SW, 19A-NC, 19A-NW, 24B)

**Table 3-3.** *E. coli* Period of Record Summary Statistics by Sampling Location

| Lake Name | Station ID | POR Start | POR End | Count | *E. coli* Concentration (#/100mL) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Average | Median | Min. | Max. | Standard Dev. |
| Alligator Lake | 10B | Oct-20 | Sep-21 | 12 | 387 | 168 | 31 | 1223 | 386 |
| East Lake | 11B | Oct-20 | Sep-21 | 12 | 525 | 550 | 148 | 1054 | 251 |
| Spring Lake | 11C | Oct-20 | Sep-21 | 12 | 554 | 300 | 74 | 1500 | 476 |
| Cove Pump | 11-Pump | Oct-20 | Sep-21 | 12 | 546 | 282 | 52 | 3076 | 825 |
| Lake 13 | 13B | Oct-20 | Sep-21 | 12 | 1761 | 454 | 134 | 7701 | 2423 |
| Lantern Lake | 14B | Oct-20 | Sep-21 | 12 | 597 | 382 | 120 | 2909 | 758 |
| Port Royal Pump | 14-Pump | Oct-20 | Sep-21 | 12 | 300 | 262 | 41 | 583 | 175 |
| Sun Lake Terrace | 15B | Oct-20 | Sep-21 | 12 | 1203 | 584 | 185 | 8664 | 2368 |
| Thurner | 16B | Oct-20 | Sep-21 | 12 | 1457 | 307 | 110 | 12997 | 3643 |
| Lake Diana | 17B | Oct-20 | Sep-21 | 12 | 1480 | 660 | 203 | 5794 | 1963 |
| Fleischmann Lake | 19B | Oct-20 | Sep-21 | 12 | 319 | 344 | 41 | 663 | 212 |
| Devils Lake | 1SE-B | Oct-20 | Sep-21 | 12 | 41 | 31 | 5 | 122 | 38 |
| Forest Lake | 20B | Oct-20 | Sep-21 | 12 | 216 | 140 | 52 | 842 | 231 |
| Willow | 21B | Oct-20 | Sep-21 | 12 | 534 | 369 | 86 | 1553 | 428 |
| Lake Manor | 22B | Oct-20 | Sep-21 | 12 | 582 | 440 | 109 | 2359 | 611 |
| Lowdermilk | 23B | Oct-20 | Sep-21 | 12 | 552 | 341 | 74 | 2603 | 681 |
| NCH Lake | 26B | Oct-20 | Sep-21 | 12 | 589 | 529 | 155 | 1112 | 296 |
| Swan Lake | 2B | Oct-20 | Sep-21 | 12 | 120 | 80 | 10 | 393 | 123 |
| Colonnade Lake | 3B | Oct-20 | Sep-21 | 12 | 150 | 115 | 10 | 565 | 148 |
| Hidden | 4B | Oct-20 | Sep-21 | 12 | 1004 | 671 | 161 | 3873 | 1069 |
| Lake Suzanne | 5B | Oct-20 | Sep-21 | 12 | 172 | 86 | 41 | 663 | 202 |
| Mandarin Lake | 6B | Oct-20 | Sep-21 | 12 | 279 | 208 | 41 | 744 | 234 |
| North Lake | 8B | Oct-20 | Sep-21 | 12 | 767 | 302 | 63 | 5475 | 1499 |
| South Lake | 9B | Oct-20 | Sep-21 | 12 | 205 | 231 | 41 | 420 | 112 |
| Public Works Pump | PW-Pump | Oct-20 | Sep-21 | 12 | 514 | 200 | 98 | 1785 | 583 |

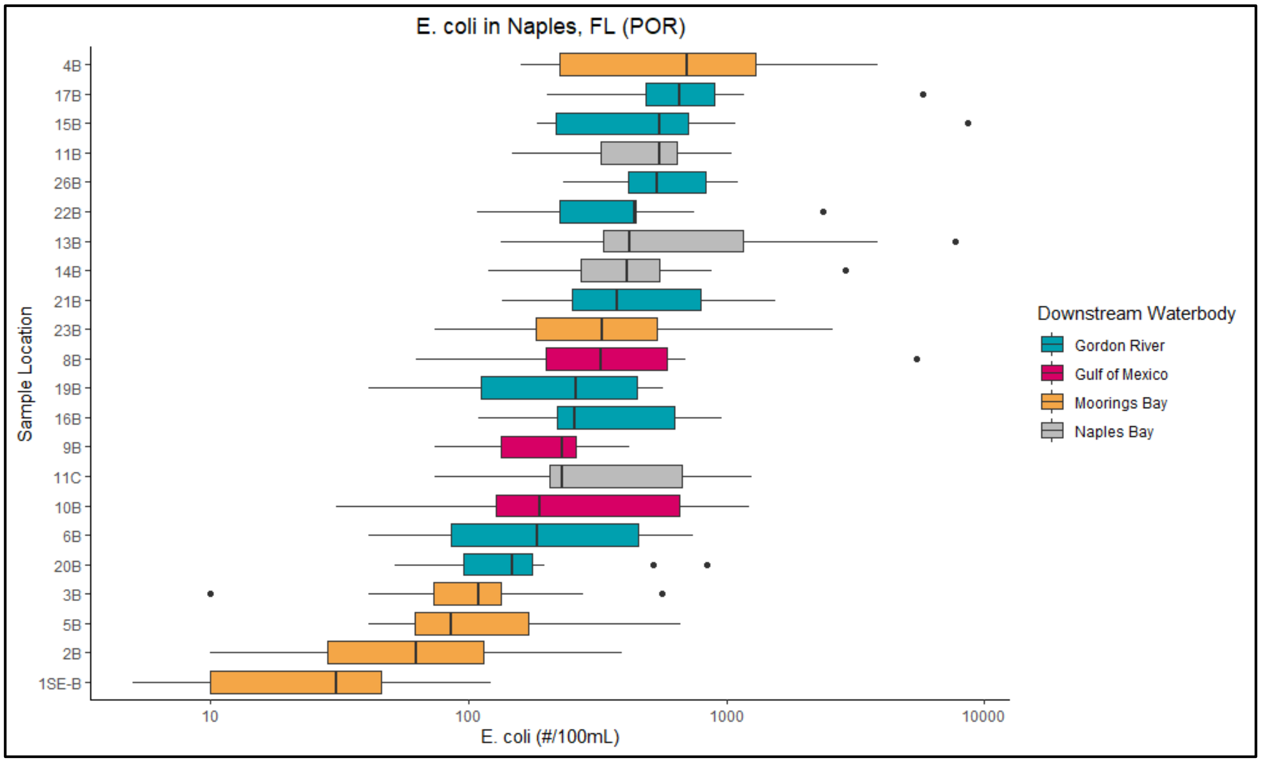



**Figure 3-5.** *E. coli* Box Plots by Sampling Location, Available Period of Record

**Table 3-4.** *Enterococci* Period of Record Summary Statistics by Sampling Location

| Lake Name | Station ID | POR Start | POR End | Count | *Enterococci* Concentration (#/100mL) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Average | Median | Min. | Max. | Standard Dev. |
| Alligator Lake | 10B | Dec-14 | Sep-21 | 37 | 186 | 50 | 5 | 2000 | 361 |
| East Lake | 11B | Dec-14 | Sep-21 | 37 | 473 | 240 | 40 | 3600 | 728 |
| Spring Lake | 11C | Oct-20 | Sep-21 | 12 | 448 | 200 | 5 | 2200 | 719 |
| Cove Pump | 11-Pump | Dec-14 | Sep-21 | 36 | 3232 | 1750 | 400 | 14900 | 4075 |
| Lake 13 | 13B | Oct-20 | Sep-21 | 12 | 538 | 245 | 10 | 2600 | 734 |
| Lantern Lake | 14B | Dec-14 | Sep-21 | 37 | 419 | 150 | 20 | 5000 | 914 |
| Port Royal Pump | 14-Pump | Dec-14 | Sep-21 | 36 | 1030 | 550 | 80 | 5200 | 1168 |
| Sun Lake Terrace | 15B | Dec-14 | Sep-21 | 43 | 409 | 200 | 5 | 4300 | 753 |
| Thurner | 16B | Oct-20 | Sep-21 | 12 | 493 | 225 | 30 | 2400 | 691 |
| Lake Diana | 17B | Oct-20 | Sep-21 | 12 | 1082 | 340 | 150 | 4400 | 1539 |
| Fleischmann Lake | 19B | Dec-14 | Sep-21 | 72 | 683 | 370 | 20 | 10500 | 1496 |
| Devils Lake | 1SE-B | Dec-14 | Sep-21 | 67 | 363 | 60 | 5 | 12500 | 1573 |
| Forest Lake | 20B | Dec-14 | Sep-21 | 67 | 593 | 130 | 5 | 20000 | 2554 |
| Willow | 21B | Oct-20 | Sep-21 | 12 | 293 | 270 | 40 | 780 | 243 |
| Lake Manor | 22B | Dec-14 | Sep-21 | 67 | 476 | 110 | 10 | 5200 | 1063 |
| Lowdermilk | 23B | Oct-20 | Sep-21 | 12 | 193 | 30 | 5 | 710 | 262 |
| NCH Lake | 26B | Dec-14 | Sep-21 | 67 | 892 | 470 | 5 | 20000 | 2481 |
| Swan Lake | 2B | Dec-14 | Sep-21 | 61 | 207 | 80 | 5 | 3600 | 480 |
| Colonnade Lake | 3B | Dec-14 | Sep-21 | 67 | 341 | 150 | 10 | 4600 | 650 |
| Hidden | 4B | Oct-20 | Sep-21 | 12 | 554 | 400 | 50 | 1600 | 426 |
| Lake Suzanne | 5B | Dec-14 | Sep-21 | 67 | 318 | 210 | 10 | 3100 | 480 |
| Mandarin Lake | 6B | Dec-14 | Sep-21 | 43 | 270 | 140 | 5 | 2300 | 385 |
| North Lake | 8B | Oct-17 | Sep-21 | 48 | 938 | 250 | 50 | 9000 | 1581 |
| South Lake | 9B | Dec-14 | Sep-21 | 67 | 239 | 150 | 20 | 2100 | 292 |
| Public Works Pump | PW-Pump | Dec-14 | Sep-21 | 36 | 1257 | 440 | 60 | 13400 | 2455 |

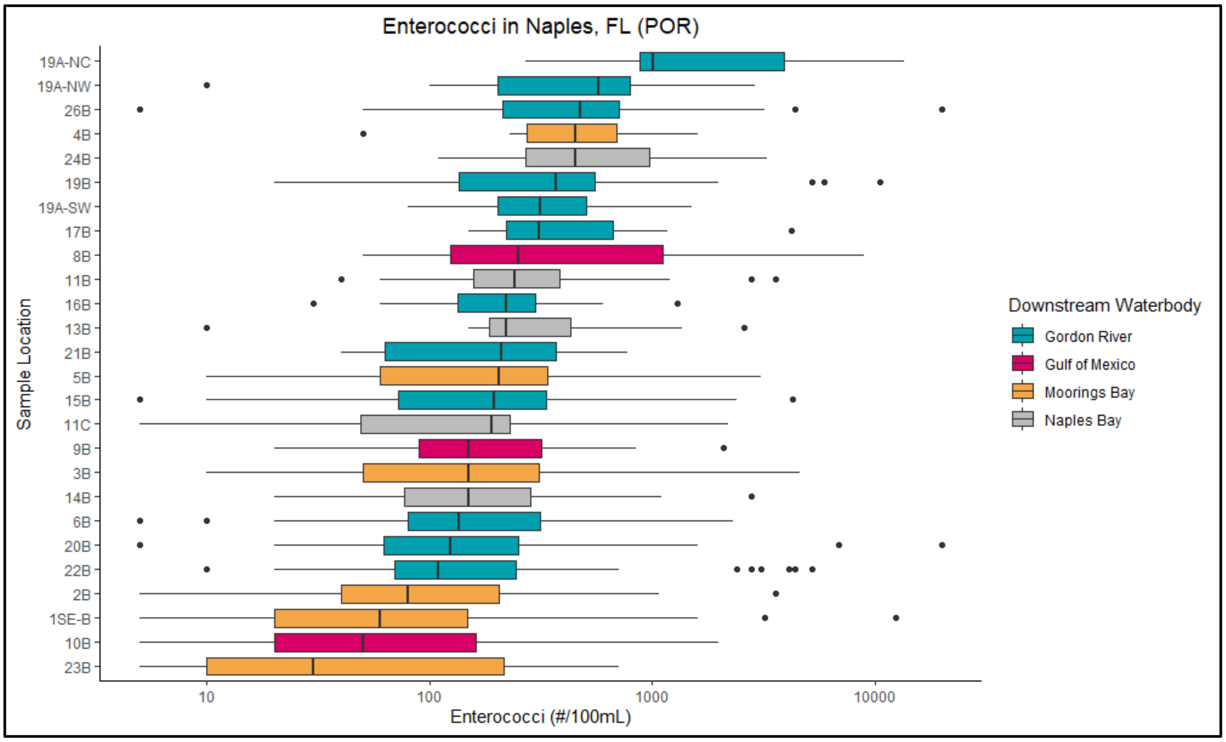



**Figure 3-6**. *Enterococci* Box Plots by Sampling Location, Available Period of Record (Note: Included in box plot are results from the following stations not included in the current sampling program: 19A-SW, 19A-NC, 19A-NW, 24B)

**Table 3-5.** Total Nitrogen Period of Record Summary Statistics by Sampling Location

| Lake Name | Station ID | POR Start | POR End | Count | Total Nitrogen Concentration (mg/L) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Average | Median | Min. | Max. | Standard Dev. |
| Alligator Lake | 10B | Dec-14 | Sep-21 | 37 | 1.16 | 1.08 | 0.53 | 1.98 | 0.35 |
| East Lake | 11B | Dec-14 | Sep-21 | 37 | 1.18 | 1.03 | 0.46 | 4.62 | 0.70 |
| Spring Lake | 11C | Oct-20 | Sep-21 | 12 | 1.55 | 0.95 | 0.73 | 3.95 | 1.11 |
| Cove Pump | 11-Pump | Dec-14 | Sep-21 | 36 | 1.40 | 1.38 | 0.81 | 2.34 | 0.26 |
| Lake 13 | 13B | Oct-20 | Sep-21 | 12 | 1.31 | 0.99 | 0.10 | 2.55 | 0.79 |
| Lantern Lake | 14B | Dec-14 | Sep-21 | 37 | 1.73 | 1.64 | 0.95 | 2.75 | 0.46 |
| Port Royal Pump | 14-Pump | Dec-14 | Sep-21 | 36 | 1.65 | 1.52 | 0.50 | 4.91 | 0.84 |
| Sun Lake Terrace | 15B | Dec-14 | Sep-21 | 43 | 1.13 | 1.09 | 0.32 | 2.03 | 0.32 |
| Thurner | 16B | Oct-20 | Sep-21 | 12 | 1.35 | 1.37 | 1.05 | 1.59 | 0.18 |
| Lake Diana | 17B | Oct-20 | Sep-21 | 12 | 1.35 | 1.34 | 0.36 | 2.29 | 0.47 |
| Fleischmann Lake | 19B | Dec-14 | Sep-21 | 72 | 1.37 | 1.25 | 0.77 | 4.33 | 0.58 |
| Devils Lake | 1SE-B | Dec-14 | Sep-21 | 67 | 1.08 | 1.04 | 0.03 | 1.99 | 0.27 |
| Forest Lake | 20B | Dec-14 | Sep-21 | 67 | 1.72 | 1.47 | 0.72 | 6.69 | 0.88 |
| Willow | 21B | Oct-20 | Sep-21 | 12 | 0.98 | 1.01 | 0.03 | 1.88 | 0.42 |
| Lake Manor | 22B | Dec-14 | Sep-21 | 67 | 0.90 | 0.85 | 0.36 | 2.84 | 0.36 |
| Lowdermilk | 23B | Oct-20 | Sep-21 | 12 | 0.62 | 0.63 | 0.44 | 0.83 | 0.12 |
| NCH Lake | 26B | Dec-14 | Sep-21 | 67 | 1.29 | 1.19 | 0.25 | 7.75 | 0.93 |
| Swan Lake | 2B | Dec-14 | Sep-21 | 61 | 1.27 | 1.11 | 0.61 | 2.67 | 0.48 |
| Colonnade Lake | 3B | Dec-14 | Sep-21 | 67 | 1.14 | 1.06 | 0.62 | 2.52 | 0.31 |
| Hidden | 4B | Oct-20 | Sep-21 | 12 | 0.84 | 0.83 | 0.37 | 1.40 | 0.28 |
| Lake Suzanne | 5B | Dec-14 | Sep-21 | 67 | 1.14 | 1.11 | 0.19 | 2.50 | 0.42 |
| Mandarin Lake | 6B | Dec-14 | Sep-21 | 43 | 1.03 | 0.93 | 0.25 | 1.87 | 0.31 |
| North Lake | 8B | Oct-17 | Sep-21 | 48 | 3.60 | 1.97 | 1.13 | 46.50 | 6.60 |
| South Lake | 9B | Dec-14 | Sep-21 | 67 | 1.83 | 1.53 | 0.03 | 9.63 | 1.21 |
| Public Works Pump | PW-Pump | Dec-14 | Sep-21 | 36 | 1.29 | 1.25 | 0.93 | 1.90 | 0.23 |

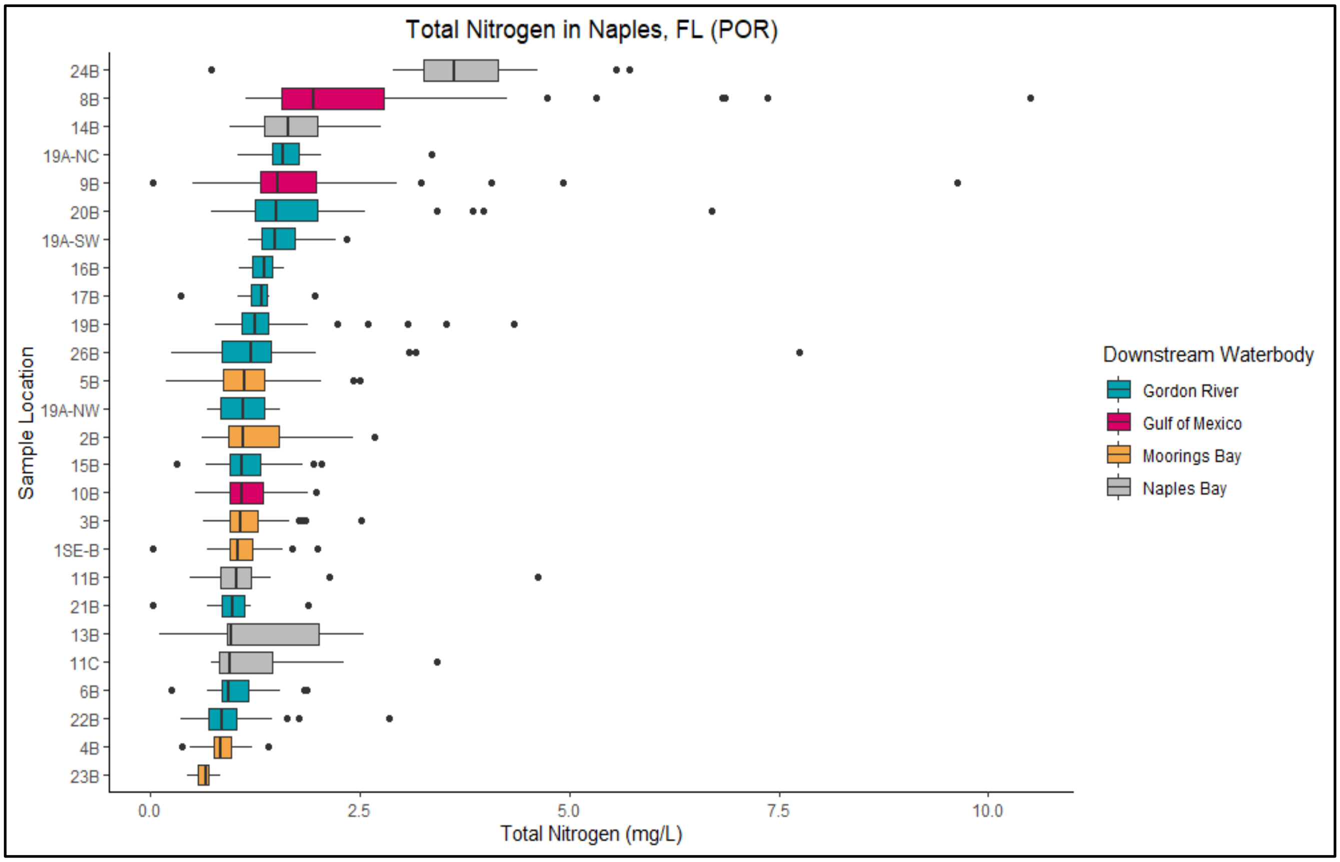



**Figure 3-7.** Total Nitrogen Box Plots by Sampling Location, Available Period of Record (Note: Included in box plot are results from the following stations not included in the current sampling program: 19A-SW, 19A-NC, 19A-NW, 24B)

**Table 3-6.** Ammonia Period of Record Summary Statistics by Sampling Location

| Lake Name | Station ID | POR Start | POR End | Count | Ammonia Concentration (mg/L) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Average | Median | Min. | Max. | Standard Dev. |
| Alligator Lake | 10B | Dec-14 | Sep-21 | 37 | 0.063 | 0.020 | 0.004 | 0.244 | 0.075 |
| East Lake | 11B | Dec-14 | Sep-21 | 37 | 0.044 | 0.015 | 0.004 | 0.753 | 0.123 |
| Spring Lake | 11C | Oct-20 | Sep-21 | 12 | 0.071 | 0.011 | 0.004 | 0.669 | 0.189 |
| Cove Pump | 11-Pump | Dec-14 | Sep-21 | 36 | 0.318 | 0.309 | 0.166 | 0.524 | 0.074 |
| Lake 13 | 13B | Oct-20 | Sep-21 | 12 | 0.185 | 0.119 | 0.004 | 0.654 | 0.201 |
| Lantern Lake | 14B | Dec-14 | Sep-21 | 37 | 0.130 | 0.052 | 0.004 | 0.973 | 0.207 |
| Port Royal Pump | 14-Pump | Dec-14 | Sep-21 | 36 | 0.366 | 0.336 | 0.004 | 1.100 | 0.204 |
| Sun Lake Terrace | 15B | Dec-14 | Sep-21 | 43 | 0.043 | 0.011 | 0.004 | 0.272 | 0.061 |
| Thurner | 16B | Oct-20 | Sep-21 | 12 | 0.037 | 0.017 | 0.004 | 0.094 | 0.037 |
| Lake Diana | 17B | Oct-20 | Sep-21 | 12 | 0.079 | 0.022 | 0.004 | 0.675 | 0.189 |
| Fleischmann Lake | 19B | Dec-14 | Sep-21 | 72 | 0.034 | 0.004 | 0.004 | 0.322 | 0.056 |
| Devils Lake | 1SE-B | Dec-14 | Sep-21 | 67 | 0.040 | 0.017 | 0.004 | 0.245 | 0.052 |
| Forest Lake | 20B | Dec-14 | Sep-21 | 67 | 0.046 | 0.008 | 0.004 | 1.110 | 0.145 |
| Willow | 21B | Oct-20 | Sep-21 | 12 | 0.045 | 0.034 | 0.004 | 0.154 | 0.047 |
| Lake Manor | 22B | Dec-14 | Sep-21 | 67 | 0.040 | 0.004 | 0.004 | 0.387 | 0.064 |
| Lowdermilk | 23B | Oct-20 | Sep-21 | 12 | 0.207 | 0.124 | 0.004 | 0.725 | 0.241 |
| NCH Lake | 26B | Dec-14 | Sep-21 | 67 | 0.024 | 0.004 | 0.004 | 0.190 | 0.038 |
| Swan Lake | 2B | Dec-14 | Sep-21 | 61 | 0.052 | 0.008 | 0.004 | 0.624 | 0.107 |
| Colonnade Lake | 3B | Dec-14 | Sep-21 | 67 | 0.086 | 0.027 | 0.004 | 0.399 | 0.112 |
| Hidden | 4B | Oct-20 | Sep-21 | 12 | 0.092 | 0.104 | 0.004 | 0.166 | 0.066 |
| Lake Suzanne | 5B | Dec-14 | Sep-21 | 67 | 0.068 | 0.038 | 0.004 | 0.345 | 0.081 |
| Mandarin Lake | 6B | Dec-14 | Sep-21 | 43 | 0.018 | 0.008 | 0.004 | 0.116 | 0.021 |
| North Lake | 8B | Oct-17 | Sep-21 | 48 | 0.032 | 0.009 | 0.004 | 0.214 | 0.045 |
| South Lake | 9B | Dec-14 | Sep-21 | 67 | 0.088 | 0.013 | 0.004 | 2.210 | 0.308 |
| Public Works Pump | PW-Pump | Dec-14 | Sep-21 | 36 | 0.336 | 0.352 | 0.103 | 0.537 | 0.089 |

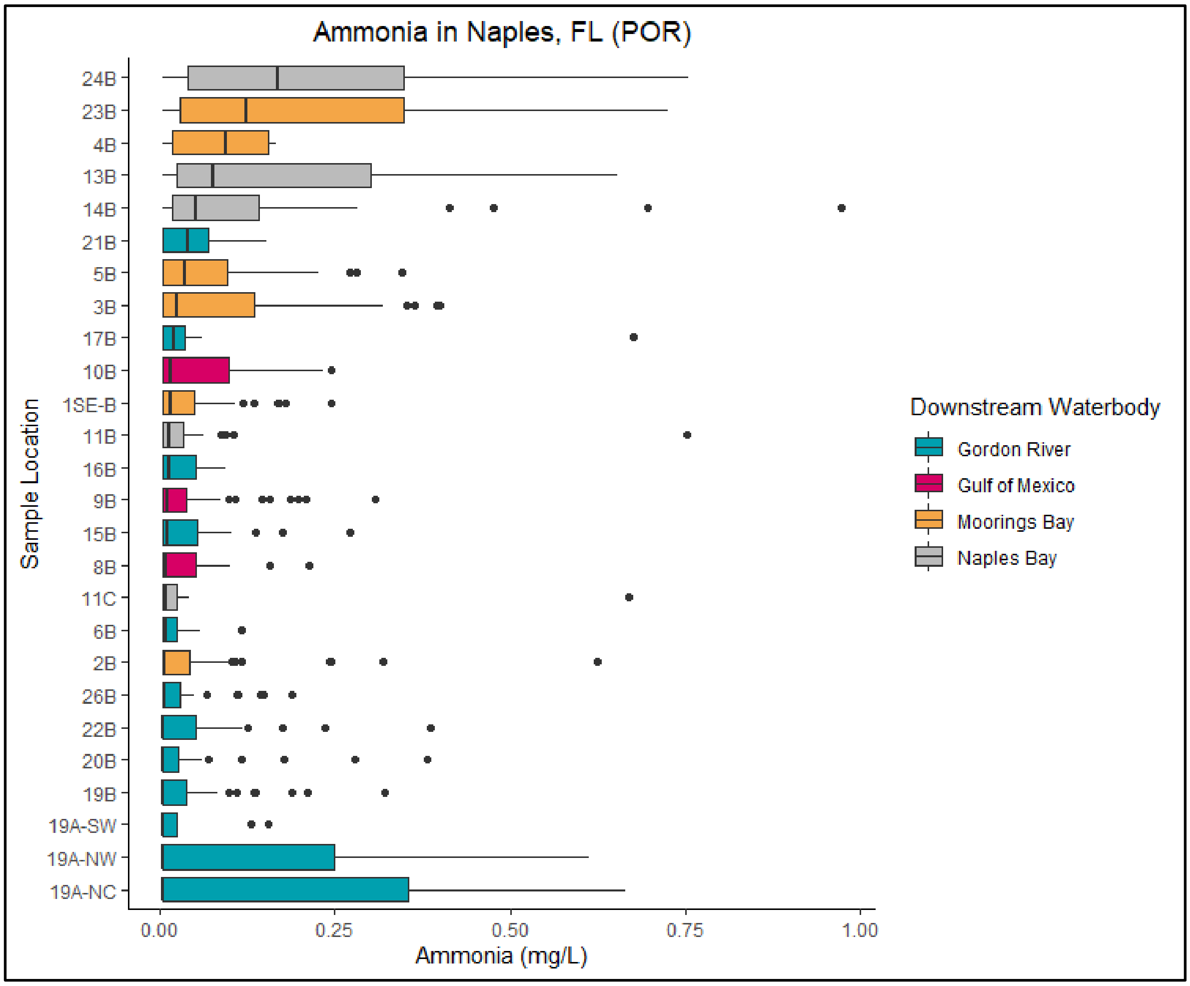



**Figure 3-8.** Ammonia Box Plots by Sampling Location, Available Period of Record (Note: Included in box plot are results from the following stations not included in the current sampling program: 19A-SW, 19A-NC, 19A-NW, 24B)

**Table 3-7.** Total Kjeldahl Nitrogen Period of Record Summary Statistics by Sampling Location

| Lake Name | Station ID | POR Start | POR End | Count | Total Kjeldahl Nitrogen Concentration (mg/L) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Average | Median | Min. | Max. | Standard Dev. |
| Alligator Lake | 10B | Dec-14 | Sep-21 | 37 | 1.136 | 1.070 | 0.526 | 1.970 | 0.351 |
| East Lake | 11B | Dec-14 | Sep-21 | 37 | 1.141 | 1.020 | 0.463 | 4.620 | 0.705 |
| Spring Lake | 11C | Oct-20 | Sep-21 | 12 | 1.521 | 0.946 | 0.726 | 3.780 | 1.066 |
| Cove Pump | 11-Pump | Dec-14 | Sep-21 | 36 | 1.098 | 1.040 | 0.502 | 2.170 | 0.260 |
| Lake 13 | 13B | Oct-20 | Sep-21 | 12 | 1.292 | 0.983 | 0.101 | 2.530 | 0.785 |
| Lantern Lake | 14B | Dec-14 | Sep-21 | 37 | 1.698 | 1.630 | 0.950 | 2.560 | 0.433 |
| Port Royal Pump | 14-Pump | Dec-14 | Sep-21 | 36 | 1.468 | 1.335 | 0.443 | 4.810 | 0.844 |
| Sun Lake Terrace | 15B | Dec-14 | Sep-21 | 43 | 1.058 | 1.020 | 0.284 | 1.990 | 0.304 |
| Thurner | 16B | Oct-20 | Sep-21 | 12 | 1.320 | 1.340 | 1.050 | 1.590 | 0.168 |
| Lake Diana | 17B | Oct-20 | Sep-21 | 12 | 1.327 | 1.290 | 0.359 | 2.290 | 0.468 |
| Fleischmann Lake | 19B | Dec-14 | Sep-21 | 72 | 1.332 | 1.230 | 0.774 | 3.510 | 0.514 |
| Devils Lake | 1SE-B | Dec-14 | Sep-21 | 67 | 1.032 | 1.020 | 0.577 | 1.810 | 0.215 |
| Forest Lake | 20B | Dec-14 | Sep-21 | 67 | 1.698 | 1.470 | 0.707 | 6.600 | 0.871 |
| Willow | 21B | Oct-20 | Sep-21 | 12 | 1.059 | 1.015 | 0.647 | 1.860 | 0.297 |
| Lake Manor | 22B | Dec-14 | Sep-21 | 67 | 0.862 | 0.808 | 0.362 | 2.830 | 0.353 |
| Lowdermilk | 23B | Oct-20 | Sep-21 | 12 | 0.612 | 0.612 | 0.440 | 0.832 | 0.130 |
| NCH Lake | 26B | Dec-14 | Sep-21 | 67 | 1.272 | 1.160 | 0.248 | 7.740 | 0.932 |
| Swan Lake | 2B | Dec-14 | Sep-21 | 61 | 1.226 | 1.080 | 0.609 | 2.650 | 0.475 |
| Colonnade Lake | 3B | Dec-14 | Sep-21 | 67 | 1.078 | 1.010 | 0.586 | 2.520 | 0.297 |
| Hidden | 4B | Oct-20 | Sep-21 | 12 | 0.782 | 0.751 | 0.269 | 1.350 | 0.292 |
| Lake Suzanne | 5B | Dec-14 | Sep-21 | 67 | 1.055 | 1.010 | 0.163 | 2.480 | 0.396 |
| Mandarin Lake | 6B | Dec-14 | Sep-21 | 43 | 1.011 | 0.923 | 0.248 | 1.870 | 0.292 |
| North Lake | 8B | Oct-17 | Sep-21 | 48 | 3.516 | 1.960 | 1.110 | 46.400 | 6.568 |
| South Lake | 9B | Dec-14 | Sep-21 | 67 | 1.825 | 1.520 | 0.496 | 9.600 | 1.180 |
| Public Works Pump | PW-Pump | Dec-14 | Sep-21 | 36 | 1.044 | 1.010 | 0.692 | 1.570 | 0.204 |

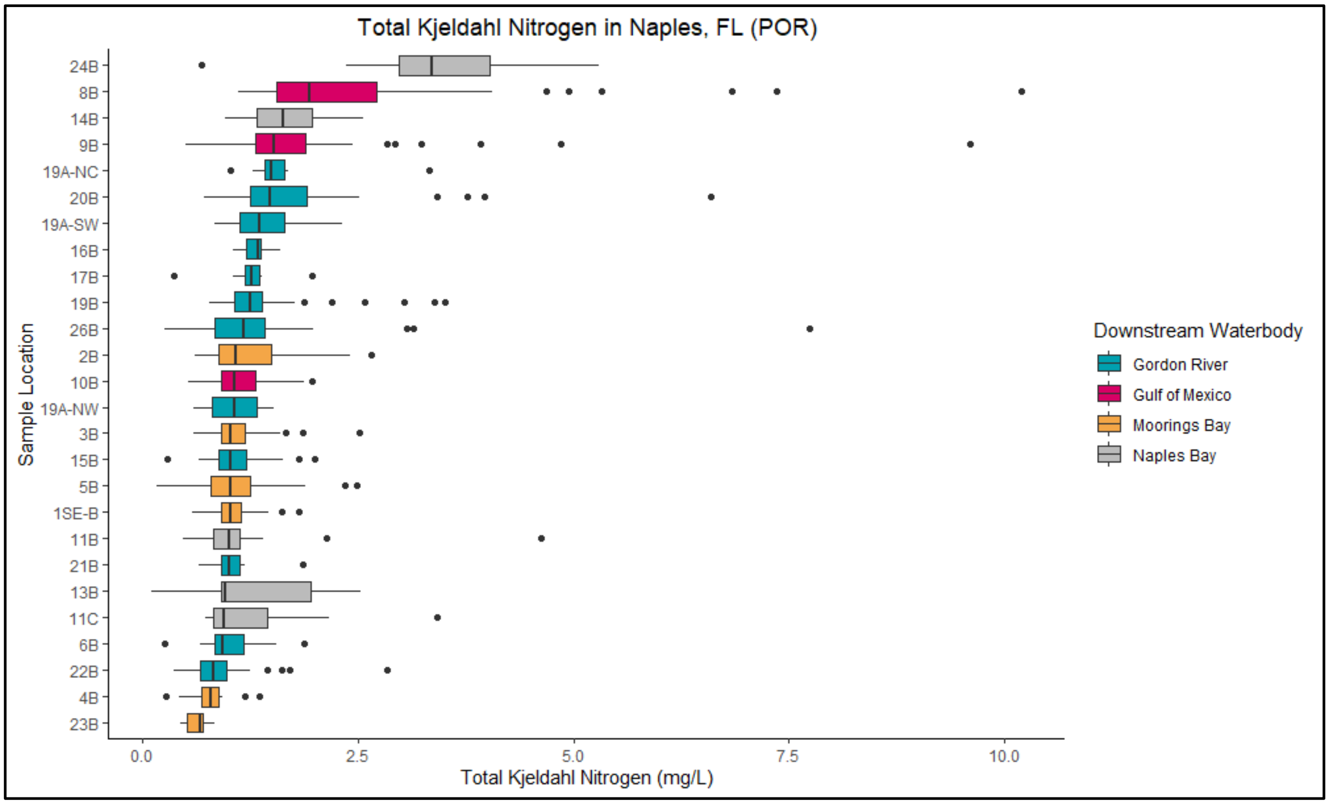



**Figure 3-9.** Total Kjeldahl Nitrogen Box Plots by Sampling Location, Available Period of Record (Note: Included in box plot are results from the following stations not included in the current sampling program: 19A-SW, 19A-NC, 19A-NW, 24B)

**Table 3-8.** Nitrate and Nitrite Period of Record Summary Statistics by Sampling Location

| Lake Name | Station ID | POR Start | POR End | Count | Nitrate+Nitrite Concentration (mg/L) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Average | Median | Min. | Max. | Standard Dev. |
| Alligator Lake | 10B | Dec-14 | Sep-21 | 37 | 0.024 | 0.011 | 0.002 | 0.236 | 0.043 |
| East Lake | 11B | Dec-14 | Sep-21 | 37 | 0.039 | 0.015 | 0.003 | 0.344 | 0.064 |
| Spring Lake | 11C | Oct-20 | Sep-21 | 12 | 0.029 | 0.003 | 0.003 | 0.170 | 0.060 |
| Cove Pump | 11-Pump | Dec-14 | Sep-21 | 36 | 0.306 | 0.305 | 0.106 | 0.496 | 0.091 |
| Lake 13 | 13B | Oct-20 | Sep-21 | 12 | 0.015 | 0.006 | 0.003 | 0.091 | 0.025 |
| Lantern Lake | 14B | Dec-14 | Sep-21 | 37 | 0.036 | 0.012 | 0.002 | 0.263 | 0.060 |
| Port Royal Pump | 14-Pump | Dec-14 | Sep-21 | 36 | 0.182 | 0.172 | 0.059 | 0.468 | 0.092 |
| Sun Lake Terrace | 15B | Dec-14 | Sep-21 | 43 | 0.073 | 0.017 | 0.002 | 0.418 | 0.106 |
| Thurner | 16B | Oct-20 | Sep-21 | 12 | 0.027 | 0.003 | 0.003 | 0.197 | 0.056 |
| Lake Diana | 17B | Oct-20 | Sep-21 | 12 | 0.022 | 0.003 | 0.003 | 0.206 | 0.058 |
| Fleischmann Lake | 19B | Dec-14 | Sep-21 | 72 | 0.032 | 0.012 | 0.002 | 0.945 | 0.112 |
| Devils Lake | 1SE-B | Dec-14 | Sep-21 | 67 | 0.063 | 0.034 | 0.002 | 0.282 | 0.077 |
| Forest Lake | 20B | Dec-14 | Sep-21 | 67 | 0.028 | 0.003 | 0.002 | 0.487 | 0.082 |
| Willow | 21B | Oct-20 | Sep-21 | 12 | 0.007 | 0.003 | 0.003 | 0.030 | 0.009 |
| Lake Manor | 22B | Dec-14 | Sep-21 | 67 | 0.037 | 0.012 | 0.002 | 0.390 | 0.062 |
| Lowdermilk | 23B | Oct-20 | Sep-21 | 12 | 0.014 | 0.003 | 0.003 | 0.087 | 0.024 |
| NCH Lake | 26B | Dec-14 | Sep-21 | 67 | 0.016 | 0.006 | 0.002 | 0.187 | 0.029 |
| Swan Lake | 2B | Dec-14 | Sep-21 | 61 | 0.044 | 0.023 | 0.002 | 0.265 | 0.057 |
| Colonnade Lake | 3B | Dec-14 | Sep-21 | 67 | 0.062 | 0.017 | 0.002 | 0.693 | 0.102 |
| Hidden | 4B | Oct-20 | Sep-21 | 12 | 0.063 | 0.050 | 0.003 | 0.207 | 0.056 |
| Lake Suzanne | 5B | Dec-14 | Sep-21 | 67 | 0.089 | 0.066 | 0.003 | 0.367 | 0.080 |
| Mandarin Lake | 6B | Dec-14 | Sep-21 | 43 | 0.021 | 0.003 | 0.002 | 0.317 | 0.058 |
| North Lake | 8B | Oct-17 | Sep-21 | 48 | 0.081 | 0.012 | 0.003 | 1.880 | 0.276 |
| South Lake | 9B | Dec-14 | Sep-21 | 67 | 0.030 | 0.015 | 0.002 | 0.291 | 0.048 |
| Public Works Pump | PW-Pump | Dec-14 | Sep-21 | 36 | 0.242 | 0.235 | 0.103 | 0.675 | 0.099 |

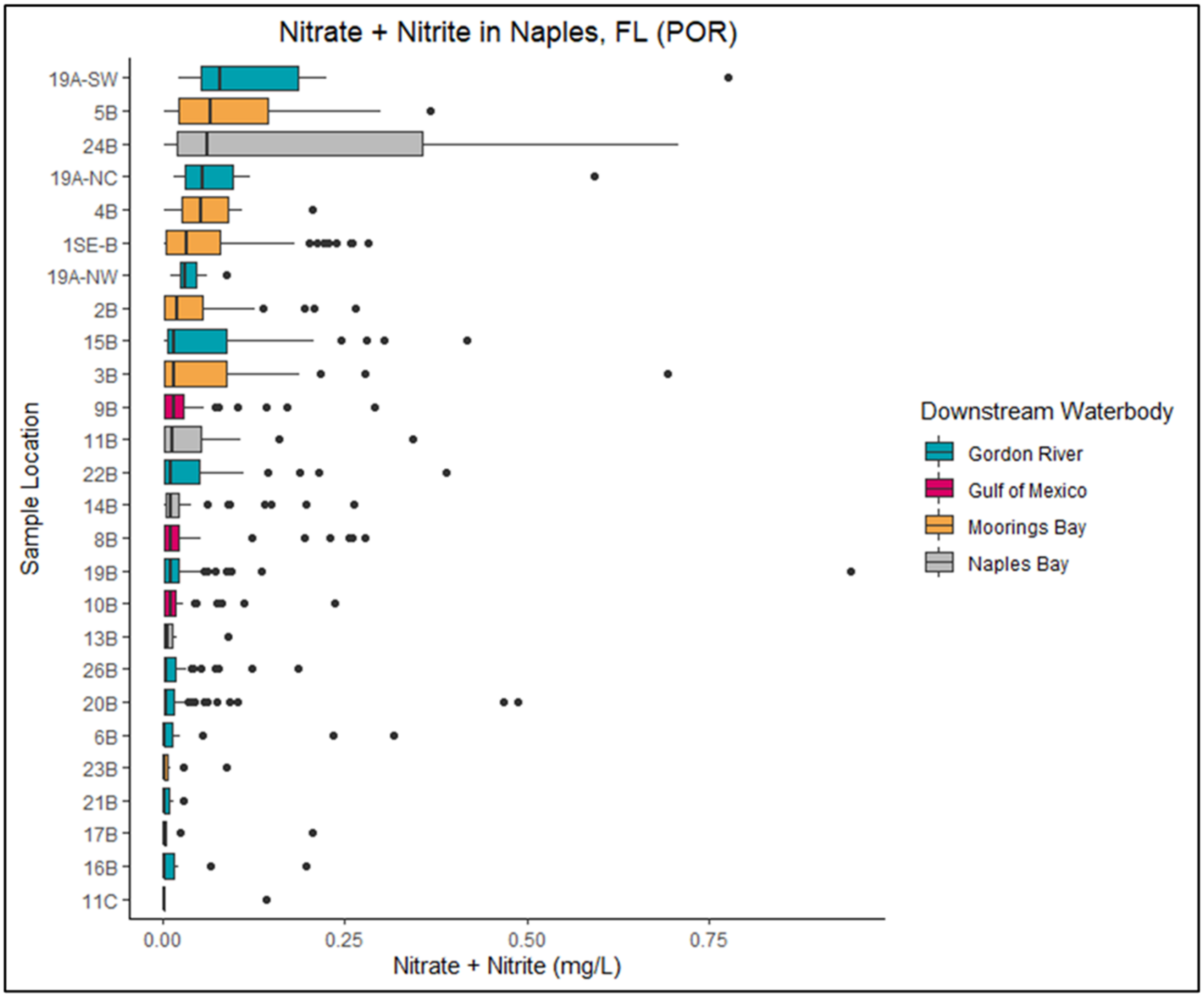



**Figure 3-10**. Nitrate and Nitrite Box Plots by Sampling Location, Available Period of Record (Note: Included in box plot are results from the following stations not included in the current sampling program: 19A-SW, 19A-NC, 19A-NW, 24B)

**Table 3-9.** Total Phosphorus Period of Record Summary Statistics by Sampling Location

| Lake Name | Station ID | POR Start | POR End | Count | Total Phosphorus Concentration (mg/L) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Average | Median | Min. | Max. | Standard Dev. |
| Alligator Lake | 10B | Dec-14 | Sep-21 | 37 | 0.104 | 0.102 | 0.009 | 0.199 | 0.039 |
| East Lake | 11B | Dec-14 | Sep-21 | 37 | 0.097 | 0.080 | 0.019 | 0.398 | 0.073 |
| Spring Lake | 11C | Oct-20 | Sep-21 | 12 | 0.067 | 0.061 | 0.041 | 0.143 | 0.028 |
| Cove Pump | 11-Pump | Dec-14 | Sep-21 | 36 | 0.133 | 0.126 | 0.059 | 0.211 | 0.034 |
| Lake 13 | 13B | Oct-20 | Sep-21 | 12 | 0.133 | 0.132 | 0.008 | 0.235 | 0.072 |
| Lantern Lake | 14B | Dec-14 | Sep-21 | 37 | 0.427 | 0.375 | 0.059 | 1.040 | 0.251 |
| Port Royal Pump | 14-Pump | Dec-14 | Sep-21 | 36 | 0.425 | 0.426 | 0.123 | 1.210 | 0.234 |
| Sun Lake Terrace | 15B | Dec-14 | Sep-21 | 43 | 0.054 | 0.041 | 0.004 | 0.356 | 0.057 |
| Thurner | 16B | Oct-20 | Sep-21 | 12 | 0.068 | 0.072 | 0.033 | 0.101 | 0.022 |
| Lake Diana | 17B | Oct-20 | Sep-21 | 12 | 0.188 | 0.189 | 0.050 | 0.322 | 0.061 |
| Fleischmann Lake | 19B | Dec-14 | Sep-21 | 72 | 0.083 | 0.072 | 0.009 | 0.270 | 0.050 |
| Devils Lake | 1SE-B | Dec-14 | Sep-21 | 67 | 0.045 | 0.039 | 0.004 | 0.208 | 0.030 |
| Forest Lake | 20B | Dec-14 | Sep-21 | 67 | 0.083 | 0.059 | 0.010 | 0.418 | 0.076 |
| Willow | 21B | Oct-20 | Sep-21 | 12 | 0.054 | 0.049 | 0.024 | 0.093 | 0.023 |
| Lake Manor | 22B | Dec-14 | Sep-21 | 67 | 0.080 | 0.076 | 0.004 | 0.265 | 0.054 |
| Lowdermilk | 23B | Oct-20 | Sep-21 | 12 | 0.075 | 0.071 | 0.029 | 0.119 | 0.023 |
| NCH Lake | 26B | Dec-14 | Sep-21 | 67 | 0.093 | 0.084 | 0.004 | 0.293 | 0.056 |
| Swan Lake | 2B | Dec-14 | Sep-21 | 61 | 0.108 | 0.087 | 0.008 | 0.386 | 0.078 |
| Colonnade Lake | 3B | Dec-14 | Sep-21 | 67 | 0.106 | 0.097 | 0.004 | 0.249 | 0.049 |
| Hidden | 4B | Oct-20 | Sep-21 | 12 | 0.072 | 0.069 | 0.027 | 0.139 | 0.034 |
| Lake Suzanne | 5B | Dec-14 | Sep-21 | 67 | 0.131 | 0.112 | 0.035 | 0.454 | 0.074 |
| Mandarin Lake | 6B | Dec-14 | Sep-21 | 43 | 0.080 | 0.080 | 0.014 | 0.162 | 0.039 |
| North Lake | 8B | Oct-17 | Sep-21 | 48 | 0.248 | 0.146 | 0.014 | 3.000 | 0.437 |
| South Lake | 9B | Dec-14 | Sep-21 | 67 | 0.172 | 0.134 | 0.014 | 0.689 | 0.130 |
| Public Works Pump | PW-Pump | Dec-14 | Sep-21 | 36 | 0.110 | 0.097 | 0.054 | 0.320 | 0.053 |

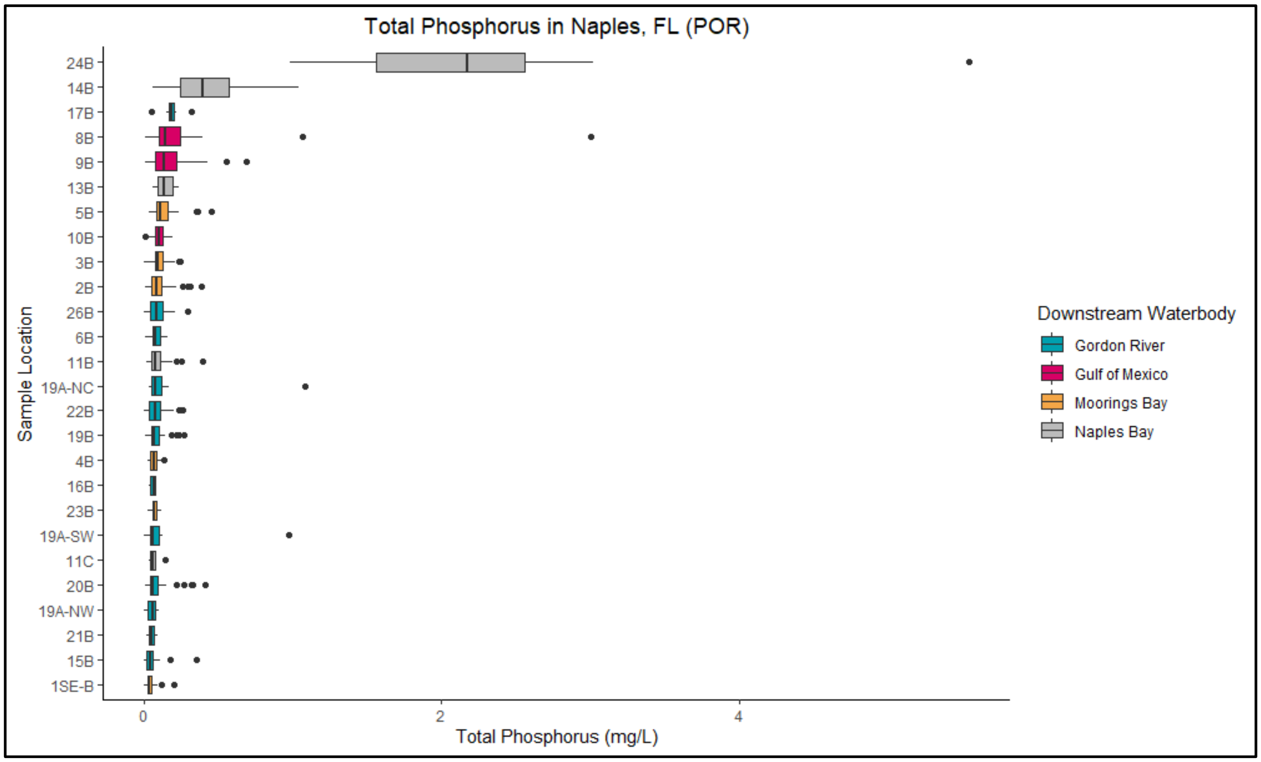



**Figure 3-11.** Total Phosphorus Box Plots by Sampling Location, Available Period of Record (Note: Included in box plot are results from the following stations not included in the current sampling program: 19A-SW, 19A-NC, 19A-NW, 24B)

**Table 3-10.** Orthophosphate Period of Record Summary Statistics by Sampling Location

| Lake Name | Station ID | POR Start | POR End | Count | Orthophosphate Concentration (mg/L) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Average | Median | Min. | Max. | Standard Dev. |
| Alligator Lake | 10B | Dec-14 | Sep-21 | 37 | 0.059 | 0.058 | 0.002 | 0.134 | 0.038 |
| East Lake | 11B | Dec-14 | Sep-21 | 37 | 0.046 | 0.043 | 0.001 | 0.212 | 0.043 |
| Spring Lake | 11C | Oct-20 | Sep-21 | 12 | 0.023 | 0.022 | 0.001 | 0.058 | 0.020 |
| Cove Pump | 11-Pump | Dec-14 | Sep-21 | 36 | 0.101 | 0.105 | 0.041 | 0.140 | 0.024 |
| Lake 13 | 13B | Oct-20 | Sep-21 | 12 | 0.075 | 0.089 | 0.006 | 0.132 | 0.044 |
| Lantern Lake | 14B | Dec-14 | Sep-21 | 37 | 0.275 | 0.199 | 0.001 | 0.678 | 0.199 |
| Port Royal Pump | 14-Pump | Dec-14 | Sep-21 | 36 | 0.359 | 0.315 | 0.060 | 1.150 | 0.213 |
| Sun Lake Terrace | 15B | Dec-14 | Sep-21 | 43 | 0.013 | 0.008 | 0.001 | 0.055 | 0.013 |
| Thurner | 16B | Oct-20 | Sep-21 | 12 | 0.022 | 0.014 | 0.007 | 0.050 | 0.016 |
| Lake Diana | 17B | Oct-20 | Sep-21 | 12 | 0.122 | 0.128 | 0.050 | 0.245 | 0.048 |
| Fleischmann Lake | 19B | Dec-14 | Sep-21 | 72 | 0.031 | 0.024 | 0.001 | 0.121 | 0.026 |
| Devils Lake | 1SE-B | Dec-14 | Sep-21 | 67 | 0.015 | 0.009 | 0.001 | 0.101 | 0.016 |
| Forest Lake | 20B | Dec-14 | Sep-21 | 67 | 0.021 | 0.015 | 0.001 | 0.230 | 0.029 |
| Willow | 21B | Oct-20 | Sep-21 | 12 | 0.031 | 0.023 | 0.001 | 0.087 | 0.029 |
| Lake Manor | 22B | Dec-14 | Sep-21 | 67 | 0.037 | 0.012 | 0.002 | 0.390 | 0.062 |
| Lowdermilk | 23B | Oct-20 | Sep-21 | 12 | 0.040 | 0.033 | 0.017 | 0.101 | 0.023 |
| NCH Lake | 26B | Dec-14 | Sep-21 | 67 | 0.029 | 0.020 | 0.001 | 0.117 | 0.029 |
| Swan Lake | 2B | Dec-14 | Sep-21 | 61 | 0.044 | 0.028 | 0.001 | 0.289 | 0.049 |
| Colonnade Lake | 3B | Dec-14 | Sep-21 | 67 | 0.052 | 0.044 | 0.001 | 0.148 | 0.035 |
| Hidden | 4B | Oct-20 | Sep-21 | 12 | 0.040 | 0.032 | 0.005 | 0.111 | 0.030 |
| Lake Suzanne | 5B | Dec-14 | Sep-21 | 67 | 0.071 | 0.056 | 0.010 | 0.362 | 0.061 |
| Mandarin Lake | 6B | Dec-14 | Sep-21 | 43 | 0.037 | 0.034 | 0.001 | 0.104 | 0.023 |
| North Lake | 8B | Oct-17 | Sep-21 | 48 | 0.047 | 0.042 | 0.001 | 0.139 | 0.034 |
| South Lake | 9B | Dec-14 | Sep-21 | 67 | 0.071 | 0.040 | 0.005 | 0.276 | 0.064 |
| Public Works Pump | PW-Pump | Dec-14 | Sep-21 | 36 | 0.079 | 0.077 | 0.034 | 0.126 | 0.023 |

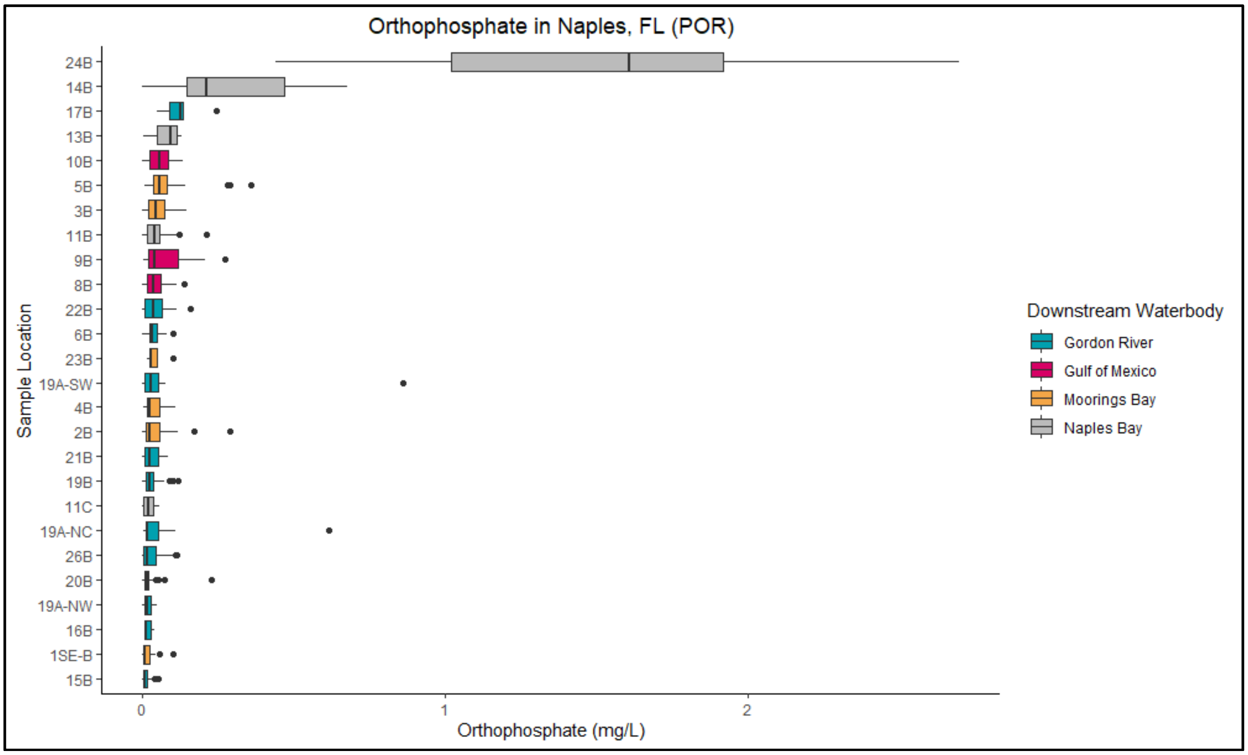
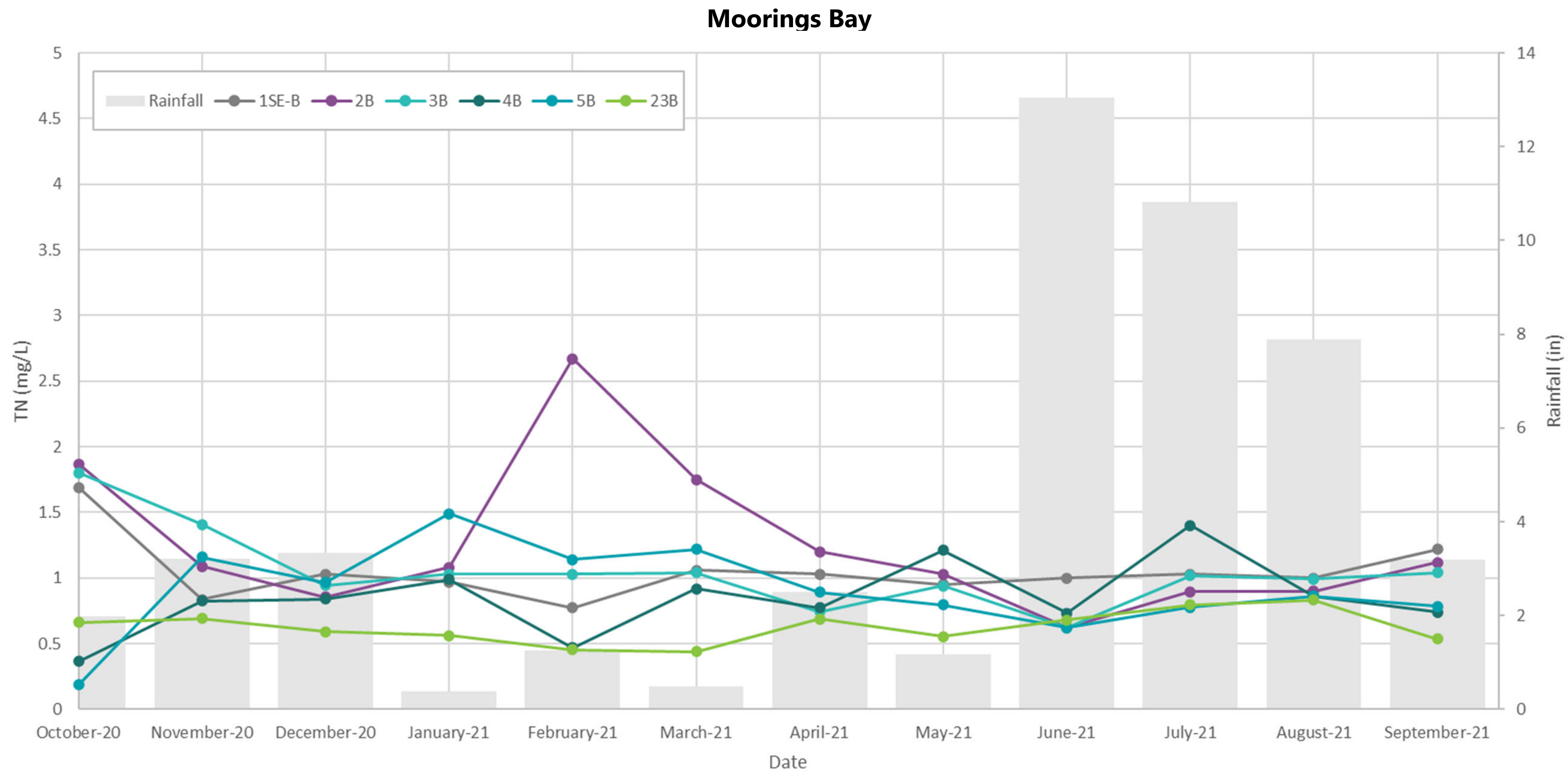
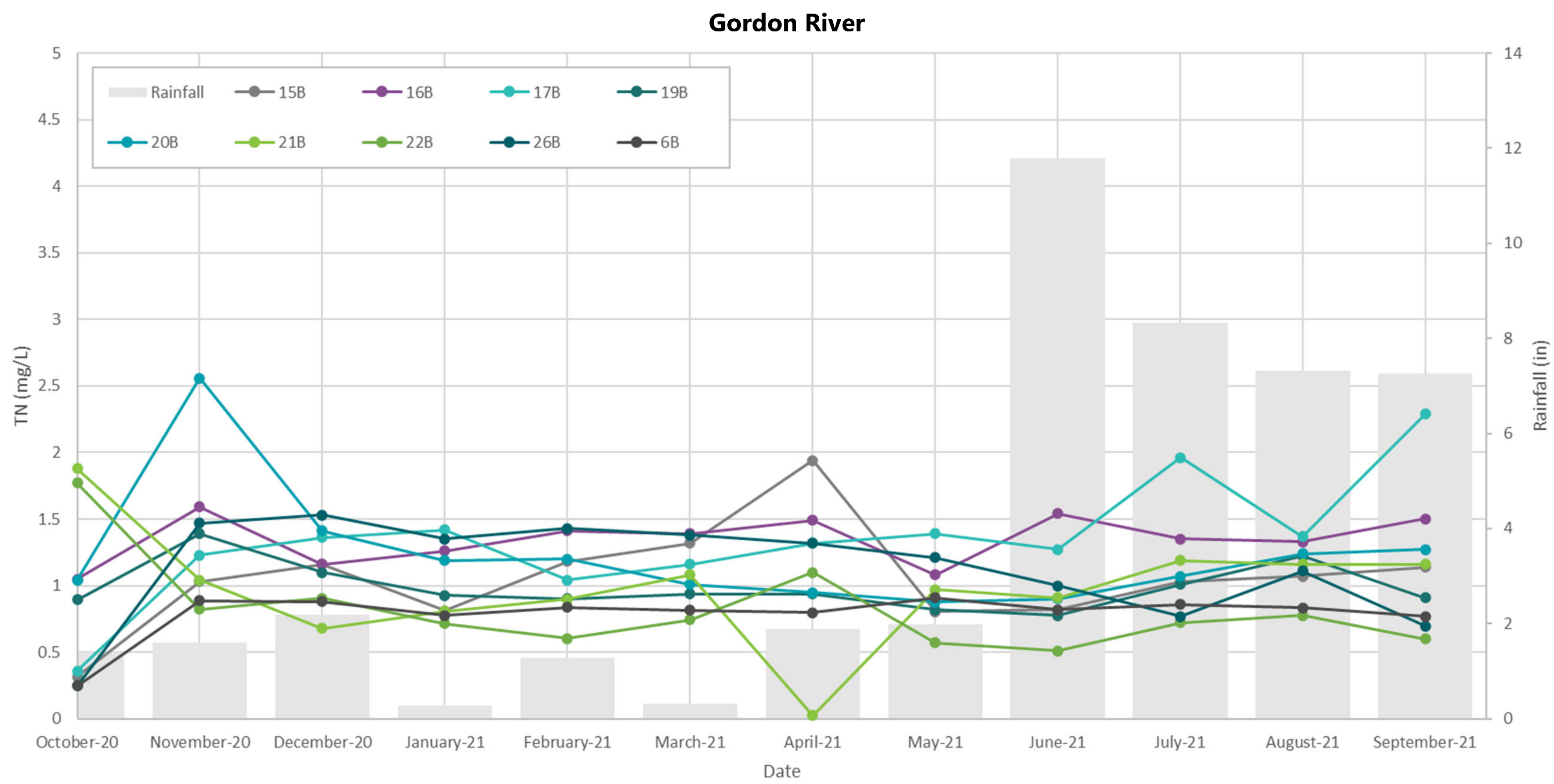



**Figure 3-12**. Orthophosphate Box Plots by Sampling Location, Available Period of Record (Note: Included in box plot are results from the following stations not included in the current sampling program: 19A-SW, 19A-NC, 19A-NW, 24B)

### 3.3. Watershed Figures

Watershed figures are included below in **Figures 3-13** through **3-17.** Bars show rainfall and points represent sample locations. The statistically significant trends and correlations for the data displayed in these figures are included in **Section 3.4** and **Section 3.5**



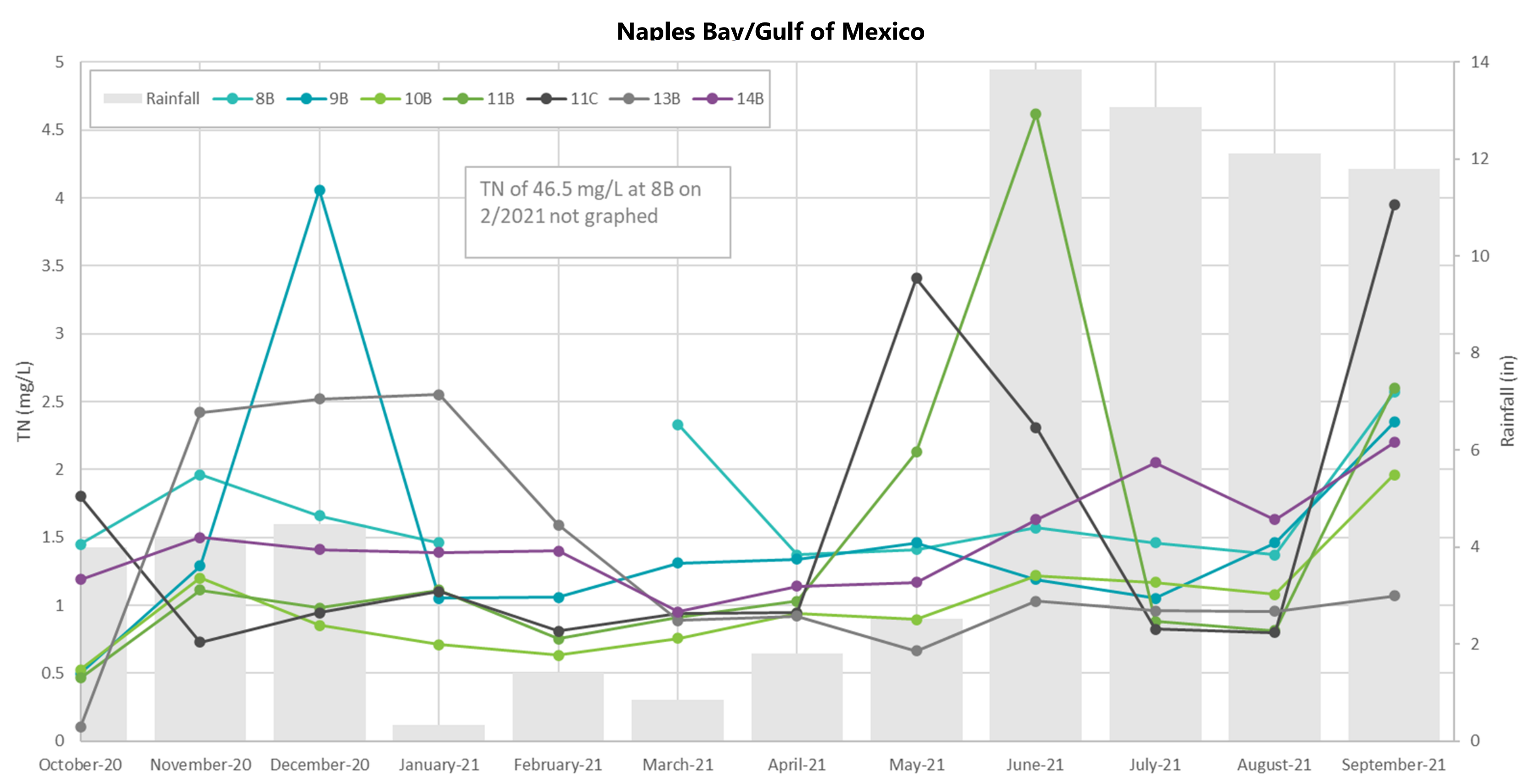
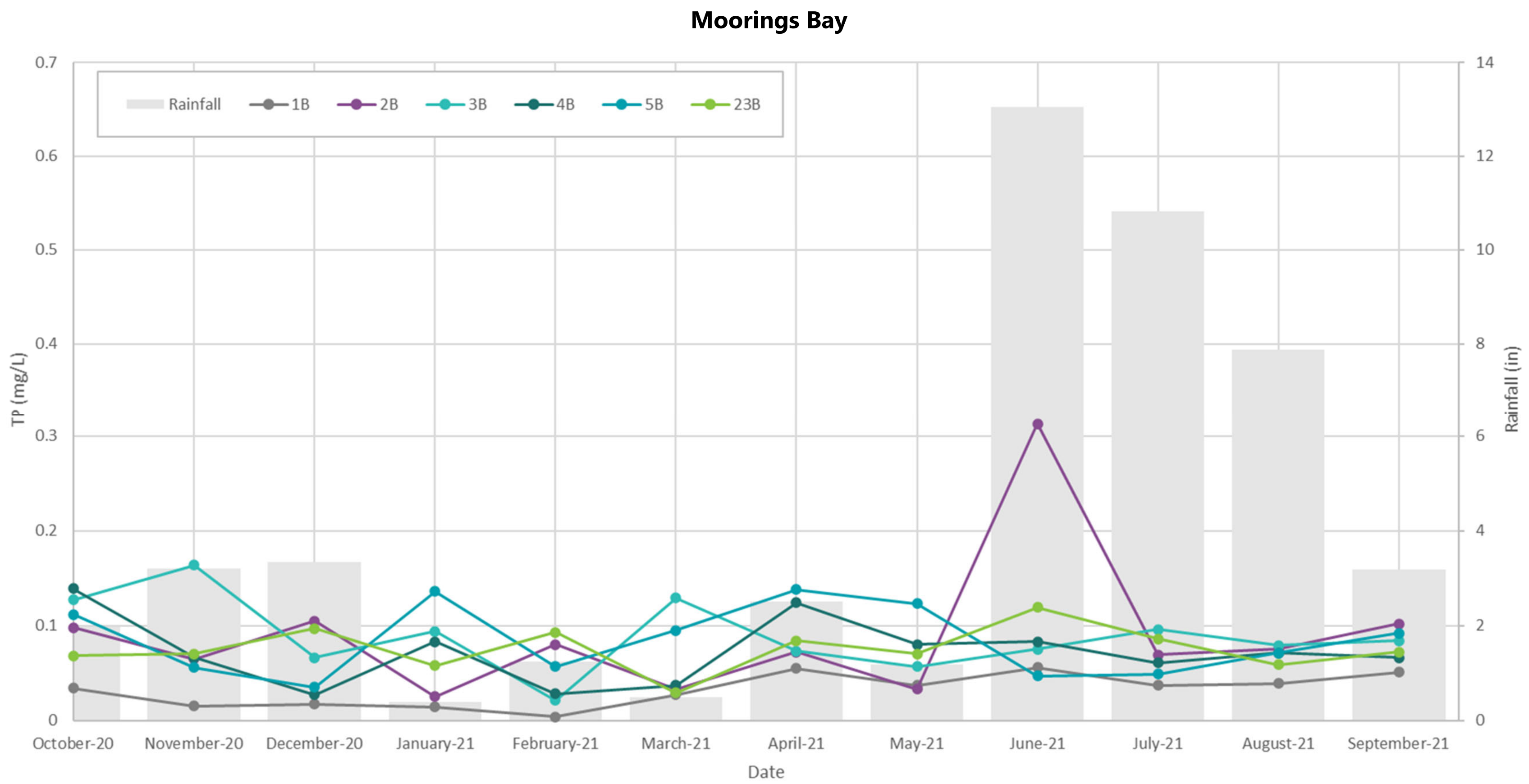
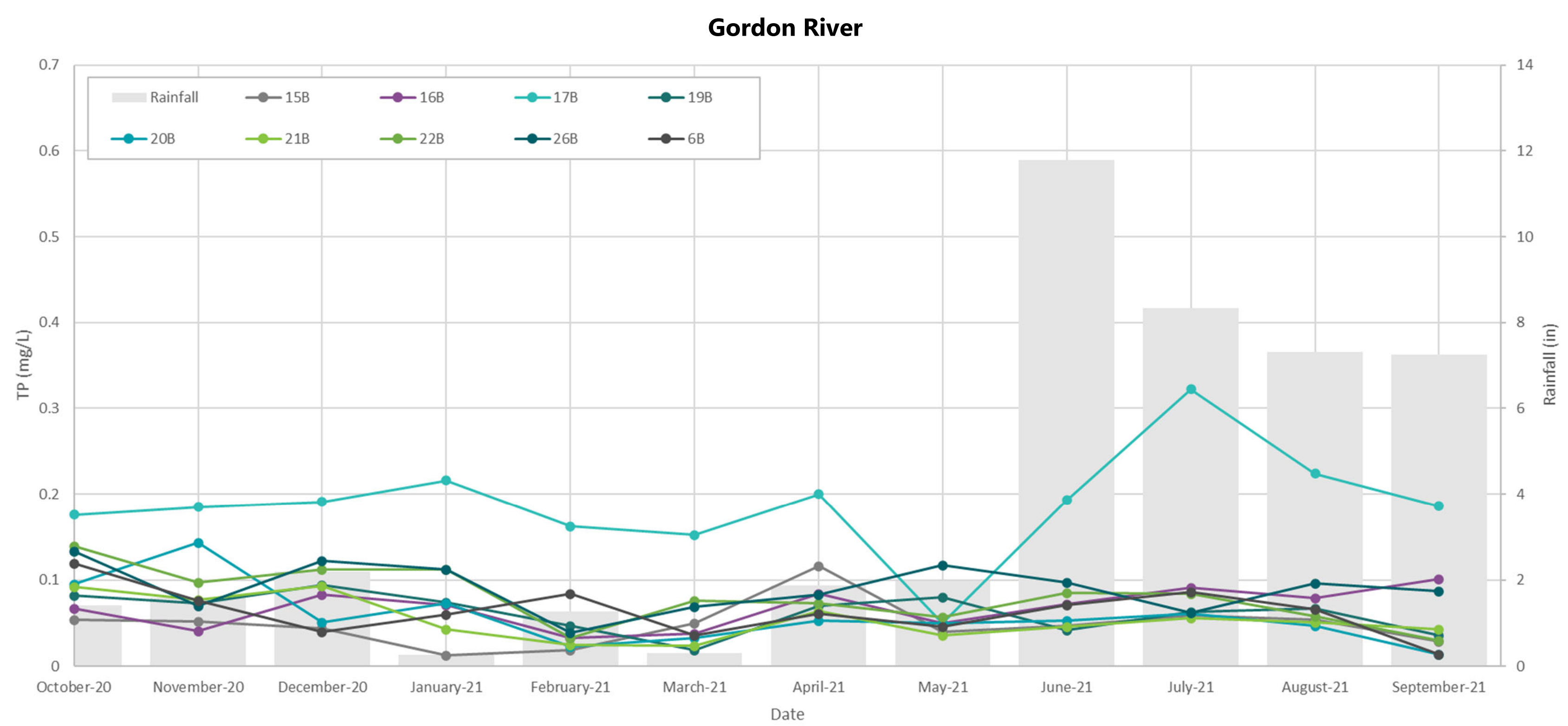




**Figure 3-13.** Time series plots of total nitrogen and precipitation from October 2020 through September 2021 at lakes that ultimately drain to Moorings Bay (top), Gordon River (middle), or Naples Bay/Gulf of Mexico (bottom).



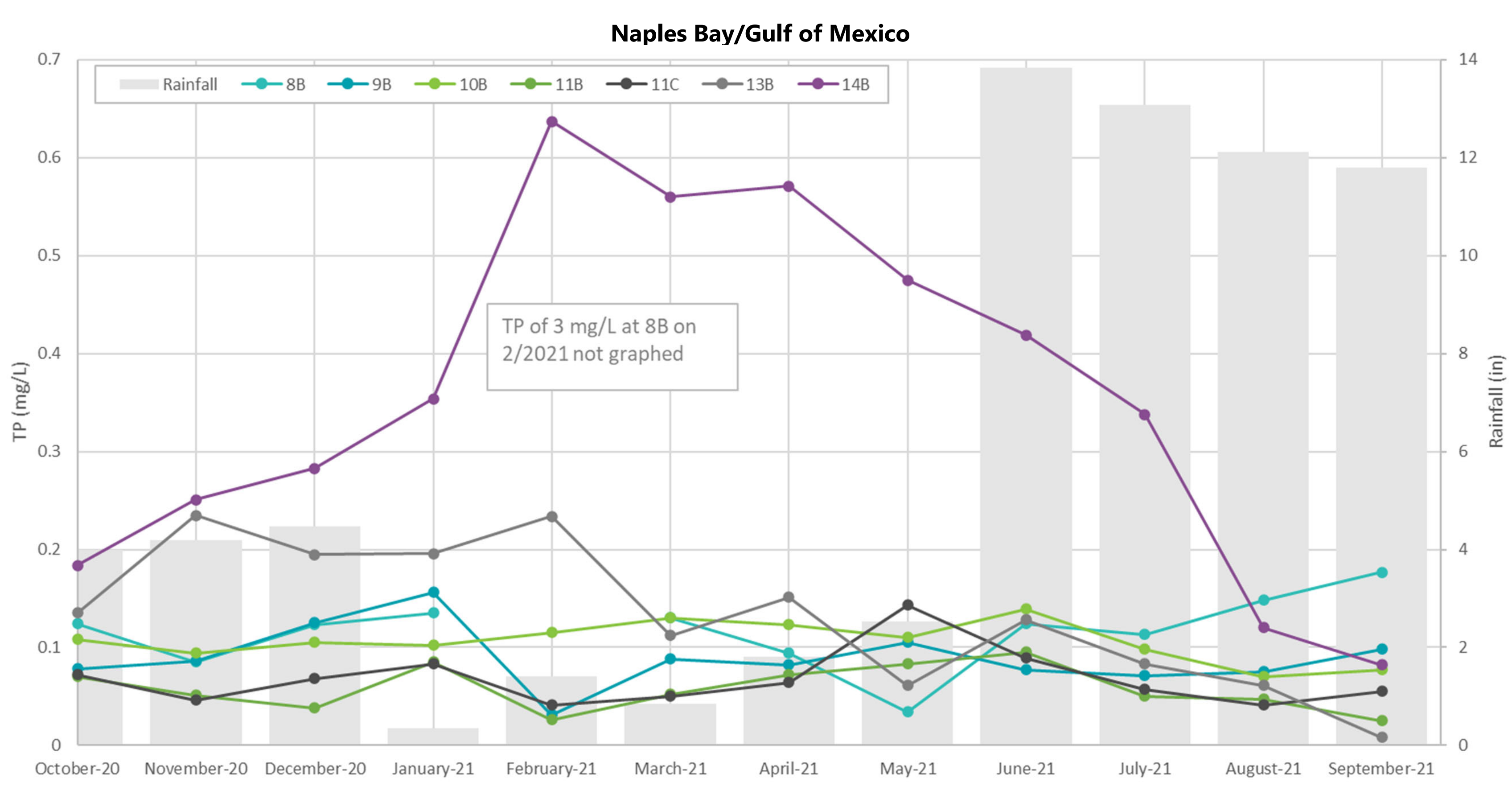




**Figure 3-14.** Time series plots of total phosphorus and precipitation from October 2020 through September 2021 at lakes that ultimately drain to Moorings Bay (top), Gordon River (middle), or Naples Bay/Gulf of Mexico (bottom).

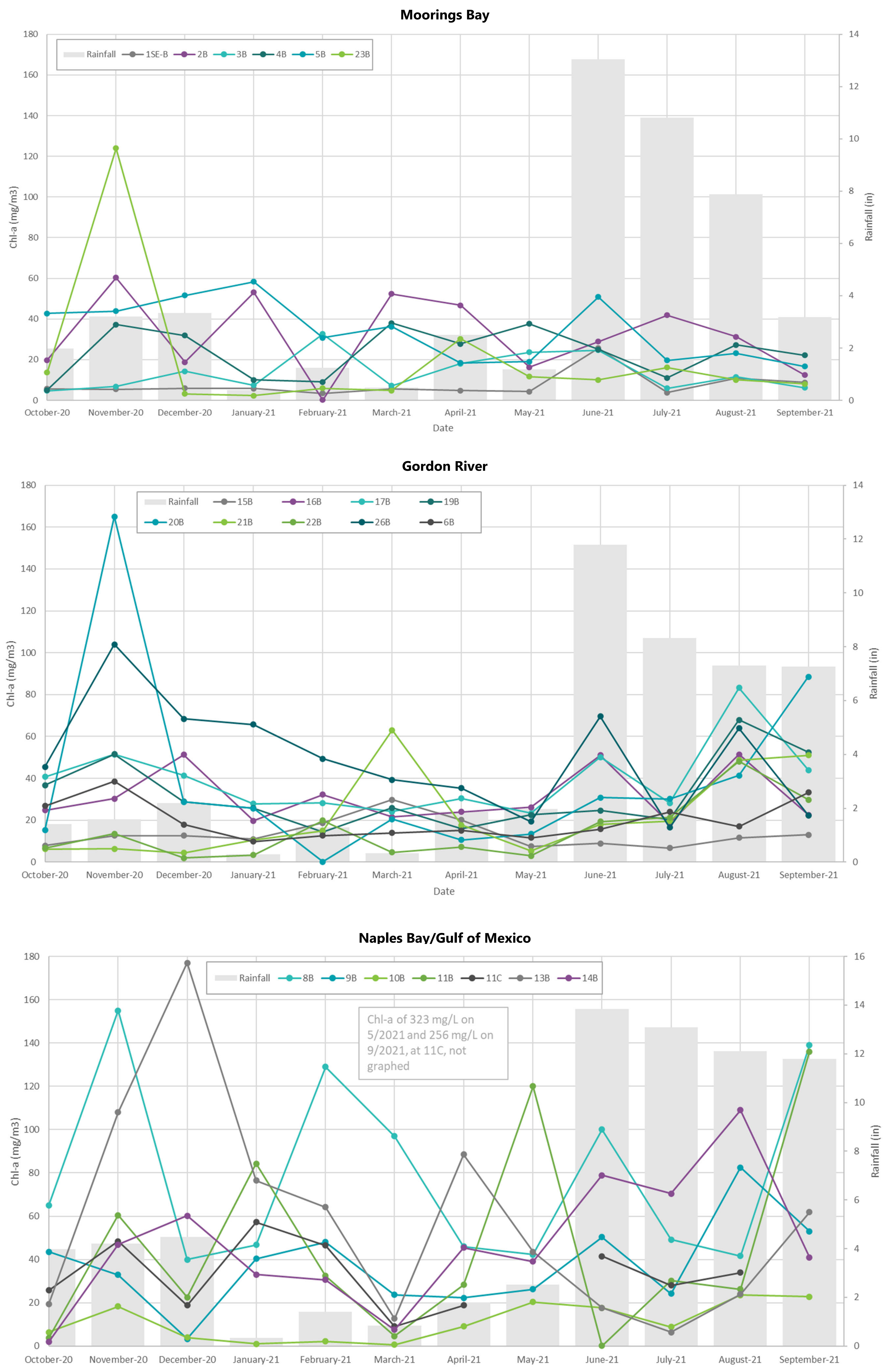



**Figure 3-15.** Time series plots of chlorophyl-a and precipitation from October 2020 through September 2021 at lakes that ultimately drain to Moorings Bay (top), Gordon River (middle), or Naples Bay/Gulf of Mexico (bottom).

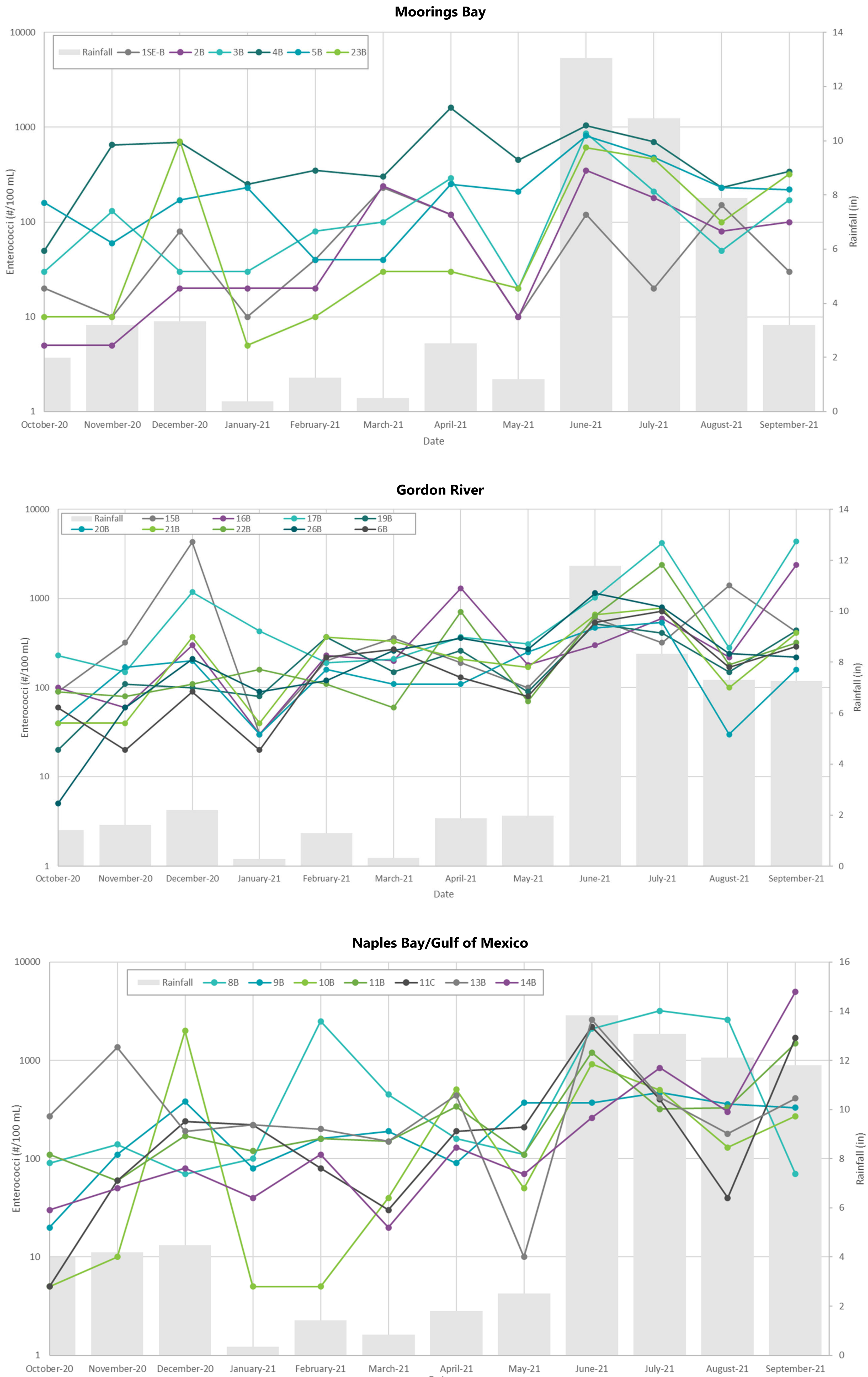



**Figure 3-16.** Time series plots of *Enterococci* and precipitation from October 2020 through September 2021 at lakes that ultimately drain to Moorings Bay (top), Gordon River (middle), or Naples Bay/Gulf of Mexico (bottom).

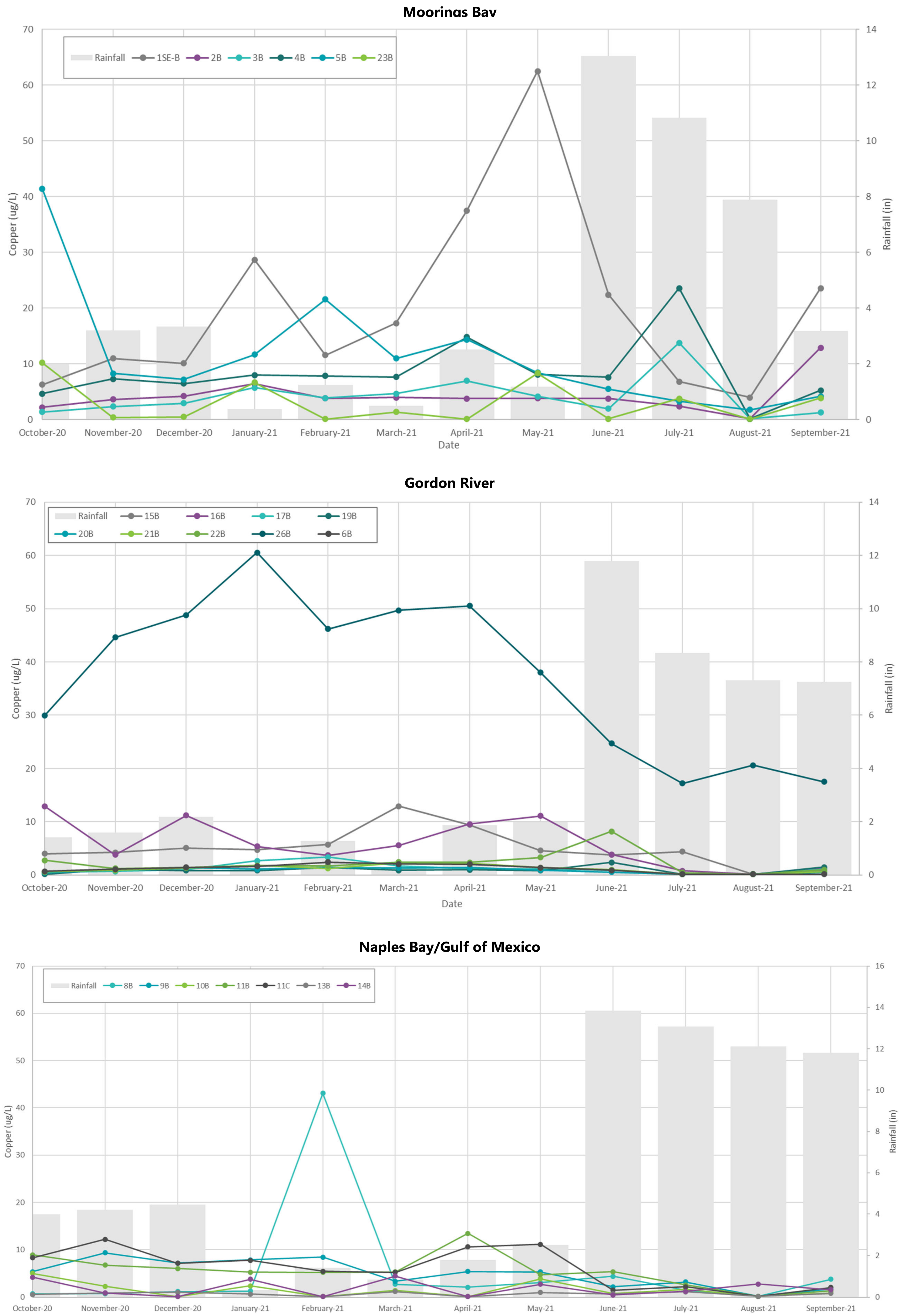



**Figure 3-17.** Time series plots of copper and precipitation from October 2020 through September 2021 at lakes that ultimately drain to Moorings Bay (top), Gordon River (middle), or Naples Bay/Gulf of Mexico (bottom).

### 3.4. Trend Analysis

Trends were analyzed for the following parameters: Chl-a, NOx, NH4, TKN, TN, OP, TP, TSS, Cu, *Enterococci* and fecal coliform. Statistically significant trends in water quality are presented in **Table 3-11** (Cu, TSS, nutrients, and Chl-a) and **Table 3-12** (*Enterococci* and fecal coliform). Only waterbodies with multiple years of data were included in the trend analysis. It was not possible to evaluate trends of *E. coli* as only one year of data is available.

Increasing trends can be a useful preliminary screening tool to assess if there may be a water quality issue at hand. Monthly data are valuable for predicting trends and changes in conditions, however they cannot reveal the mechanisms causing those changes in conditions. Generally, anthropogenic impacts in watersheds can result in changes in runoff quantity and quality, especially with respect to nutrients, TSS, metals and bacteria. For example, nutrients can be introduced to stormwater lakes via runoff from fertilized lawns. However, the form of nutrients in the runoff (for example, dissolved or particulate) varies and once introduced into the water column, in-lake process can further affect the nutrient concentrations. In some lakes, sediments can be a source of nutrients. Monthly water quality sampling cannot account for the specific runoff characteristics or the in-lake process.

Forty-eight significant trends in 12 lakes and three pump stations were identified among the Cu, nutrients, and Chl-a parameters, and 12 significant trends in 10 lakes were identified among the bacteria parameters. Most significant trends were decreasing, but increasing trends were identified for NOx, NH4 and OP in Alligator Lake, NOx at the Port Royal pump station, OP in Lake Manor, Chl-a in Devils Lake and copper in Lake Suzanne. Statistically significant increasing trends for *Enterococci* were identified in Alligator Lake, Sun Lake Terrace, Forest Lake, and South Lake. Statistically significant increasing trends for fecal coliform were identified in Forest Lake, Lake Manor, North Lake, and South Lake. In addition to trends of raw data, trends of the highest Chl-a concentration per year for each lake were analyzed **(Table 3-13)** to support the investigation into lake health described in **Section 3.7.2**. East Lake, Devils Lake, and Lake Manor all had statistically significant increasing trends in maximum annual Chl-a values.

It should also be noted that while the trends may be statistically significant, they may not be ecologically significant. A trend slope near zero likely will not show a measurable effect within a reasonable time frame (i.e., years to decades). Therefore, decreasing trends do not necessarily indicate that additional water quality improvement projects would not be beneficial to the stormwater lake and downstream.

If a parameter/lake combination is not listed in **Table 3-11** through **Table 3-13**, a statistically significant trend was not observed for that parameter/lake.

**Table 3-11.** Significant trends in copper and nutrient parameters identified by Mann-Kendall trend tests

| Lake | Station ID | Parameter | Sen's Slope | Tau | *p*-value | Trend |
|---|---|---|---|---|---|---|
| Alligator Lake | 10B | Chl-a | -0.19 | -0.24 | 0.03 | Significantly Decreasing |
| | | NOx | 0.00 | 0.27 | 0.02 | Significantly Increasing |
| | | NH4 | 0.00 | 0.33 | 0.01 | Significantly Increasing |
| | | TKN | 0.00 | -0.24 | 0.03 | Significantly Decreasing |
| | | OP | 0.00 | 0.24 | 0.04 | Significantly Increasing |
| East Lake | 11B | TP | 0.00 | -0.37 | 0.00 | Significantly Decreasing |
| | | NOx | 0.00 | -0.48 | 0.00 | Significantly Decreasing |
| | | OP | 0.00 | -0.38 | 0.00 | Significantly Decreasing |
| Cove Pump | 11-Pump | TP | 0.00 | -0.51 | 0.00 | Significantly Decreasing |
| | | NOx | 0.00 | -0.25 | 0.03 | Significantly Decreasing |
| | | OP | 0.00 | -0.26 | 0.03 | Significantly Decreasing |
| Lantern Lake | 14B | TP | 0.00 | -0.26 | 0.02 | Significantly Decreasing |
| | | NOx | 0.00 | -0.23 | 0.05 | Significantly Decreasing |
| | | Copper | -0.06 | -0.32 | 0.01 | Significantly Decreasing |
| Port Royal Pump | 14-Pump | NOx | 0.00 | 0.24 | 0.04 | Significantly Increasing |
| Fleischmann Lake | 19B | TN | 0.00 | -0.24 | 0.00 | Significantly Decreasing |
| | | TP | 0.00 | -0.17 | 0.04 | Significantly Decreasing |
| | | TSS | -0.05 | -0.20 | 0.01 | Significantly Decreasing |
| | | NOx | 0.00 | -0.34 | 0.00 | Significantly Decreasing |
| | | TKN | 0.00 | -0.21 | 0.01 | Significantly Decreasing |
| Devils Lake | 1SE-B | Chl-a | 0.05 | 0.25 | 0.00 | Significantly Increasing |
| | | NOx | 0.00 | -0.18 | 0.04 | Significantly Decreasing |
| | | Copper | -0.23 | -0.19 | 0.03 | Significantly Decreasing |
| Forest Lake | 20B | TN | -0.01 | -0.28 | 0.00 | Significantly Decreasing |
| | | TSS | -0.08 | -0.17 | 0.04 | Significantly Decreasing |
| | | TKN | -0.01 | -0.29 | 0.00 | Significantly Decreasing |
| Lake Manor | 22B | TN | -0.01 | -0.31 | 0.00 | Significantly Decreasing |
| | | TKN | -0.01 | -0.33 | 0.00 | Significantly Decreasing |
| | | OP | 0.00 | 0.19 | 0.02 | Significantly Increasing |
| NCH Lake | 26B | Copper | -0.65 | -0.31 | 0.00 | Significantly Decreasing |
| Swan Lake | 2B | TP | 0.00 | -0.32 | 0.00 | Significantly Decreasing |
| | | OP | 0.00 | -0.30 | 0.00 | Significantly Decreasing |
| Colonnade Lake | 3B | TP | 0.00 | -0.18 | 0.03 | Significantly Decreasing |
| | | Copper | -0.03 | -0.19 | 0.02 | Significantly Decreasing |

*Continued next page*

| Lake | Station ID | Parameter | Sen's Slope | Tau | *p*-value | Trend |
|---|---|---|---|---|---|---|
| Lake Suzanne | 5B | TN | -0.01 | -0.24 | 0.00 | Significantly Decreasing |
| | | TP | 0.00 | -0.36 | 0.00 | Significantly Decreasing |
| | | NOx | 0.00 | -0.25 | 0.00 | Significantly Decreasing |
| | | TKN | 0.00 | -0.19 | 0.02 | Significantly Decreasing |
| | | OP | 0.00 | -0.17 | 0.04 | Significantly Decreasing |
| | | Copper | 0.06 | 0.20 | 0.02 | Significantly Increasing |
| Mandarin Lake | 6B | TN | -0.01 | -0.46 | 0.00 | Significantly Decreasing |
| | | TP | 0.00 | -0.22 | 0.04 | Significantly Decreasing |
| | | TSS | -0.04 | -0.27 | 0.01 | Significantly Decreasing |
| | | TKN | -0.01 | -0.45 | 0.00 | Significantly Decreasing |
| South Lake | 9B | TP | 0.00 | -0.32 | 0.00 | Significantly Decreasing |
| | | OP | 0.00 | -0.22 | 0.01 | Significantly Decreasing |
| | | Copper | -0.05 | -0.22 | 0.01 | Significantly Decreasing |
| Public Works Pump | PW-Pump | Copper | -0.05 | -0.36 | 0.00 | Significantly Decreasing |

**Table 3-12.** Significant trends in *Enterococci* and fecal coliform by Mann-Kendall trend tests

| Lake | Station ID | Parameter | Sen's Slope | Tau | *p*-value | Trend |
|---|---|---|---|---|---|---|
| Alligator Lake | 10B | *Enterococci* | 1.52 | 0.23 | 0.05 | Significantly Increasing |
| Sun Lake Terrace | 15B | *Enterococci* | 2.31 | 0.22 | 0.04 | Significantly Increasing |
| Fleischmann Lake | 19B | *Enterococci* | -4.69 | -0.23 | 0.00 | Significantly Decreasing |
| Devils Lake | 1SE-B | *Enterococci* | -0.74 | -0.22 | 0.01 | Significantly Decreasing |
| Forest Lake | 20B | *Enterococci* | 1.60 | 0.21 | 0.01 | Significantly Increasing |
| | | Fecal Coliform | 4.55 | 0.26 | 0.01 | Significantly Increasing |
| Lake Manor | 22B | Fecal Coliform | 3.89 | 0.27 | 0.00 | Significantly Increasing |
| NCH Lake | 26B | *Enterococci* | -4.55 | -0.18 | 0.03 | Significantly Decreasing |
| Colonnade Lake | 3B | *Enterococci* | -2.00 | -0.20 | 0.02 | Significantly Decreasing |
| North Lake | 8B | Fecal Coliform | 15.58 | 0.30 | 0.01 | Significantly Increasing |
| South Lake | 9B | *Enterococci* | 1.82 | 0.19 | 0.02 | Significantly Increasing |
| | | Fecal Coliform | 2.67 | 0.25 | 0.01 | Significantly Increasing |

**Table 3-*13*.** Waterbodies with significant increasing trends in maximum annual Chl-a concentrations

| Lake | Station ID | Parameter | Sen's Slope | Tau | *p*-value | Trend |
|---|---|---|---|---|---|---|
| East Lake | 11B | Chl-a | 0.67 | 0.93 | 0.00 | Significantly Increasing |
| Devils Lake | 1SE-B | Chl-a | 0.29 | 0.84 | 0.01 | Significantly Increasing |
| Lake Manor | 22B | Chl-a | 0.33 | 0.64 | 0.04 | Significantly Increasing |

### 3.5. Correlation Analysis

The full results of the correlation analysis are included in **Appendix C** for both the full POR and the October 2020 – September 2021 sampling program. Significant results from the October 2020 – September 2021 program, with a focus on nutrient, bacteria, and Cu correlations with precipitation, by lake, are included in **Table 3-14**. Precipitation correlations with DOC, TOC, and color are also emphasized in this section because they can be indicative of inputs from less forested areas. Areas with vegetation would increase carbon derived from plant matter and debris. Precipitation was commonly positively correlated with bacteria, indicating rainfall runoff as a potential source and transport mechanism of bacteria to and/or in the stormwater lakes. Cu was often negatively correlated with precipitation, potentially a dilution effect in cases where the source of Cu was from algaecide applied to lakes. Both positive and negative precipitation correlations were observed for nutrients, indicating that the relationships between nutrient concentrations and precipitation are dependent on nutrient and lake-specific factors. Positive correlations between nutrients and rainfall may be due to 1) increased runoff of nutrients into the lakes, and/or 2) increased sediment nutrient flux rates that occur when the water column is diluted with lower concentrations. The negative correlation between carbon-related parameters and rainfall may indicate potential dilution of carbon-containing compounds from watersheds with limited forested areas.

**Table 3-14.** Statistically Significant Water Quality Correlations for Select Parameters with Precipitation for Naples Stormwater Stations, October 2020 – September 2021. Positive correlations with rainfall and temperature and negative correlations with salinity, conductivity and hardness not included.

| Lake (Station ID) | Rainfall | Positive Correlations | Negative Correlations |
|---|---|---|---|
| Devil's Lake | 7-Day Rain | OP, NH4, TP | TOC, Color, DOC |
| | 30-Day Rain | OP | Color, DOC, DO |
| Swan Lake | 7-Day Rain | NH4 | Copper, DOC, TOC |
| | 30-Day Rain | - | TKN, TN, DOC, TOC |
| Colonnade Lake | 7-Day Rain | - | TOC |
| | 30-Day Rain | - | DO |
| Hidden Lake | 7-Day Rain | - | TOC, DOC, Color |
| | 30-Day Rain | - | - |
| Lake Suzanne | 7-Day Rain | Entero, NH4, *E. coli* | Color, DOC, TKN, TN |
| | 30-Day Rain | *E. coli* | OP, TP, Color, Copper, DOC |
| Mandarin Lake | 7-Day Rain | TSS, Temp, *E. coli,* Entero, NOx | TOC, Copper |
| | 30-Day Rain | TSS, Chl-a | Copper |

*Continued next page*

| Lake (Station ID) | Rainfall | Positive Correlations | Negative Correlations |
|---|---|---|---|
| North Lake | 7-Day Rain | - | DO, DO Saturation, TOC |
| | 30-Day Rain | - | DO |
| South Lake | 7-Day Rain | - | Copper, DOC |
| | 30-Day Rain | Entero | Copper, TSS |
| Alligator Lake | 7-Day Rain | Turbidity, TKN, pH, Chl-a | - |
| | 30-Day Rain | TKN, TN, Chl-a | - |
| East Lake | 7-Day Rain | NH4, Entero | Color, pH |
| | 30-Day Rain | - | pH |
| Spring Lake | 7-Day Rain | - | TOC, Color, Copper |
| | 30-Day Rain | *E. coli* | TOC, Copper, pH, DO, DO Saturation |
| Lake 13 | 7-Day Rain | - | DOC |
| | 30-Day Rain | - | - |
| Lantern Lake | 7-Day Rain | Entero, TKN, TN, Turbidity, | - |
| | 30-Day Rain | Chl-a, Entero, TKN, TN, Turbidity | OP |
| Sun Terrace Lake | 7-Day Rain | NH4 | DO, DO Saturation |
| | 30-Day Rain | Entero, OP, NH4 | DO, DO Saturation, Copper |
| Thurner | 7-Day Rain | - | DO, DO Saturation |
| | 30-Day Rain | TP, *E. coli* | - |
| Lake Diana | 7-Day Rainfall | - | - |
| | 30-Day Rainfall | Chl-a, TKN, TP | Copper, Hardness |
| Fleischmann Lake | 7-Day Rain | Entero | TOC |
| | 30-Day Rain | Entero | - |
| Forest Lake | 7-Day Rain | OP | DO, DOC |
| | 30-Day Rain | Chl-a | Copper, DO, TOC |
| Willow | 7-Day Rain | Entero | DO, Copper |
| | 30-Day Rain | - | DO, DO Saturation, Copper, pH |
| Lake Manor | 7-Day Rain | Chl-a, Entero | TOC, OP |
| | 30-Day Rain | Chl-a, Entero | pH |
| Lowdermilk | 7-Day Rain | TKN | Conductivity |
| | 30-Day Rain | Entero, TKN, TN | Conductivity |
| NCH Lake | 7-Day Rain | Entero, NOx | DO Saturation, Color, TSS, TOC, TKN, TN, Copper, pH |
| | 30-Day Rain | - | Color, Copper, pH |

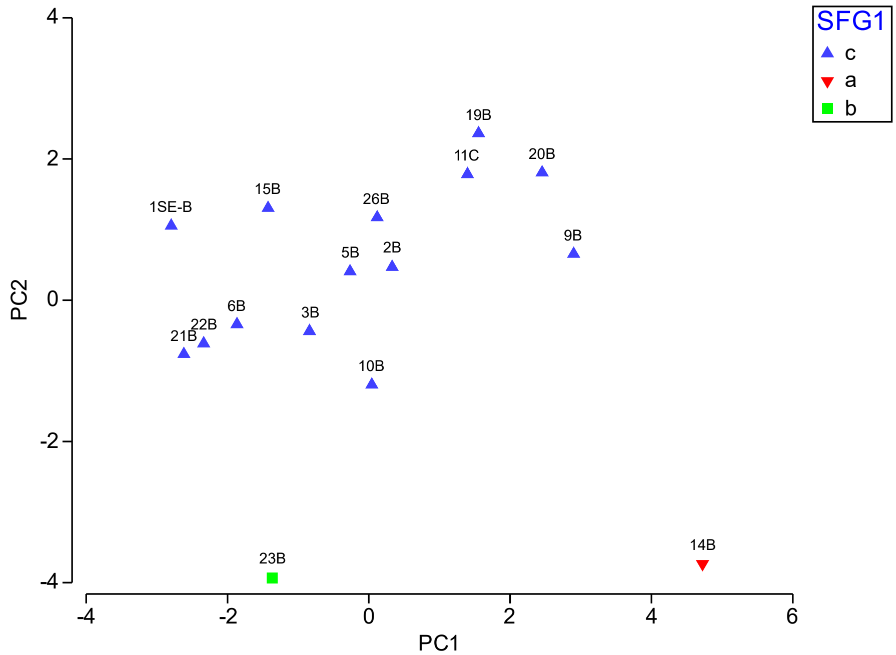
### 3.6. Multivariate Analysis

A combination of cluster analysis and principal components analysis was used to explore differences in water quality among lakes. Analyses were conducted on two datasets: One on the full POR from 2014 through 2021, and the second for lake data collected 2020-2021. The PCA ordination plots based on Euclidean distances in average water quality data clearly illustrated these differences, as described below:

- Full dataset (2014-2021): Cluster analyses suggested three groupings among the lakes ($p < 0.05$) (**Figure 3-18**):

    - Lantern Lake (14B) was one group (group a), Lowdermilk Lake (23B) was a second group (group b), and the remaining lakes clustered into a third group (group c).
    - The clustering into three groups was driven by differences in specific conductance and total phosphorus. For example, higher levels of specific conductance in Lowdermilk Lake (23B) drove Lowdermilk Lake (23B) to partition from the rest of the lakes. And Lantern Lake (14B) was separated from other lakes based on the overall higher TP concentrations.
    - Lakes in group c appear to orient along a TN gradient, which would infer that those lakes have similar patterns and behaviors for TN.
- Water quality for one-year study, data collected by Wood, 2020-2021 (**Figure 3-19**):
    - Cluster analyses suggested eight groupings among the lakes ($p < 0.05$)
    - Lakes separated into high TOC, high Chl-a and differences driven by:
        - TOC and TP for horizontal axis (PC1)
        - Specific conductance and Chl-a for the second axis (PC2)

Overall, the multivariate analyses of water quality separated lakes into three groups for the 2014-2021 data, and eight groups for the 2020-2021 data. The differences among the lakes were driven by specific conductance, Chl-a, TP, and TOC. The differences between the PCAs can be explained by the fact that different water quality data were used, as well as different set of lakes (the POR and 2020-2021 datasets). Greater number of lake groupings were found in the 2020-2021 data collected by Wood—this was a result of a greater number of water quality parameters sampled during 2020-2021 (18) compared to the 14 parameters available for the full POR – resulting in clearer separation among the lakes. These results are in general agreement with the univariate results. For example, Lantern Lake (14B) was clearly different in the PCA **(Figure 3-18),** driven by Chl-a and TP, as shown in **Figures 3-3 and 3-11**. In the longer-term PCA (**Figure 3-19**), Lantern Lake (14B) was furthest along the TP gradient, and had one of the highest TP concentrations (**Figure 3-11**). Specific conductance was also a strong differentiator among the lakes, and Lowdermilk Lake (23B) clearly was different than the other lakes, in terms of this parameter (**Appendix B**).



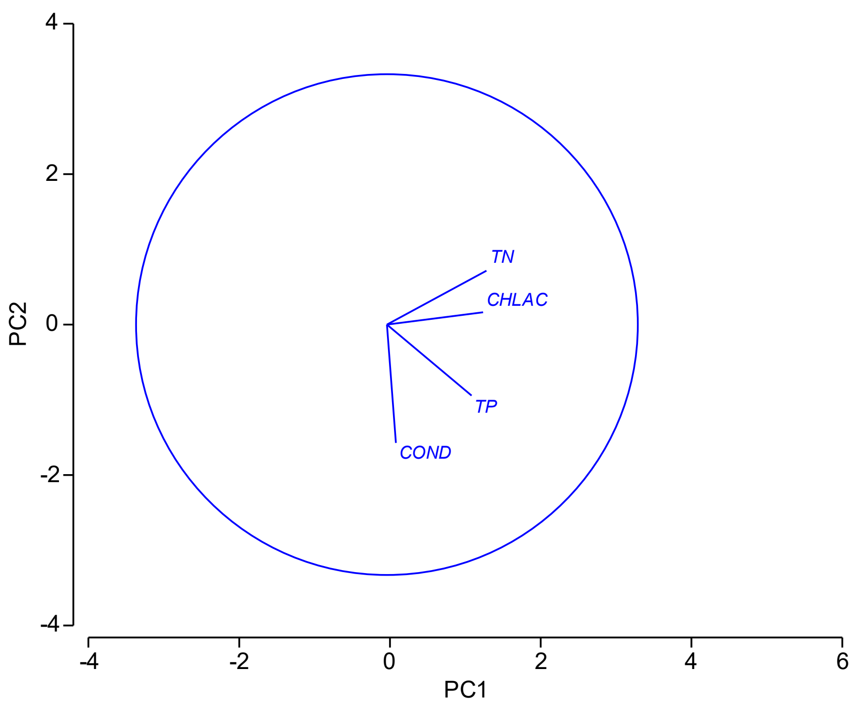




**Figure 3-18**. Principal components analyses ordination illustrating (dis)similarities in water quality for stormwater lakes from December 2014 through September 2021. Notes: Data based on averages of monthly sampling. Top plot: PCA ordination. Lakes with different colors were significantly different ($p < 0.05$) in water quality, based on hierarchical cluster analysis (SFGI). Bottom: Vector plot for influential water quality parameters. The length of the line indicates the strength of the association. Note: Vector labels include: TN = total nitrogen; CHLAC = chlorophyll-a; TP = total phosphorus; COND = specific conductance.

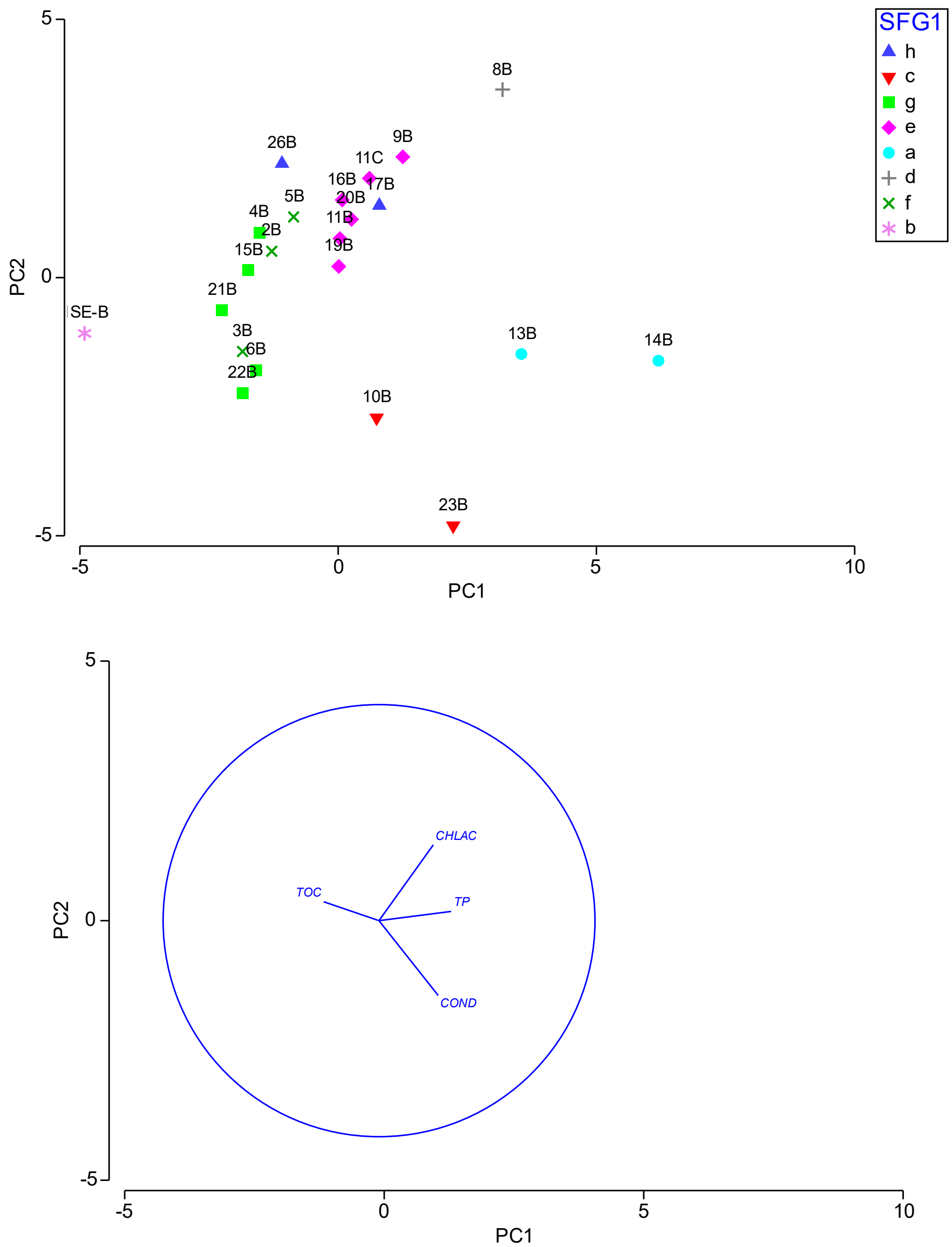



**Figure 3-19.** Principal components analyses plot of stormwater lakes for data by Wood from October 2020 through September 2021. Notes: Top plot: PCA ordination. Lakes with different colors were significantly different ($p < 0.05$) in water quality, based on hierarchical cluster analysis (SFGI). Bottom: Vector plot for influential water quality parameters. The length of the line indicates the strength of the association. Note: Vector labels include: TOC = total organic carbon; CHLAC = chlorophyll-a; TP = total phosphorus; COND = specific conductance.

## 3.7. Impairment Assessment

Stormwater lake water quality data were compared to the non-applicable FDEP criteria of the downstream waterbodies. These comparisons incorporate both site specific criteria for Chl-a, TN and TP (which vary based on Estuary Nutrient Region) as well as impairments of downstream waterbodies. Additionally, an evaluation of the Chl-a data was completed to identify waterbodies with the highest long-term Chl-a concentrations. This evaluation included comparing Chl-a data to the natural freshwater lakes criteria and identifying individual years (and individual samples) of high Chl-a concentrations. It also incorporated a trend test to identify if any waterbodies' highest annual Chl-a concentration is increasing over time.

### 3.7.1. Potential Impacts to Downstream Waters

Stormwater lake data collected over the long-term POR as well as data from October 2020 - September 2021 were compared to the downstream criteria for the selected parameters. Water quality criteria do not apply to the stormwater lakes, from a regulatory perspective. The downstream waterbody criteria are described in **Section 1.2.2**; with regulatory criteria included in **Table 1-6**.

Over the long-term POR, all lakes except for Devils Lake, Lowdermilk Lake and Hidden Lake had higher Chl-a and TN AGMs than the downstream criteria in all years (**Table 3-15**). Similarly, only 6 of the 22 lakes did not have higher TP AGMs than the downstream criteria in all years. In the Gordon River basin, NCH Lake and Sun Lake Terrace have long periods of record with the majority (≥77%) of Cu samples exceeding the criteria. In the Naples Bay basin, the only station with a long POR and the majority (59%) of Cu samples above the downstream criteria is East Lake. For *Enterococci*, both NCH Lake and Fleischmann Lake have long periods of record and at least 75% of their samples are above the downstream criteria. The stormwater lakes within Naples Bay have >50% of their samples above the *Enterococci* criteria. Lake Suzanne in the Moorings Bay basin and North Lake in the Gulf of Mexico basin both have long periods of record and more than 60% of their samples above the *Enterococci* criteria. Gordon River is the only waterbody impaired for DO, and Mandarin Lake has the highest percent of samples below the 42% DO criterion, at 35% percent.

For samples collected during the previous sampling year (October 2020-September 2021), the majority of waterbodies were above the downstream criteria for Chl-a, TN, and TP (**Table 3-16**). Devils Lake was the only waterbody with a Chl-a AGM below the downstream criterion. Lowdermilk Lake, Hidden Lake, and Lake Suzanne were the only waterbodies below the downstream TN criterion while Devils Lake and Sun Lake Terrace were the only waterbodies below the downstream TP criterion. For Cu, ≥75% of samples were above the downstream criterion in Sun Lake Terrace, NCH Lake, Devils Lake, Hidden Lake, Lake Suzanne and East Lake. All waterbodies exceeded the downstream *Enterococci* criteria at least three times throughout the October 2020-September 2021 period, while every sample from Lake Diana exceeded the criterion. Mandarin Lake stands out for having the highest percent of samples below the 42% DO criterion (83%) with Lake 13 having the next highest percent of samples below 42% DO (58%).

**Table 3-15**. Long-term period of record percent of the number of samples not meeting the downstream criteria

| Station ID | Lake Name | No. of Samples | Percent of No. of Samples Exceeding Downstream Criteria | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | CU | ENTERO | Chl-a[1] | TN[1] | TP[1] | DO |
| **Gordon River** *(verified impaired for Cu, DO, ENTERO, Chl-a, and nutrients; draft not impaired for Cu)* | | | ***>3.7 µg/L*** | ***>130 #/100mL*** | ***>4.3 µg/L*** | ***>0.57 mg/L*** | ***>0.045 mg/L*** | ***<42 %*** |
| 15B | Sun Lake Terrace | 43 | 77 | 58 | 100 | 100 | 43 | 9 |
| 16B | Thurner | 12 | 67 | 75 | 100 | 100 | 100 | 33 |
| 17B | Lake Diana | 12 | 0 | 100 | 100 | 100 | 100 | 33 |
| 19B | Fleischmann Lake | 72 | 4 | 75 | 100 | 100 | 100 | 11 |
| 20B | Forest Lake | 67 | 3 | 49 | 100 | 100 | 86 | 15 |
| 21B | Willow | 12 | 0 | 67 | 100 | 100 | 50 | 33 |
| 22B | Lake Manor | 67 | 6 | 45 | 100 | 100 | 86 | 24 |
| 26B | NCH Lake | 67 | 100 | 88 | 100 | 100 | 86 | 13 |
| 6B | Mandarin Lake | 43 | 7 | 51 | 100 | 100 | 100 | 35 |
| **Gulf of Mexico** | | | ***>3.7 µg/L*** | ***>130 #/100mL*** | ***>3.1 µg/L*** | ***>0.25 mg/L*** | ***>0.04 mg/L*** | ***<42 %*** |
| 10B | Alligator Lake | 37 | 15 | 32 | 100 | 100 | 100 | 11 |
| 8B | North Lake | 48 | 42 | 69 | 100 | 100 | 100 | 15 |
| 9B | South Lake | 67 | 69 | 54 | 100 | 100 | 100 | 6 |
| **Moorings Bay** *(verified impaired for TP and draft impaired for TN)* | | | ***>3.7 µg/L*** | ***>130 #/100mL*** | ***>8.1 µg/L*** | ***>0.85 mg/L*** | ***>0.04 mg/L*** | ***<42 %*** |
| 1SE-B | Devils Lake | 67 | 93 | 27 | 0 | 88 | 47 | 6 |
| 23B | Lowdermilk | 12 | 42 | 33 | 100 | 50 | 92 | 25 |
| 2B | Swan Lake | 61 | 60 | 36 | 100 | 87 | 88 | 8 |
| 3B | Colonnade Lake | 67 | 55 | 52 | 100 | 89 | 91 | 10 |
| 4B | Hidden | 12 | 92 | 92 | 100 | 63 | 75 | 0 |
| 5B | Lake Suzanne | 67 | 70 | 63 | 100 | 80 | 97 | 7 |
| **Naples Bay** *(verified impaired for Chl-a and Cu, and draft impaired for Enterococci)* | | | ***>3.7 µg/L*** | ***>130 #/100mL*** | ***>4.3 µg/L*** | ***>0.57 mg/L*** | ***>0.045 mg/L*** | ***<42 %*** |
| 11B | East Lake | 37 | 59 | 81 | 100 | 100 | 100 | 27 |
| 11C | Spring Lake | 12 | 67 | 58 | 100 | 100 | 100 | 17 |
| 13B | Lake 13 | 12 | 0 | 92 | 100 | 100 | 100 | 58 |
| 14B | Lantern Lake | 37 | 45 | 57 | 100 | 100 | 100 | 22 |
| 24B | Half Moon Lake | 25 | 20 | 96 | 100 | 100 | 100 | 40 |

Note: Yellow shading indicates downstream waterbody has been, or will soon be, impaired for this parameter. [1] – AGMs from 2015-2021 were used for this analysis for Chl-a, TN, and TP, with the exception of Moorings Bay with Chl-a as AGM and TN and TP as mg/L.. See Table 1-6 for additional information on downstream waterbody criteria.

**Table 3-16.** Percent of number of samples (12 samples total, October 2020-September 2021 POR) not meeting the downstream criteria

| Station ID | Lake Name | Percent of No. of Samples Exceeding Downstream Criteria | | | | | |
|---|---|---|---|---|---|---|---|
| | | CU | ENTERO | Chl-a[1] | TN[1] | TP[1] | DO |
| **Gordon River** *(verified impaired for Cu, DO, ENTERO, Chl-a, and nutrients; draft not impaired for Cu)* | | ***>3.7 µg/L*** | ***>130 #/100mL*** | ***>4.3 µg/L*** | ***>0.57 mg/L*** | ***>0.045 mg/L*** | ***<42 %*** |
| 15B | Sun Lake Terrace | 83 | 75 | 100 | 100 | 0 | 17 |
| 16B | Thurner | 67 | 75 | 100 | 100 | 100 | 33 |
| 17B | Lake Diana | 0 | 100 | 100 | 100 | 100 | 33 |
| 19B | Fleischmann Lake | 0 | 58 | 100 | 100 | 100 | 25 |
| 20B | Forest Lake | 0 | 58 | 100 | 100 | 100 | 8 |
| 21B | Willow | 0 | 67 | 100 | 100 | 100 | 33 |
| 22B | Lake Manor | 8 | 50 | 100 | 100 | 100 | 42 |
| 26B | NCH Lake | 100 | 67 | 100 | 100 | 100 | 0 |
| 6B | Mandarin Lake | 0 | 50 | 100 | 100 | 100 | 83 |
| **Gulf of Mexico** | | ***>3.7 µg/L*** | ***>130 #/100mL*** | ***>3.1 µg/L*** | ***>0.25 mg/L*** | ***>0.04 mg/L*** | ***<42 %*** |
| 10B | Alligator Lake | 17 | 42 | 100 | 100 | 100 | 17 |
| 8B | North Lake | 25 | 58 | 100 | 100 | 100 | 8 |
| 9B | South Lake | 58 | 67 | 100 | 100 | 100 | 0 |
| **Moorings Bay** *(verified impaired for TP and draft impaired for TN)* | | ***>3.7 µg/L*** | ***>130 #/100mL*** | ***>8.1 µg/L*** | ***>0.85 mg/L*** | ***>0.04 mg/L*** | ***<42 %*** |
| 1SE-B | Devils Lake | 100 | 17 | 0 | 83 | 25 | 0 |
| 23B | Lowdermilk | 42 | 33 | 100 | 0 | 92 | 25 |
| 2B | Swan Lake | 67 | 25 | 100 | 92 | 75 | 17 |
| 3B | Colonnade Lake | 50 | 33 | 100 | 83 | 92 | 8 |
| 4B | Hidden | 92 | 92 | 100 | 42 | 75 | 0 |
| 5B | Lake Suzanne | 83 | 75 | 100 | 58 | 92 | 8 |
| **Naples Bay** *(verified impaired for Chl-a and Cu, and draft impaired for Enterococci)* | | ***>3.7 µg/L*** | ***>130 #/100mL*** | ***>4.3 µg/L*** | ***>0.57 mg/L*** | ***>0.045 mg/L*** | ***<42 %*** |
| 11B | East Lake | 75 | 67 | 100 | 100 | 100 | 8 |
| 11C | Spring Lake | 67 | 58 | 100 | 100 | 100 | 17 |
| 13B | Lake 13 | 0 | 92 | 100 | 100 | 100 | 58 |
| 14B | Lantern Lake | 25 | 33 | 100 | 100 | 100 | 17 |

Note: Yellow shading indicates downstream waterbody has been, or will soon be, impaired for this parameter. [1] – One AGM calculated from samples collected between October 2020 and September 2021 were used for this analysis for Chl-a, TN, and TP, with the exception of Moorings Bay with Chl-a as AGM and TN and TP as mg/L.. See Table 1-6 for additional information on downstream waterbody criteria.

### 3.7.2. Potential Impacts to Lake Health

The FDEP determines applicable nutrient (and Chl-a) criteria by the long-term geometric mean of color for freshwater lakes in the State of Florida. However, color was only included as a parameter during this current study period (October 2020-September 2021). Nonetheless, all lakes that were sampled had geometric mean color results of greater than 40 PCU (46-163 PCU). This indicates that they fall under the category of high color lakes and the comparable natural waterbody Chl-a criteria is 20 µg/L (as an AGM). As previously mentioned, no lake in this report is considered a Water of the State, and comparisons to the criteria are for informational and comparison purposes only.

As shown in **Table 3-17** Lantern Lake, South Lake, NCH Lake, Fleischmann Lake and Half Moon Lake have all had Chl-a AGMs above 20 µg/L for all seven years of sampling, indicating higher algal concentrations in these lakes and, in natural waterbodies, these Chl-a concentrations would indicate impaired conditions. However, stormwater lakes are designed to intercept nutrient-laden runoff which can contribute to the cyclical increasing and decreasing algal populations. Additionally, these lakes have some of the highest maximum Chl-a AGMs and individual Chl-a values. Other lakes that have exceeded 20 µg/L for every year of sampling include North Lake, Lake 13, Spring Lake, Lake Diana, and Thurner Lake – however these lakes have fewer years of data (5 years of data for North Lake, 2 years of data for Lake 13, Spring Lake, Lake Diana and Thurner Lake).

Hidden Lake, Lake Manor, Lowdermilk Lake, Sun Lake Terrace and Devils Lake were the only waterbodies that have never had a Chl-a AGM over 20 µg/L in their respective period of record. However, maximum individual Chl-a concentrations per year show statistically significant ($p<0.05$) increasing trends in Devils Lake and Lake Manor, indicating that these lakes may begin to experience increasing concentrations of Chl-a, indicating a potential increased chance for algal blooms.

Copper concentrations observed in the waterbodies were also compared to FDEP’s water quality criteria. Similar to the analysis of Chl-a above, these copper criteria are not applicable to the stormwater ponds as they are not considered Waters of the State.

As shown in **Table 3-18** copper concentrations exceeding the criteria were observed in 11 of the 25 stormwater ponds and pump stations between October 2020 and September 2021. All 12 samples collected from NCH Lake were above the copper criteria while ≥42% of samples from Port Royal Pump, Lowdermilk and Devils Lake were above the criteria. Exceedances were also observed in Alligator Lake, Lantern Lake, Thurner, Colonnade Lake, Hidden Lake, Lake Suzanne and North Lake.

**Table 3-19** shows exceedances of the copper criteria were observed throughout the year. However January, April and October were the months with the highest number of lakes exceeding the criteria (5 lakes). December was the only month that had just one lake (NCH Lake) exceed the copper criteria.

**Table 3-17.** Waterbodies organized by highest algal abundance

| Lake | Station ID | Count of Chl-a AGMs > 20 µg/L / Total Years of Samples[1] | Maximum Chl-a AGM (µg/L) | Maximum Individual Chl-a (µg/L) |
|---|---|---|---|---|
| Lantern Lake | 14B | 7/7 | 94 | 266 |
| South Lake | 9B | 7/7 | 60 | 1,018 |
| NCH Lake | 26B | 7/7 | 53 | 779 |
| Fleischmann Lake | 19B | 7/7 | 51 | 252 |
| Half Moon Lake | 24B | 6/6 | 169 | 255 |
| Forest Lake | 20B | 5/7 | 93 | 511 |
| North Lake | 8B | 5/5 | 78 | 249 |
| Alligator Lake | 10B | 4/7 | 32 | 92 |
| Lake Suzanne | 5B | 4/7 | 31 | 290 |
| Swan Lake | 2B | 4/7 | 30 | 135 |
| Colonnade Lake | 3B | 3/7 | 31 | 492 |
| Lake 13 | 13B | 2/2 | 72 | 177 |
| Spring Lake | 11C | 2/2 | 48 | 323 |
| Lake Diana | 17B | 2/2 | 44 | 83 |
| Thurner | 16B | 2/2 | 34 | 51 |
| Mandarin Lake | 6B | 2/7 | 29 | 80 |
| East Lake* | 11B | 2/7 | 27 | 136 |
| Willow | 21B | 1/2 | 21 | 63 |
| Hidden | 4B | 0/2 | 20 | 38 |
| Lake Manor* | 22B | 0/7 | 18 | 55 |
| Lowdermilk | 23B | 0/2 | 17 | 124 |
| Sun Lake Terrace | 15B | 0/7 | 15 | 41 |
| Devils Lake* | 1SE-B | 0/7 | 7 | 37 |

* - Significant increasing trend in maximum Chl-a, see **Section 3.3.1.**

[1] – Data from 2014 were not included in this analysis as only one month of data was collected.

**Table 3-18.** Waterbodies organized by copper exceedances observed between October 2020 and September 2021.

| Lake | Station ID | Number of Exceedances | Percent Exceedance |
|---|---|---|---|
| **NCH Lake** | **26B** | **12** | **100%** |
| **Devils Lake** | **1SE-B** | **6** | **50%** |
| **Port Royal Pump** | **14-PUMP** | **5** | **42%** |
| **Lowdermilk** | **23B** | **5** | **42%** |
| **Lantern Lake** | **14B** | **3** | **25%** |
| **Lake Suzanne** | **5B** | **3** | **25%** |
| **Alligator Lake** | **10B** | **2** | **17%** |
| **Hidden** | **4B** | **2** | **17%** |
| **Thurner** | **16B** | **1** | **8%** |
| **Colonnade Lake** | **3B** | **1** | **8%** |
| **North Lake** | **8B** | **1** | **8%** |
| East Lake | 11B | 0 | 0% |
| Spring Lake | 11C | 0 | 0% |
| Cove Pump | 11-Pump | 0 | 0% |
| Lake 13 | 13B | 0 | 0% |
| Sun Lake Terrace | 15B | 0 | 0% |
| Lake Diana | 17B | 0 | 0% |
| Fleischmann Lake | 19B | 0 | 0% |
| Forest Lake | 20B | 0 | 0% |
| Willow | 21B | 0 | 0% |
| Lake Manor | 22B | 0 | 0% |
| Swan Lake | 2B | 0 | 0% |
| Mandarin Lake | 6B | 0 | 0% |
| South Lake | 9B | 0 | 0% |
| Public Works Pump | PW-PUMP | 0 | 0% |

Notes: Waterbodies with at least one copper exceedance are **bold**. For marine waters, the copper criterion is 3.7 μg/L. In freshwater, the copper criterion is calculated based on the hardness of the water.

**Table 3-19.** Number and Percent of waterbodies exceeding Copper Criteria between October 2020 and September 2021.

| Month | Number of Lakes Exceeding Copper Criteria | Percent of Lakes Exceeding Copper Criteria |
|---|---|---|
| **January** | **5** | **20%** |
| February | 3 | 12% |
| **March** | **4** | **16%** |
| **April** | **5** | **20%** |
| **May** | **4** | **16%** |
| June | 2 | 8% |
| **July** | **4** | **16%** |
| August | 2 | 8% |
| **September** | **4** | **16%** |
| **October** | **5** | **20%** |
| November | 2 | 8% |
| December | 1 | 4% |

Note: Months with at least four copper exceedances are **bold**.
For marine waters, the copper criterion is 3.7 µg/L. In freshwater, the copper criterion is calculated based on the hardness of the water.

### 3.8. Pump Station Pollutant Loading Estimates

Monthly loads from the three pump stations were calculated for parameters of concern (TP, TN, TSS, Cu). Total monthly pump run times were multiplied by maximum capacities for each pump to calculate volumes used in the monthly load estimates. Considering that the pumps are on variable frequency drive (which modifies pumping velocity based on pump station volume), using the maximum pump capacities likely overestimates actual volumes and loads from the pump stations. Therefore, these loads are represented as estimates of maximum loads; actual loads will vary and will likely be lower during dry periods.

The largest pollutant loads appear to be from 11-Pump. 14-Pump has the second highest TP and Cu while PW-Pump has the second highest TN and TSS loads (**Table 3-20**).

**Table 3-20.** Maximum monthly and annual pollutant loading (in pounds) from City of Naples Pump Stations from October 2020 to September 2021

| Station ID | Pump Station | Month | TP (lbs) | TN (lbs) | TSS (lbs) | Cu (lbs) |
|---|---|---|---|---|---|---|
| 11-Pump | Cove Pump | October-20 | 75.6 | 833.7 | 185.6 | 3.73 |
| | | November-20 | 73.4 | 903.5 | 2509.6 | 1.62 |
| | | December-20 | 51.1 | 691.6 | 1161.7 | 1.34 |
| | | January-21 | 24.3 | 269.3 | 62.4 | 0.52 |
| | | February-21 | 33.1 | 224.3 | 79.2 | 0.51 |
| | | March-21 | 23.5 | 266.8 | 802.3 | 0.41 |
| | | April-21 | 39.3 | 384.0 | 83.5 | 0.73 |
| | | May-21 | 19.1 | 216.0 | 44.0 | 0.33 |
| | | June-21 | 87.7 | 1278.3 | 4344.4 | 0.84 |
| | | July-21 | 126.4 | 1363.4 | 2478.9 | 1.76 |
| | | August-21 | 74.8 | 1012.2 | 259.9 | 0.16 |
| | | *Total* | *628.2* | *7,443.0* | *12,011.6* | *12.0* |
| 14-Pump | Port Royal Pump | October-20 | 46.6 | 109.9 | 90.1 | 0.07 |
| | | November-20 | 23.3 | 134.6 | 504.6 | 0.36 |
| | | December-20 | 15.4 | 63.6 | 160.4 | 0.09 |
| | | January-21 | 10.1 | 46.7 | 52.7 | 0.24 |
| | | February-21 | 18.8 | 47.1 | 289.7 | 0.09 |
| | | March-21 | 7.2 | 28.3 | 308.5 | 0.13 |
| | | April-21 | 6.4 | 22.3 | 675.3 | 0.01 |
| | | May-21 | 7.7 | 26.4 | 287.0 | 0.06 |
| | | June-21 | 38.5 | 135.8 | 1917.5 | 0.05 |
| | | July-21 | 111.0 | 301.0 | 557.5 | 3.27 |
| | | August-21 | 40.3 | 131.7 | 767.8 | 4.01 |
| | | *Total* | *325.3* | *1,047.4* | *5,611.1* | *8.4* |
| PW-Pump | Public Works Pump | October-20 | 19.1 | 208.9 | 161.9 | 0.45 |
| | | November-20 | 13.6 | 199.4 | 126.6 | 0.33 |
| | | December-20 | 23.5 | 390.4 | 1395.2 | 1.65 |
| | | January-21 | 7.4 | 125.9 | 28.9 | 0.15 |
| | | February-21 | 4.9 | 76.6 | 148.2 | 0.11 |
| | | March-21 | 10.1 | 55.9 | 142.3 | 0.16 |
| | | April-21 | 9.3 | 178.1 | 544.6 | 0.37 |
| | | May-21 | 4.6 | 46.2 | 13.3 | 0.05 |
| | | June-21 | 35.0 | 440.0 | 2557.2 | 0.61 |
| | | July-21 | 70.4 | 664.0 | 572.4 | 1.06 |
| | | August-21 | 23.1 | 338.0 | 1180.3 | 0.75 |
| | | *Total* | *221.0* | *2,723.4* | *6,871.1* | *5.7* |

## 4.0 SUMMARY

This 2020-2021 Annual Surface Water and Pump Station Monitoring and Analysis Report included data analysis (trends, correlations, multivariate analyses, impairment assessment) for over 15 water quality parameters, 22 lakes, and three pump stations, with data spanning from 2014-2021 for some locations. To focus this summary section, select regulated parameters are summarized according to the receiving waterbody for the stormwater lakes included in the 2020-2021 monitoring program using the full POR available for each lake. The median concentrations, downstream exceedance criteria, and trends for nutrients, Chl-a, Cu, and *Enterococci* are included below in **Tables 4-1** through **4-4**. Recommendations based on the data summarized in this report are included in **Section 5.0**.

It is important to note that the FDEP water quality impairment criteria do not apply to stormwater lakes since they are manmade features and are not classified as Waters of the State. Stormwater lakes are designed to receive rainfall runoff containing nutrients and other pollutants and exceedances are expected when comparing the stormwater lakes to downstream criteria which apply to more natural waterbodies that were not designed and constructed to intercept stormwater runoff from developed lands. The comparison to downstream water quality criteria is simply a comparison tool and the downstream water quality criteria do not represent target water quality conditions in stormwater lakes. Information on stormwater lake samples with exceedances of non-applicable downstream waterbody criteria is provided to assist in managers in where to conduct additional study to support water quality improvement projects.

The marine segment of the Gordon River is on the Verified Impaired List (FDEP 2021b) for Cu, *Enterococci*, Chl-a, TN, and TP.  According to the Draft Impaired List (FDEP 2021a), the marine segment is no longer impaired for Cu.  Of the nine lakes discharging to the Gordon River, Thurner Lake, Lake Diana, Fleischmann Lake, and the NCH Lake stand out with generally high concentrations and high downstream criteria exceedances in many parameters (**Table 4-1**). Positive correlations with precipitation and regulated parameters were also observed in these lakes: *Enterococc*i (Thurner Lake, Fleischmann Lake, and NCH Lake), TP (Thurner and Lake Diana), and Chl-a (Lake Diana). The positive precipitation correlations indicate a potential input from rainfall runoff in the stormwater lakes which subsequently discharge this runoff to the Gordon River. With impairments for TN, TP, Chl-a, Cu, and *Enterococci* in the Gordon River, the relatively high concentrations (compared to non-applicable downstream waterbody criteria) and positive precipitation correlations for nutrients, Chl-a, and *Enterococci* in the lakes are of potential concern but also indicate areas where water quality improvements can be targeted.

North Lake, which discharges to the Gulf of Mexico (**Table 4-2**), had generally high concentrations (compared to other lakes draining to the Gulf of Mexico) of the downstream regulated parameters and high downstream waterbody criteria exceedance percentages, with the exception of copper. In North Lake, there was also a significant positive precipitation correlation with *Enterococci*.

Naples Bay is currently on the Verified Impaired List (FDEP 2021b) for Cu and Chl-a and, according to the Draft Impaired List (FDEP 2021a), the waterbody is also impaired for *Enterococci*. Exceedances in stormwater lakes samples of parameters with Naples Bay criteria were common for nutrients and Chl-a, but less common for copper and *Enterococci*. East Lake and Lake 13 stand out in **Table 4-3**, with generally high concentrations in the parameters with downstream impairments (Chl-a, Cu, and *Enterococci*). In East Lake, precipitation was positively correlated with *Enterococci*. No correlations were observed with precipitation in Lake 13, but only one year of data were available. In Lantern Lake, which stands out in **Table 4-3** with high (compared to other lakes listed in the table) nutrients, concentration of Chl-a, *Enterococc*i, TKN and TN were positively correlated with precipitation. Depending on the City's goals, the correlations with precipitation and in-lake data potentially indicate that additional sampling and water quality improvements in East Lake, Lantern Lake, or Lake 13 may benefit Naples Bay.

Moorings Bay is currently on the Verified Impaired List (FDEP 2021b) for TP and, according to the Draft Impaired List (FDEP 2021a), the waterbody is also impaired for TN. Swan Lake (with higher median concentrations [compared to other lakes in the watershed] of TN and Chl-a and over 75% of samples exceeding downstream waterbody criteria for TN, TP, and Chl-a) and Lake Suzanne (with higher median concentrations [compared to other lakes in the watershed] of TN and TP and over 75% of samples exceeding downstream waterbody criteria for TN, TP, and Chl-a) stand out in **Table 4-4** with high concentrations and/or high downstream waterbody criteria exceedances. In Lake Suzanne, precipitation was positively correlated with *E. coli* and *Enterococci*, indicating rainfall runoff as a potential source of bacteria. Therefore, additional study may reveal water quality improvement projects in Swan Lake and Lake Suzanne that could benefit Moorings Bay.

In addition, several lakes stood out with respect to certain parameters, regardless of the potential impacts to downstream waterbodies. Overall, sampling locations that stood out with the highest average concentrations of nutrients, Chl-a, and fecal indicator bacteria include Half Moon Lake, North Lake, South Lake, and Lantern Lake. Half Moon Lake was not sampled during the 2020-2021 sampling year because it does not receive public drainage. North Lake and Lantern Lake were also identified in the discussion above as potential locations for water quality improvements that would be beneficial to downstream waterbodies.

**Table 4-1.** Summary of nutrients, Chl-a, Cu and *Enterococci* in Stormwater Lakes Discharging to the Gordon River, which is impaired (FDEP, 2012b) in the marine segment for TN, TP, Chl-a, Cu, and *Enterococci.* Note that according to the Draft Impaired List (FDEP 2021a), the waterbody is no longer impaired for Cu. Parameters with verified impairments shaded yellow in table.

| Station ID | Lake Name | TN | | | TP | | | Chl-a | | | CU | | | ENTERO | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Median (mg/L) | % Downstream Exceedance | Trend | Median (mg/L) | % Downstream Exceedance | Trend | Median (ug/L) | % Downstream Exceedance | Trend | Median (ug/L) | % Downstream Exceedance | Trend | Median (#/100 mL) | % Downstream Exceedance | Trend |
| 15B | Sun Lake Terrace | 1.09 | **100** | x | 0.041 | 43 | x | 12.6 | **100** | x | 4.65 | 77 | x | 200 | 58 | ▲ |
| 16B | Thurner | 1.37 | **100** | -- | 0.072 | **100** | -- | 25.5 | **100** | -- | 4.63 | 67 | -- | 225 | **75** | -- |
| 17B | Lake Diana | 1.34 | **100** | -- | **0.189** | **100** | -- | **35.6** | **100** | -- | 1.08 | 0 | -- | 340 | **100** | -- |
| 19B | Fleischmann Lake | 1.25 | **100** | TN, NOx, TKN: ▼ NH4: x | 0.072 | **100** | TP: ▼ OP: x | 30.05 | **100** | x | 0.87 | 4 | x | 370 | **75** | ▼ |
| 20B | Forest Lake | **1.47** | **100** | TN, TKN: ▼ NOx, NH4: x | 0.059 | **86** | x | 30.8 | **100** | x | 0.83 | 3 | x | 130 | 49 | ▲ |
| 21B | Willow | 1.01 | **100** | -- | 0.049 | 50 | -- | 16.35 | **100** | -- | 1.12 | 0 | -- | 270 | 67 | -- |
| 22B | Lake Manor | 0.85 | **100** | TN, TKN: ▼ NOx, NH4: x | 0.076 | **86** | TP: x OP: ▲ | 15.2 | **100** | x | 1.36 | 6 | x | 110 | 45 | x |
| 26B | NCH Lake | 1.19 | **100** | x | 0.084 | **86** | x | 29.7 | **100** | x | **43.7** | **100** | ▼ | **470** | **88** | ▼ |
| 6B | Mandarin Lake | 0.93 | **100** | TN, TKN: ▼ NOx, NH4: x | 0.08 | **100** | TP: ▼ OP: x | 17 | **100** | x | 0.92 | 7 | x | 140 | 51 | x |

Notes: Highest median concentration in red font, percent of downstream exceedances in red font if greater than or equal to 75%. Red trend arrow indicates significantly increasing concentration, green trend arrow indicates significantly decreasing concentration, x=trend not significant, --=insufficient data to perform trend analysis. Data from full POR (2014-2021), with the exception of Thurner, Lake Diana, and Willow which were only sampled during the October 2020 – September 2021 sampling program.

**Table 4-2.** Summary of nutrients, Chl-a, Cu and *Enterococci* in Stormwater Lakes Discharging to the Gulf of Mexico.

| Station ID | Lake Name | TN | | | TP | | | Chl-a | | | CU | | | ENTERO | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Median (mg/L) | % Downstream Exceedance | Trend | Median (mg/L) | % Downstream Exceedance | Trend | Median (ug/L) | % Downstream Exceedance | Trend | Median (ug/L) | % Downstream Exceedance | Trend | Median (#/100 mL) | % Downstream Exceedance | Trend |
| 10B | Alligator Lake | 1.08 | 100 | TN: x<br>NOx, NH4: ▲<br>TKN: ▼ | 0.102 | 100 | TP: x<br>OP: ▲ | 18.3 | 100 | ▼ | 1.43 | 15 | x | 50 | 32 | ▲ |
| 8B | North Lake | 1.97 | 100 | x | 0.146 | 100 | x | 67.1 | 100 | x | 2.94 | 42 | x | 250 | 69 | x |
| 9B | South Lake | 1.53 | 100 | x | 0.134 | 100 | TP, OP: ▼ | 46 | 100 | x | 5.39 | 69 | ▼ | 150 | 54 | ▲ |

Notes: Highest median concentration in red font, percent of downstream exceedances in red font if greater than or equal to 75%. Red trend arrow indicates significantly increasing concentration, green trend arrow indicates significantly decreasing concentration, x=trend not significant, --= insufficient data to perform trend analysis. Data from full POR (2014-2021).

**Table 4-3.** Summary of nutrients, Chl-a, Cu and *Enterococci* in Stormwater Lakes Discharging to Naples Bay, which is impaired (FDEP, 2021b) for Chl-a and Cu, and on the Draft Impaired List (FDEP 2021a) for *Enterococci.* Parameters with verified or draft impairments shaded yellow in table.

| Station ID | Lake Name | TN | | | TP | | | Chl-a | | | CU | | | ENTERO | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Median (mg/L) | % Downstream Exceedance | Trend | Median (mg/L) | % Downstream Exceedance | Trend | Median (ug/L) | % Downstream Exceedance | Trend | Median (ug/L) | % Downstream Exceedance | Trend | Median (#/100 mL) | % Downstream Exceedance | Trend |
| 11B | East Lake | 1.03 | 100 | NOx: ▼<br>TN, TKN, NH4: x | 0.08 | 100 | TP, OP: ▼ | 20.6 | 100 | x | 4.5 | 59 | x | 240 | 81 | x |
| 11C | Spring Lake | 0.95 | 100 | -- | 0.061 | 100 | -- | 37.75 | 100 | -- | 6.3 | 67 | -- | 200 | 58 | -- |
| 13B | Lake 13 | 0.99 | 100 | -- | 0.132 | 100 | -- | 52.7 | 100 | -- | 0.76 | 0 | -- | 245 | 92 | -- |
| 14B | Lantern Lake | 1.64 | 100 | NOx: ▼<br>TN, TKN, NH4: x | 0.375 | 100 | TP: ▼<br>OP: x | 51.4 | 100 | x | 3.07 | 45 | ▼ | 150 | 57 | x |

Notes: Highest median concentration in red font, percent of downstream exceedances in red font if greater than or equal to 75%. Red trend arrow indicates significantly increasing concentration, green trend arrow indicates significantly decreasing concentration, x=trend not significant, --= insufficient data to perform trend analysis. Data from full POR (2014-2021), with the exception of Spring Lake and Lake 13 which were only sampled during the October 2020 – September 2021 sampling program.

**Table 4-4.** Summary of nutrients, Chl-a, Cu and *Enterococci* in Stormwater Lakes Discharging to Moorings Bay, which is impaired (FDEP, 2021b) for TP and on the Draft Impaired List (FDEP, 2021a) for TN. Parameters with verified or draft impairments shaded yellow in table.

| Station ID | Lake Name | TN | | | TP | | | Chl-a | | | CU | | | ENTERO | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Median (mg/L) | % Downstream Exceedance | Trend | Median (mg/L) | % Downstream Exceedance | Trend | Median (ug/L) | % Downstream Exceedance | Trend | Median (ug/L) | % Downstream Exceedance | Trend | Median (#/100 mL) | % Downstream Exceedance | Trend |
| 1SE-B | Devils Lake | 1.04 | **88** | NOx: ▼ TN, TKN, NH4: x | 0.039 | 47 | x | 4.41 | 0 | ▲ | **14.8** | **93** | ▼ | 60 | 27 | ▼ |
| 23B | Lowdermilk | 0.63 | 50 | -- | 0.071 | **92** | -- | 10.1 | **100** | -- | 0.95 | 42 | -- | 30 | 33 | -- |
| 2B | Swan Lake | **1.11** | **87** | x | 0.087 | **88** | TP, OP: ▼ | **28.3** | **100** | x | 4.12 | 60 | x | 80 | 36 | x |
| 3B | Colonnade Lake | 1.06 | **89** | x | 0.097 | **91** | TP: ▼ OP: x | 19.3 | **100** | x | 3.92 | 55 | ▼ | 150 | 52 | ▼ |
| 4B | Hidden | 0.83 | 63 | -- | 0.069 | **75** | -- | 26.15 | **100** | -- | 7.64 | **92** | -- | **400** | **92** | -- |
| 5B | Lake Suzanne | **1.11** | **80** | TN, TKN, NOx: ▼ NH4: x | **0.112** | **97** | TP, OP: ▼ | 22.4 | **100** | x | 4.82 | 70 | ▲ | 210 | 63 | x |

Notes: Highest median concentration in red font, percent of downstream exceedances in red font if greater than or equal to 75%. Red trend arrow indicates significantly increasing concentration, green trend arrow indicates significantly decreasing concentration, x=trend not significant, --= insufficient data to perform trend analysis. Data from full POR (2014-2021), with the exception of Lowdermilk and Hidden Lakes during the October 2020 – September 2021 sampling program.

## 5.0 RECOMMENDATIONS

The City of Naples is dedicated to improving water quality conditions in City stormwater lakes. For example, the City is currently conducting lake restorations at Lakes 11, 19, and 31 that began in August 2021. The recommendations provided below include additional data collection and analysis to support the development of water quality improvement projects and a discussion of effective water quality improvement technologies that can be employed for improving the water quality of stormwater runoff into and out of the City's stormwater lakes.

### 5.1. Recommended Analyses

Pollutant load modeling is a desktop analysis, assuming drainage basin delineations are sufficiently detailed and permit coverages for existing stormwater treatment systems are available. This modeling can be supplemented by additional sampling at lake inflows and lake outflows to quantify in-lake processes (i.e., potential contributions from groundwater seepage and/or sediment flux-driven internal loading), and monitoring flows out of the lakes and sediment quality evaluations.

Pollutant load modeling is the primary recommendation because it could provide valuable data for identifying potential monitoring and water quality improvement projects. Deciding which lakes to include in a pollutant load modeling study is outside of the scope of the current project and requires assessing whether the potential projects that will be identified based on the modeling results will be targeted at in-lake improvements and/or downstream waterbodies. However, an initial review of the stormwater lake data indicates that pollutant load modeling may be beneficial in the following lakes to assess projects to benefit downstream waterbodies:

- Gordon River: Thurner Lake and Lake Diana
- Naples Bay: Lake 13
- Moorings Bay: Swan Lake and Lake Suzanne

As described above, pollutant load modeling should be supplemented by monitoring lake inflows and outflows. If monitoring inflows and outflows indicates that the lake is exporting nutrients, sediment internal loading should be assessed via a sediment characterization study. Sediment characterization studies can include the following components:

- Bathymetric and sediment thickness surveys: These surveys provide information on sediment bottom elevations and soft sediment thicknesses. These surveys are typically conducted by physically sounding and probing the sediment thickness on a grid (sized according to lake size) using a 2" diameter PVC sounding pole.
- Screening level sediment characterization: Sediment grab sampling locations can be optimized based on the results of the sediment thickness survey. Grab samples should be analyzed for nutrients, metals, total organic carbon and bulk density, at a minimum.
- Hot spot identification: Hot spots, or areas with higher nutrient concentrations, can be identified at a sub-basin scale using the results of the pollutant load modeling and sediment sampling and sediment thickness surveys.
- Sediment fractionation: Sediment nutrient fractionation can be conducted on a smaller subset of samples. Nutrient fractionation can be used to estimate the different chemical states of nutrients that range from highly available and likely to release (depending on environmental conditions) to

recalcitrant (unavailable). Samples for nutrient fractionation are collected with a piston core sampler.

- Sediment flux: Sediment nutrient flux studies enable estimation of the nutrient flux rate and attributable load to the water column from the sediments. For flux studies, intact sediment cores are incubated in a laboratory under aerobic and anoxic conditions.

More in-depth pollutant source tracking methods can be incorporated as needed. These include flow-weighted stormwater sampling and isotopic analysis of water samples.

### 5.2. Recommended Water Quality Improvement Projects

As described previously, the stormwater lake concentration data provides valuable information, however, it does not provide pollutant loads in and out of the lakes, which are key in proposing specific projects. To understand which lakes are the highest overall load contributors, it's important to measure those loads so that projects can be designed to properly attenuate the internal and external loads combined. Measuring the internally derived loads from each lake if nutrients are found to export out of the lake is key to selecting and prioritizing projects. Once lakes or areas are targeted for projects, there are a variety of structural and non-structural Best Management Practices (BMPs) that can be employed to improve the quality of stormwater runoff.

#### 5.2.1. Structural BMPs

Low impact development (LID) structural BMPs may be incorporated into the stormwater lake watersheds to treat nutrients (nitrogen, phosphorus or both) and other constituents of concern. Encouraging widespread LID practices in existing developments as retrofits and future redevelopments is an effective strategy to mitigate existing water quality issues, improve resiliency, and prevent future watershed degradation. The overall goals of LIDs are to "slow, spread, and soak" (i.e., to prevent excess stormwater runoff by creating upgradient storage volumes, to reduce the volume of stormwater runoff by increasing the amount of pervious area, allowing stored water to infiltrate into the groundwater, and by treating stored water (for nutrient removal) with vegetation or biosorptive activated filter media before infiltration or discharge). Storing stormwater, slowing it down, and allowing it to infiltrate lessens peak flows and reduces erosion, sedimentation, and flooding, which in turn reduces nutrient runoff inputs to lakes. Nutrient removal from surface water and groundwater contributions to the lakes can further improve water quality. A list of LID structural BMPs is provided below. Although planning a new development (or redevelopment) with LID practices is typically easier and more cost effective, the suggested BMPs can also be implemented to improve existing development.

**Bioretention/Bioinfiltration**: Bioretention/bioinfiltration basins (commonly referred to as rain gardens) are shallow depressions used to capture, temporarily store, treat, and infiltrate stormwater runoff. Organic mulch and soils, vegetation, and additional nutrient adsorption media facilitate pollutant removal and infiltration to the groundwater. The basins can be underlain by layers of gravel or other porous media to hold additional runoff storage volume and can be engineered with underdrains and overflow pipes or weirs, in case of emergency flooding issues. Because these BMPs can be designed and planted to fit a wide variety of applications and landscaping aesthetics, they are well-suited for use in parks and recreational areas, parking lots, or in front of schools or other public buildings. They can be planned in new developments, constructed in existing open areas, or installed privately by residents in their existing yards.

**Stormwater Treatment Wetlands**: Constructed for pollutant load removal, flood protection and erosion control, constructed treatment wetlands also provide habitat for wildlife. Constructed wetlands typically include a fore-bay for pre-treatment of raw influent stormwater prior to entry into the wetland portion of the system to settle out and reduce suspended solids before further treatment by the constructed wetlands. Constructed treatment wetlands can be designed to fit a wide variety of aesthetics and applications and could be implemented in parks and recreational areas, along roadways, on public lands (schools, fire stations etc.), or downstream of treated wastewater discharges (with intent to provide additional nutrient attenuation/polishing, not to replace existing wastewater treatment). Although BMPs such as bioinfiltration basins and dry ponds are designed to temporarily store water and return to dry conditions after infiltration and evapotranspiration, constructed treatment wetlands are designed to retain water levels that support wetland ecosystems and invoke biogeochemical mechanisms to treat water prior to discharge and/or infiltration. These BMPs should be implemented in areas that can hydrologically support wetlands without creating offsite flooding impacts.

**Bioswales**: Bioswales are shallow vegetated swales that capture runoff for stormwater conveyance and provide treatment and infiltration along with brief temporary storage. Similar to bioretention basins, bioswales can also be enhanced with underlain layers of Biosorptive activated media (BAM) and/or gravel to enhance nutrient removal, add storage capacity, and improve infiltration. Because bioswales are typically long, narrow conveyances, they are ideal for application as medians, for parking lot drainage, or along roadsides. New developments can integrally design streets and parking lots to drain to central bioswale medians, but bioswales are also highly suitable for retrofitting existing developments, especially where the City maintains existing stormwater infrastructure within the right-of-way (ROW) along roadways.

### 5.2.2. Nonstructural BMPs

A nonstructural BMP that could provide benefits to the stormwater lakes and downstream waterbodies is sediment management/inactivation which could provide water quality improvement gains in respect to the potential sediment internal cycling load from contributing lakes. If additional investigation into the potential sediment related loads from lakes finds that loads are extensive, the City may consider sediment inactivation projects using innovative and highly cost-effective sediment capping products such as Phoslock or Virophos. Wood has repeatedly tested these products on the bench and mesocosm scales and have found between 80-95% reduction of phosphorus loading from the sediment when the product is applied to the top of the sediment as a chemical inactivation cap. Virophos was also found to remove around 50% of nitrogen. The products have both been tested by the manufacturers, distributors and academia and were found to be non-toxic and safe for organisms in the benthos and elsewhere in the waterbody and ecosystem. Additional toxicity information is available from each of the manufacturers (SePRO for Phoslock and Enviremed for Virophos). Phoslock has been approved and permitted to be applied to several lakes in Florida on a whole lake basis (Pine Lake and Prima Vista Lake). Virophos has not yet been applied at a whole-lake scale and has only been applied during a mesocosm study (Crystal Lake in City of Lakeland) by Wood, and the experimental study is still underway. Additional toxicity information will be available upon completion of the mesocosm study. Full scale application of these products need to be permitted if the lake is a natural waterbody. It is likely that the stormwater lakes may fall under a permit exemption, but an application would be needed to confirm this assumption based on previous experience by Wood. It is unknown if outside entities have tested for toxicity or public health concerns. However, the products have been shown to be safe and non-toxic with the available information at the time of this report. The lifespan of the products and application dosing and frequency is entirely based on the site-specific nature of the sediment profile characteristics and additional ongoing inflows. Therefore, a site-specific assessment would be needed to provide a dosing rate, frequency and schedule once a sediment characterization is completed for each lake that has an expected sediment nutrient load issue. Wood understands that this is a relatively new technology and City staff are encouraged to seek out additional information on sediment inactivation products as they become available.

Public outreach regarding fertilizer use may also be beneficial. Nutrient runoff from nonpoint sources such as fertilizer contributes to algae blooms, anoxia, and biodiversity loss in aquatic environments (Yang and Toor, 2016), and Jani et. al (2020) reported that stormwater runoff is a leading source of nitrogen to waterbodies. In particular, the application of fertilizer to grass lawns and sports/recreational fields/courses have been recognized as an important source of nitrogen and phosphorus pollution in urban areas (Souto et al., 2019; Yang and Toor, 2016; Yang and Toor, 2017; Krimsky et al., 2021), via stormwater runoff and over application of fertilizer which can result in nitrogen leaching through the root zone during infiltration. As such, municipal and county governments throughout Florida have enacted restrictions on residential fertilizer use as part of water quality restoration efforts (Krimsky et al. 2021). Quantifying the success of these programs at improving water quality is difficult because of the numerous sources of nutrients (e.g., atmospheric deposition, septic/wastewater/reclaimed, pet waste, yard clippings) in addition to fertilizers (Yang and Toor, 2016; Yang and Toor, 2017; Krimsky et al., 2021) and landscape differences (Krimsky et al. 2021). However, residential fertilizers are large contributors to nutrient concentrations in urban runoff (Yang and Toor, 2016; Yang and Toor, 2017; Krimsky et al., 2021). Krimsky et al. (2021) reported that the source and concentration of these nutrients are influenced by homeowner fertilizer behavior and recommended that nutrient management should include outreach and education. As described earlier in **Section 1.2.1**, the City of Naples has a fertilizer ordinance[6] and web-based outreach materials. Landscape companies are also required to complete the Green Industries Best Management Practices certification provided through the State—an initiative that was started within the City of Naples' and grew statewide based on these efforts. The addition of public outreach staff within the City would allow for the expansion of outreach efforts to landscape companies and Homeowners Associations, for example. Other initiatives to supplement ongoing efforts could contribute to a targeted outreach or education campaign. Outreach may be a useful tool for lakes receiving only private discharge, like Half Moon Lake, which was monitored in previous City sampling programs and had high concentrations of nutrients and Chl-a. Outreach would also be an opportunity for the City to further educate residents on Florida-Friendly landscaping with low maintenance plants, keeping grass clippings out of stormwater lakes, and adjusting fertilizer use if irrigating with reclaimed water. Moreover, potentially enhancing restrictions via fertilizer and other ordinances that increase water quality protection are highly recommended.

[6] Fertilizer Use and Maintenance of Landscapes, City of Naples, available at: https://www.naplesgov.com/fertilizer, accessed 2021-07-23.

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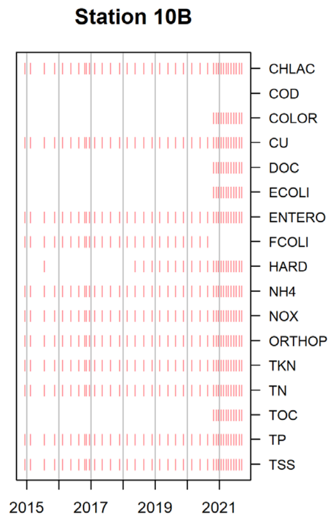
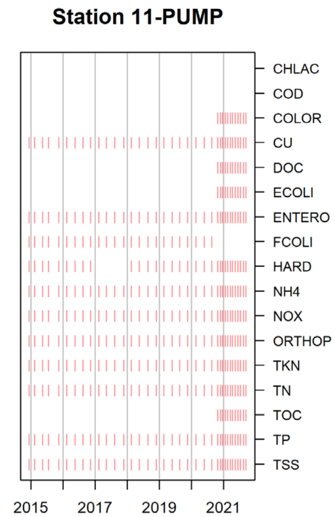
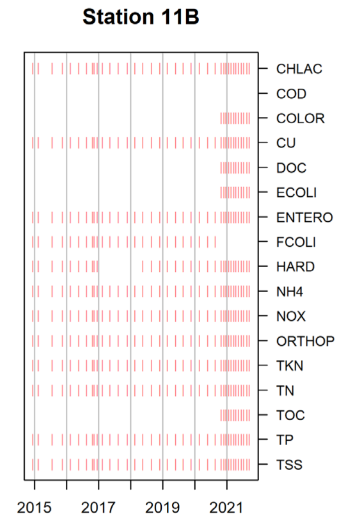
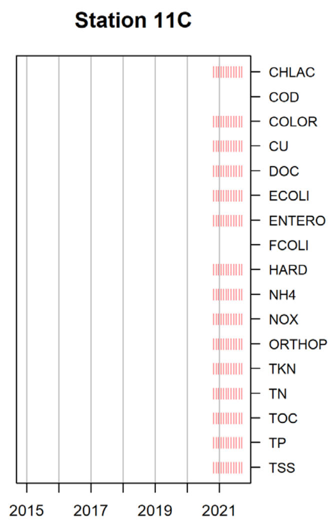
## Appendix A – Water Quality Periods of Record for Naples Stormwater Stations

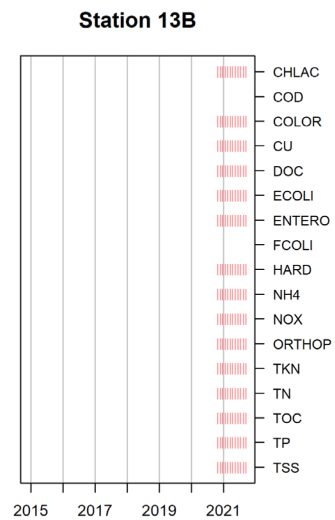
## Appendix A – Water Quality Periods of Record for Naples Stormwater Stations

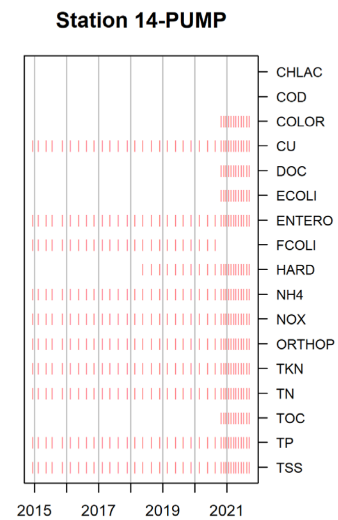


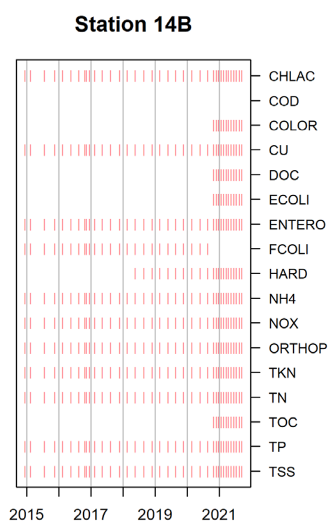



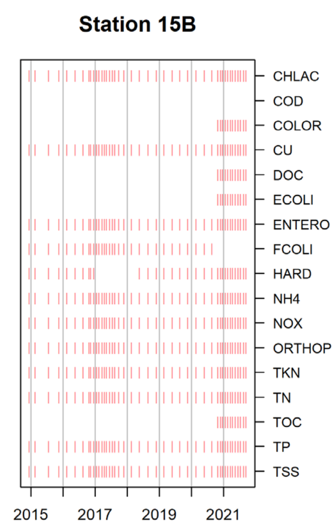



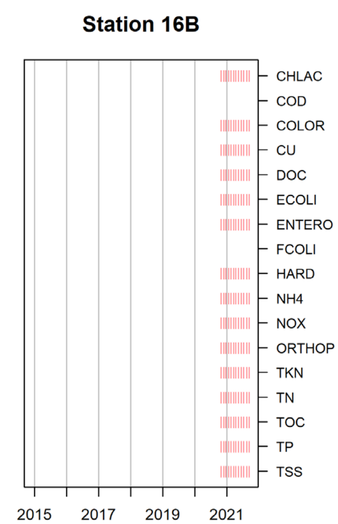



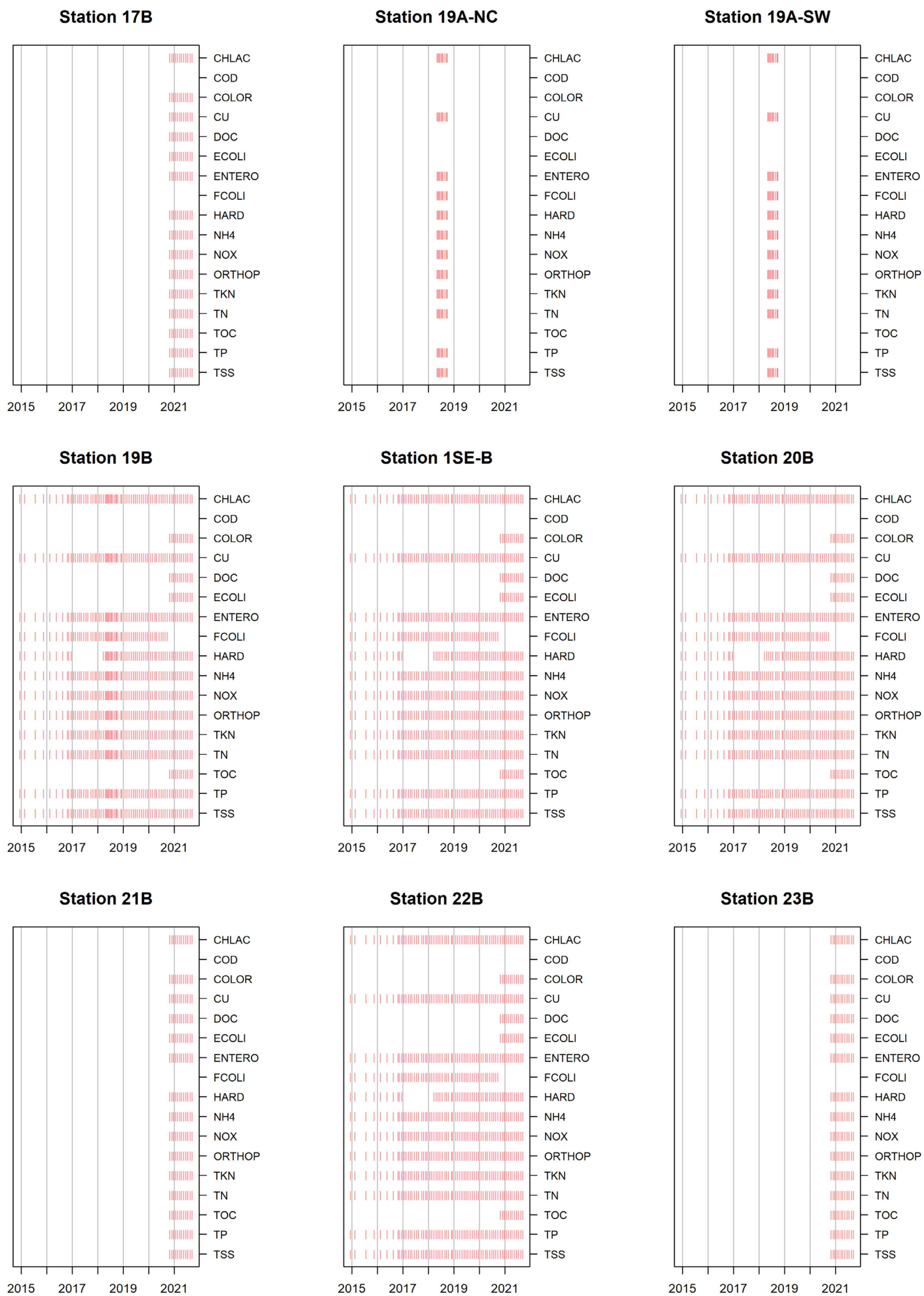



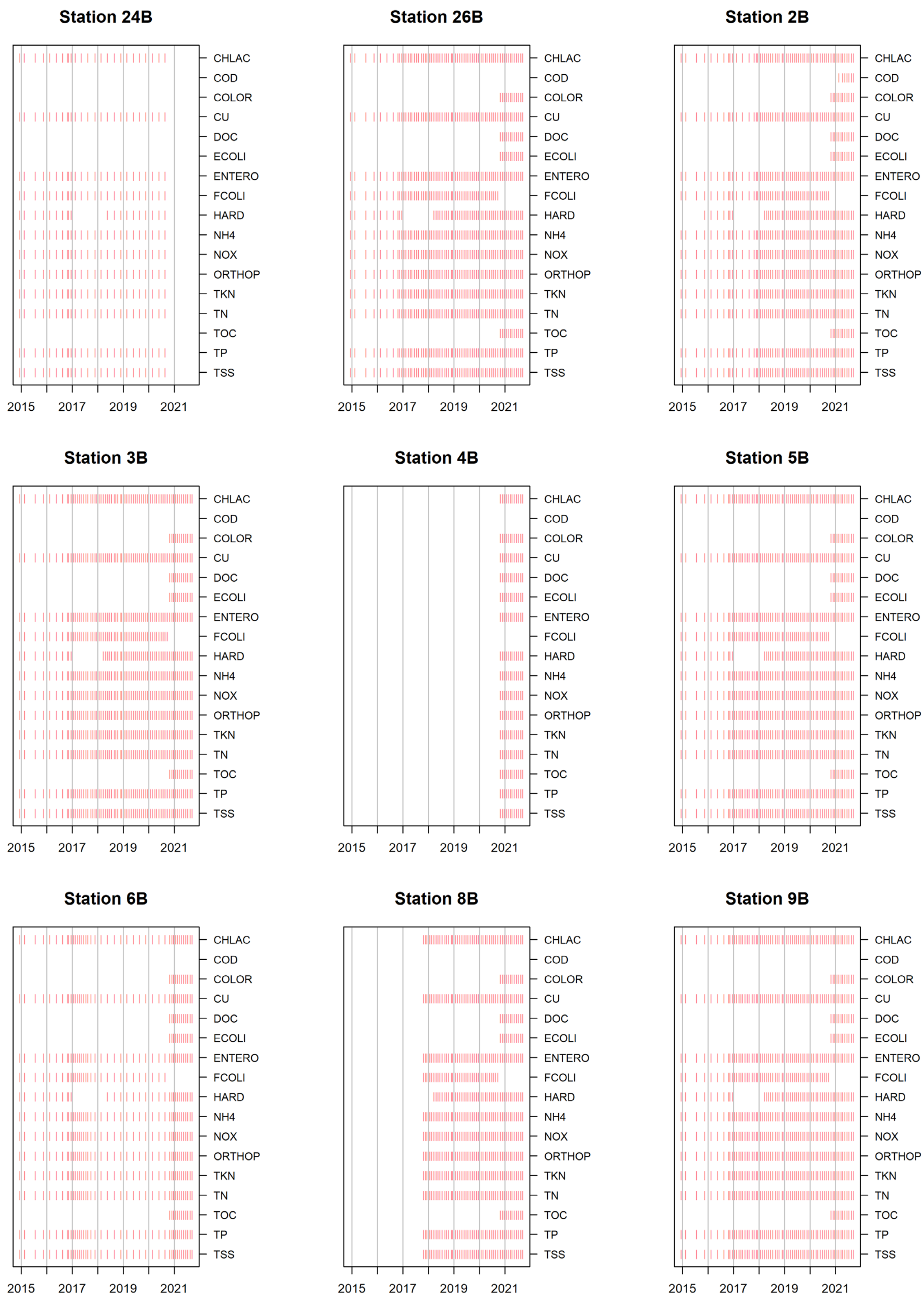



# Appendix A – Water Quality Periods of Record for Naples Stormwater Stations



## Appendix A – Water Quality Periods of Record for Naples Stormwater Stations



# Appendix B – Water Quality Summary Statistics for Naples Stormwater Stations

## Appendix B – Water Quality Summary Statistics for Naples Stormwater Stations

| Drainage Basin | Lake Name | Station ID | Parameter | POR | | | | | | | | FY20-21 (October 2020-September 2021) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First Sample | Last Sample | Sample Count | Mean | Median | Min | Max | SD | Sample Count | Mean | Median | Min | Max | SD |
| Gordon River | Fleischmann Lake | 19A-NC | Chlorophyll-a, Corrected | 18-May | 18-Sep | 10 | 25.5 | 32.7 | 0.3 | 52.9 | 19.4 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-NC | Conductivity | 18-May | 18-Sep | 10 | 767 | 633 | 452 | 2063 | 479 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-NC | Copper | 18-May | 18-Sep | 10 | 4.11 | 1.92 | 0.72 | 20.60 | 5.94 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-NC | Dissolved Oxygen | 18-May | 18-Sep | 10 | 3.00 | 2.38 | 1.49 | 7.03 | 1.74 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-NC | Dissolved Oxygen, Saturation | 18-May | 18-Sep | 10 | 39.1 | 30.7 | 18.2 | 89.1 | 22.3 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-NC | Enterococci | 18-May | 18-Sep | 10 | 2994 | 1010 | 270 | 13600 | 4017 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-NC | Fecal Coliform | 18-May | 18-Sep | 10 | 3269 | 825 | 5 | 20000 | 6151 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-NC | Total Hardness, CaCO3 | 18-May | 18-Sep | 10 | 199.6 | 165.0 | 96.4 | 498.0 | 118.8 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-NC | Ammonia | 18-May | 18-Sep | 10 | 0.18 | 0.00 | 0.00 | 0.67 | 0.26 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-NC | Nitrate+Nitrite | 18-May | 18-Sep | 10 | 0.11 | 0.06 | 0.02 | 0.59 | 0.17 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-NC | Orthophosphate | 18-May | 18-Sep | 10 | 0.09 | 0.02 | 0.01 | 0.62 | 0.19 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-NC | pH | 18-May | 18-Sep | 10 | 8.3 | 8.2 | 7.4 | 11.2 | 1.1 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-NC | Salinity | 18-May | 18-Sep | 10 | 0.38 | 0.31 | 0.22 | 1.05 | 0.25 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-NC | Temperature | 18-May | 18-Sep | 10 | 28.0 | 28.6 | 22.7 | 31.2 | 2.7 | - | - | - | - | - | - |

Appendix B – Water Quality Summary Statistics for Naples Stormwater Stations

| Drainage Basin | Lake Name | Station ID | Parameter | POR | | | | | | | | FY20-21 (October 2020-September 2021) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First Sample | Last Sample | Sample Count | Mean | Median | Min | Max | SD | Sample Count | Mean | Median | Min | Max | SD |
| Gordon River | Fleischmann Lake | 19A-NC | Total Kjeldahl Nitrogen | 18-May | 18-Sep | 10 | 1.63 | 1.49 | 1.02 | 3.32 | 0.62 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-NC | Total Nitrogen | 18-May | 18-Sep | 10 | 1.74 | 1.57 | 1.04 | 3.35 | 0.62 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-NC | Total Phosphorus | 18-May | 18-Sep | 10 | 0.18 | 0.08 | 0.04 | 1.08 | 0.32 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-NC | Total Suspended Solids | 18-May | 18-Sep | 10 | 18.8 | 16.9 | 5.6 | 36.0 | 10.3 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-NC | Turbidity | 18-May | 18-Sep | 10 | 8.7 | 7.2 | 3.8 | 17.2 | 5.0 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-NW | Chlorophyll-a, Corrected | 18-May | 18-Sep | 10 | 21.8 | 30.5 | 0.1 | 46.9 | 19.1 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-NW | Conductivity | 18-May | 18-Sep | 10 | 707 | 544 | 430 | 2202 | 535 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-NW | Copper | 18-May | 18-Sep | 10 | 1.90 | 1.11 | 0.17 | 8.55 | 2.49 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-NW | Dissolved Oxygen | 18-May | 18-Sep | 10 | 5.89 | 6.18 | 3.62 | 8.03 | 1.52 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-NW | Dissolved Oxygen, Saturation | 18-May | 18-Sep | 10 | 76.0 | 80.6 | 48.5 | 100.3 | 18.2 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-NW | Enterococci | 18-May | 18-Sep | 10 | 762 | 575 | 10 | 2900 | 868 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-NW | Fecal Coliform | 18-May | 18-Sep | 10 | 1013 | 110 | 5 | 5900 | 1868 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-NW | Total Hardness, CaCO3 | 18-May | 18-Sep | 10 | 203.2 | 151.0 | 102.0 | 672.0 | 167.0 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-NW | Ammonia | 18-May | 18-Sep | 10 | 0.15 | 0.00 | 0.00 | 0.61 | 0.24 | - | - | - | - | - | - |

Appendix B – Water Quality Summary Statistics for Naples Stormwater Stations

| Drainage Basin | Lake Name | Station ID | Parameter | POR | | | | | | | | FY20-21 (October 2020-September 2021) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First Sample | Last Sample | Sample Count | Mean | Median | Min | Max | SD | Sample Count | Mean | Median | Min | Max | SD |
| Gordon River | Fleischmann Lake | 19A-NW | Nitrate+Nitrite | 18-May | 18-Sep | 10 | 0.04 | 0.03 | 0.01 | 0.09 | 0.02 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-NW | Orthophosphate | 18-May | 18-Sep | 10 | 0.02 | 0.02 | 0.00 | 0.05 | 0.02 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-NW | pH | 18-May | 18-Sep | 10 | 9.1 | 8.2 | 7.8 | 11.6 | 1.5 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-NW | Salinity | 18-May | 18-Sep | 10 | 0.35 | 0.26 | 0.20 | 1.12 | 0.28 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-NW | Temperature | 18-May | 18-Sep | 10 | 28.7 | 28.7 | 26.4 | 30.5 | 1.4 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-NW | Total Kjeldahl Nitrogen | 18-May | 18-Sep | 10 | 1.06 | 1.06 | 0.58 | 1.52 | 0.32 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-NW | Total Nitrogen | 18-May | 18-Sep | 10 | 1.09 | 1.11 | 0.67 | 1.54 | 0.31 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-NW | Total Phosphorus | 18-May | 18-Sep | 10 | 0.05 | 0.06 | 0.00 | 0.10 | 0.03 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-NW | Total Suspended Solids | 18-May | 18-Sep | 10 | 43.9 | 15.5 | 6.0 | 190.0 | 62.2 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-NW | Turbidity | 18-May | 18-Sep | 10 | 15.5 | 8.2 | 4.0 | 69.5 | 20.1 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-SW | Chlorophyll-a, Corrected | 18-May | 18-Sep | 10 | 32.5 | 33.0 | 4.6 | 67.0 | 21.5 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-SW | Conductivity | 18-May | 18-Sep | 9 | 657 | 653 | 478 | 1139 | 211 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-SW | Copper | 18-May | 18-Sep | 10 | 3.01 | 1.21 | 0.17 | 13.90 | 4.44 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-SW | Dissolved Oxygen | 18-May | 18-Sep | 9 | 2.87 | 2.53 | 1.80 | 4.41 | 0.85 | - | - | - | - | - | - |

## Appendix B – Water Quality Summary Statistics for Naples Stormwater Stations

| Drainage Basin | Lake Name | Station ID | Parameter | POR | | | | | | | | FY20-21 (October 2020-September 2021) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First Sample | Last Sample | Sample Count | Mean | Median | Min | Max | SD | Sample Count | Mean | Median | Min | Max | SD |
| Gordon River | Fleischmann Lake | 19A-SW | Dissolved Oxygen, Saturation | 18-May | 18-Sep | 9 | 37.2 | 31.3 | 24.0 | 54.9 | 10.8 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-SW | Enterococci | 18-May | 18-Sep | 10 | 477 | 315 | 80 | 1500 | 446 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-SW | Fecal Coliform | 18-May | 18-Sep | 10 | 1683 | 310 | 20 | 10400 | 3272 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-SW | Total Hardness, CaCO3 | 18-May | 18-Sep | 10 | 154.0 | 149.5 | 101.0 | 206.0 | 32.4 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-SW | Ammonia | 18-May | 18-Sep | 10 | 0.04 | 0.00 | 0.00 | 0.16 | 0.06 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-SW | Nitrate+Nitrite | 18-May | 18-Sep | 10 | 0.17 | 0.08 | 0.02 | 0.78 | 0.23 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-SW | Orthophosphate | 18-May | 18-Sep | 10 | 0.11 | 0.03 | 0.00 | 0.86 | 0.26 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-SW | pH | 18-May | 18-Sep | 9 | 8.0 | 8.0 | 7.1 | 8.9 | 0.7 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-SW | Salinity | 18-May | 18-Sep | 9 | 0.31 | 0.30 | 0.23 | 0.56 | 0.10 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-SW | Temperature | 18-May | 18-Sep | 9 | 28.4 | 29.1 | 25.4 | 30.4 | 1.8 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-SW | Total Kjeldahl Nitrogen | 18-May | 18-Sep | 10 | 1.43 | 1.35 | 0.84 | 2.32 | 0.46 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-SW | Total Nitrogen | 18-May | 18-Sep | 10 | 1.60 | 1.48 | 1.17 | 2.34 | 0.40 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-SW | Total Phosphorus | 18-May | 18-Sep | 10 | 0.16 | 0.06 | 0.00 | 0.98 | 0.29 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19A-SW | Total Suspended Solids | 18-May | 18-Sep | 10 | 17.4 | 8.6 | 2.8 | 96.0 | 27.9 | - | - | - | - | - | - |

| Drainage Basin | Lake Name | Station ID | Parameter | POR | | | | | | | | FY20-21 (October 2020-September 2021) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First Sample | Last Sample | Sample Count | Mean | Median | Min | Max | SD | Sample Count | Mean | Median | Min | Max | SD |
| Gordon River | Fleischmann Lake | 19A-SW | Turbidity | 18-May | 18-Sep | 9 | 9.7 | 4.9 | 1.9 | 26.8 | 8.8 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19B | Calcium | 20-Nov | 21-Sep | 11 | 55.55 | 51.50 | 32.70 | 83.80 | 15.61 | 11 | 55.55 | 51.50 | 32.70 | 83.80 | 15.61 |
| Gordon River | Fleischmann Lake | 19B | Chlorophyll-a, Corrected | 14-Dec | 21-Sep | 72 | 37.6 | 30.1 | 2.5 | 252.0 | 34.4 | 12 | 32.3 | 25.9 | 14.4 | 67.9 | 16.6 |
| Gordon River | Fleischmann Lake | 19B | Color, Apparent | 20-Oct | 21-Sep | 12 | 83 | 75 | 40 | 160 | 35 | 12 | 83 | 75 | 40 | 160 | 35 |
| Gordon River | Fleischmann Lake | 19B | Color pH | 20-Oct | 21-Sep | 12 | 7.92 | 7.96 | 7.38 | 8.14 | 0.21 | 12 | 7.92 | 7.96 | 7.38 | 8.14 | 0.21 |
| Gordon River | Fleischmann Lake | 19B | Conductivity | 14-Dec | 21-Sep | 72 | 552 | 549 | 414 | 898 | 72 | 12 | 559 | 520 | 449 | 898 | 117 |
| Gordon River | Fleischmann Lake | 19B | Copper | 14-Dec | 21-Sep | 72 | 1.18 | 0.87 | 0.17 | 7.40 | 1.34 | 12 | 0.95 | 0.88 | 0.17 | 2.39 | 0.64 |
| Gordon River | Fleischmann Lake | 19B | Dissolved Oxygen | 14-Dec | 21-Sep | 72 | 6.53 | 6.46 | 0.23 | 12.50 | 2.67 | 12 | 4.97 | 5.60 | 0.23 | 7.12 | 2.04 |
| Gordon River | Fleischmann Lake | 19B | Dissolved Organic Carbon | 20-Oct | 21-Sep | 12 | 10.22 | 10.80 | 4.60 | 14.50 | 3.00 | 12 | 10.22 | 10.80 | 4.60 | 14.50 | 3.00 |
| Gordon River | Fleischmann Lake | 19B | Dissolved Oxygen, Saturation | 14-Dec | 21-Sep | 72 | 80.5 | 79.9 | 3.0 | 168.5 | 34.9 | 12 | 56.7 | 67.3 | 3.0 | 94.1 | 29.5 |
| Gordon River | Fleischmann Lake | 19B | E. coli | 20-Oct | 21-Sep | 12 | 319 | 344 | 41 | 663 | 212 | 12 | 319 | 344 | 41 | 663 | 212 |
| Gordon River | Fleischmann Lake | 19B | Enterococci | 14-Dec | 21-Sep | 72 | 683 | 370 | 20 | 10500 | 1496 | 12 | 225 | 150 | 20 | 520 | 168 |
| Gordon River | Fleischmann Lake | 19B | Fecal Coliform | 14-Dec | 20-Sep | 60 | 725 | 365 | 5 | 3500 | 876 | - | - | - | - | - | - |
| Gordon River | Fleischmann Lake | 19B | Total Hardness, CaCO3 | 14-Dec | 21-Sep | 58 | 165.8 | 168.5 | 95.6 | 246.0 | 31.6 | 12 | 165.7 | 156.5 | 99.8 | 246.0 | 41.7 |

## Appendix B – Water Quality Summary Statistics for Naples Stormwater Stations

| Drainage Basin | Lake Name | Station ID | Parameter | POR | | | | | | | | FY20-21 (October 2020-September 2021) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First Sample | Last Sample | Sample Count | Mean | Median | Min | Max | SD | Sample Count | Mean | Median | Min | Max | SD |
| Gordon River | Fleischmann Lake | 19B | Magnesium | 20-Nov | 21-Sep | 11 | 6.26 | 5.93 | 4.40 | 8.90 | 1.47 | 11 | 6.26 | 5.93 | 4.40 | 8.90 | 1.47 |
| Gordon River | Fleischmann Lake | 19B | Ammonia | 14-Dec | 21-Sep | 72 | 0.03 | 0.00 | 0.00 | 0.32 | 0.06 | 12 | 0.05 | 0.03 | 0.00 | 0.14 | 0.05 |
| Gordon River | Fleischmann Lake | 19B | Nitrate+Nitrite | 14-Dec | 21-Sep | 72 | 0.03 | 0.01 | 0.00 | 0.95 | 0.11 | 12 | 0.01 | 0.00 | 0.00 | 0.02 | 0.01 |
| Gordon River | Fleischmann Lake | 19B | Orthophosphate | 14-Dec | 21-Sep | 72 | 0.03 | 0.02 | 0.00 | 0.12 | 0.03 | 12 | 0.03 | 0.03 | 0.01 | 0.06 | 0.01 |
| Gordon River | Fleischmann Lake | 19B | pH | 14-Dec | 21-Sep | 72 | 8.1 | 8.0 | 6.6 | 9.1 | 0.5 | 12.0 | 7.7 | 7.7 | 6.6 | 8.0 | 0.4 |
| Gordon River | Fleischmann Lake | 19B | Salinity | 14-Dec | 21-Sep | 72 | 0.27 | 0.27 | 0.20 | 0.44 | 0.04 | 12 | 0.27 | 0.26 | 0.21 | 0.44 | 0.06 |
| Gordon River | Fleischmann Lake | 19B | Temperature | 14-Dec | 21-Sep | 72 | 61.0 | 27.6 | 16.9 | 2518.0 | 293.7 | 12.0 | 25.7 | 26.3 | 18.1 | 29.3 | 3.5 |
| Gordon River | Fleischmann Lake | 19B | Total Kjeldahl Nitrogen | 14-Dec | 21-Sep | 72 | 1.33 | 1.23 | 0.77 | 3.51 | 0.51 | 12 | 0.98 | 0.92 | 0.77 | 1.38 | 0.17 |
| Gordon River | Fleischmann Lake | 19B | Total Nitrogen | 14-Dec | 21-Sep | 72 | 1.37 | 1.25 | 0.77 | 4.33 | 0.58 | 12 | 0.98 | 0.93 | 0.77 | 1.39 | 0.17 |
| Gordon River | Fleischmann Lake | 19B | Total Organic Carbon | 20-Oct | 21-Sep | 12 | 11.36 | 10.70 | 6.10 | 16.20 | 2.73 | 12 | 11.36 | 10.70 | 6.10 | 16.20 | 2.73 |
| Gordon River | Fleischmann Lake | 19B | Total Phosphorus | 14-Dec | 21-Sep | 72 | 0.08 | 0.07 | 0.01 | 0.27 | 0.05 | 12 | 0.06 | 0.07 | 0.02 | 0.09 | 0.02 |
| Gordon River | Fleischmann Lake | 19B | Total Suspended Solids | 14-Dec | 21-Sep | 72 | 10.7 | 8.9 | 2.0 | 40.0 | 7.5 | 12 | 6.9 | 7.2 | 2.0 | 9.4 | 2.1 |
| Gordon River | Fleischmann Lake | 19B | Turbidity | 14-Dec | 21-Sep | 72 | 7.9 | 5.7 | 1.7 | 43.0 | 7.5 | 12 | 4.5 | 4.0 | 2.8 | 11.0 | 2.2 |
| Gordon River | Forest Lake | 20B | Calcium | 20-Nov | 21-Sep | 11 | 67.18 | 66.80 | 52.90 | 90.50 | 10.70 | 11 | 67.18 | 66.80 | 52.90 | 90.50 | 10.70 |
| Gordon River | Forest Lake | 20B | Chlorophyll-a, Corrected | 14-Dec | 21-Sep | 67 | 54.0 | 30.8 | 0.1 | 511.0 | 69.0 | 12 | 39.2 | 27.3 | 0.1 | 165.0 | 45.4 |
| Gordon River | Forest Lake | 20B | Color, Apparent | 20-Oct | 21-Sep | 12 | 91 | 90 | 50 | 120 | 25 | 12 | 91 | 90 | 50 | 120 | 25 |

## Appendix B – Water Quality Summary Statistics for Naples Stormwater Stations

| Drainage Basin | Lake Name | Station ID | Parameter | POR | | | | | | | | FY20-21 (October 2020-September 2021) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First Sample | Last Sample | Sample Count | Mean | Median | Min | Max | SD | Sample Count | Mean | Median | Min | Max | SD |
| Gordon River | Forest Lake | 20B | Color pH | 20-Oct | 21-Sep | 12 | 8.10 | 8.18 | 7.44 | 8.89 | 0.37 | 12 | 8.10 | 8.18 | 7.44 | 8.89 | 0.37 |
| Gordon River | Forest Lake | 20B | Conductivity | 14-Dec | 21-Sep | 67 | 548 | 542 | 351 | 716 | 69 | 12 | 531 | 538 | 441 | 620 | 48 |
| Gordon River | Forest Lake | 20B | Copper | 14-Dec | 21-Sep | 67 | 1.15 | 0.83 | 0.17 | 8.00 | 1.19 | 12 | 0.87 | 0.91 | 0.17 | 1.43 | 0.48 |
| Gordon River | Forest Lake | 20B | Dissolved Oxygen | 14-Dec | 21-Sep | 67 | 7.13 | 6.91 | 0.57 | 18.01 | 3.58 | 12 | 5.76 | 5.50 | 1.72 | 12.48 | 2.65 |
| Gordon River | Forest Lake | 20B | Dissolved Organic Carbon | 20-Oct | 21-Sep | 12 | 12.46 | 13.40 | 6.23 | 16.80 | 3.59 | 12 | 12.46 | 13.40 | 6.23 | 16.80 | 3.59 |
| Gordon River | Forest Lake | 20B | Dissolved Oxygen, Saturation | 14-Dec | 21-Sep | 67 | 87.9 | 84.4 | 5.1 | 223.3 | 46.4 | 12 | 70.4 | 68.4 | 22.4 | 150.7 | 31.0 |
| Gordon River | Forest Lake | 20B | E. coli | 20-Oct | 21-Sep | 12 | 216 | 140 | 52 | 842 | 231 | 12 | 216 | 140 | 52 | 842 | 231 |
| Gordon River | Forest Lake | 20B | Enterococci | 14-Dec | 21-Sep | 67 | 593 | 130 | 5 | 20000 | 2554 | 12 | 189 | 160 | 30 | 540 | 163 |
| Gordon River | Forest Lake | 20B | Fecal Coliform | 14-Dec | 20-Sep | 55 | 451 | 260 | 30 | 2700 | 538 | - | - | - | - | - | - |
| Gordon River | Forest Lake | 20B | Total Hardness, CaCO3 | 14-Dec | 21-Sep | 53 | 184.6 | 182.0 | 127.0 | 245.0 | 27.0 | 12 | 183.3 | 186.5 | 143.0 | 245.0 | 27.7 |
| Gordon River | Forest Lake | 20B | Magnesium | 20-Nov | 21-Sep | 11 | 3.53 | 3.57 | 2.56 | 4.51 | 0.57 | 11 | 3.53 | 3.57 | 2.56 | 4.51 | 0.57 |
| Gordon River | Forest Lake | 20B | Ammonia | 14-Dec | 21-Sep | 67 | 0.05 | 0.01 | 0.00 | 1.11 | 0.15 | 12 | 0.03 | 0.01 | 0.00 | 0.12 | 0.04 |
| Gordon River | Forest Lake | 20B | Nitrate+Nitrite | 14-Dec | 21-Sep | 67 | 0.03 | 0.00 | 0.00 | 0.49 | 0.08 | 12 | 0.01 | 0.00 | 0.00 | 0.10 | 0.03 |
| Gordon River | Forest Lake | 20B | Orthophosphate | 14-Dec | 21-Sep | 67 | 0.02 | 0.02 | 0.00 | 0.23 | 0.03 | 12 | 0.01 | 0.01 | 0.00 | 0.04 | 0.01 |
| Gordon River | Forest Lake | 20B | pH | 14-Dec | 21-Sep | 67 | 8.0 | 8.0 | 7.0 | 9.0 | 0.4 | 12.0 | 7.9 | 8.0 | 7.0 | 8.8 | 0.5 |
| Gordon River | Forest Lake | 20B | Salinity | 14-Dec | 21-Sep | 67 | 0.27 | 0.26 | 0.17 | 0.44 | 0.04 | 12 | 0.26 | 0.26 | 0.21 | 0.30 | 0.02 |
| Gordon River | Forest Lake | 20B | Temperature | 14-Dec | 21-Sep | 67 | 26.3 | 27.4 | 16.4 | 33.7 | 4.3 | 12.0 | 25.9 | 27.1 | 18.3 | 29.3 | 3.5 |
| Gordon River | Forest Lake | 20B | Total Kjeldahl Nitrogen | 14-Dec | 21-Sep | 67 | 1.70 | 1.47 | 0.71 | 6.60 | 0.87 | 12 | 1.21 | 1.13 | 0.88 | 2.46 | 0.42 |
| Gordon River | Forest Lake | 20B | Total Nitrogen | 14-Dec | 21-Sep | 67 | 1.72 | 1.47 | 0.72 | 6.69 | 0.88 | 12 | 1.23 | 1.13 | 0.88 | 2.56 | 0.45 |
| Gordon River | Forest Lake | 20B | Total Organic Carbon | 20-Oct | 21-Sep | 12 | 14.02 | 13.85 | 8.48 | 20.50 | 3.31 | 12 | 14.02 | 13.85 | 8.48 | 20.50 | 3.31 |
| Gordon River | Forest Lake | 20B | Total Phosphorus | 14-Dec | 21-Sep | 67 | 0.08 | 0.06 | 0.01 | 0.42 | 0.08 | 12 | 0.06 | 0.05 | 0.01 | 0.14 | 0.03 |
| Gordon River | Forest Lake | 20B | Total Suspended Solids | 14-Dec | 21-Sep | 67 | 12.6 | 10.0 | 0.3 | 78.5 | 11.8 | 12 | 10.2 | 8.9 | 5.3 | 19.3 | 4.0 |
| Gordon River | Forest Lake | 20B | Turbidity | 14-Dec | 21-Sep | 67 | - | - | - | - | - | 12 | 8.8 | 5.2 | 2.8 | 39.6 | 10.2 |
| Gordon River | Lake Diana | 17B | Calcium | 20-Nov | 21-Sep | 11 | 49.67 | 50.70 | 37.80 | 60.50 | 6.73 | 11 | 49.67 | 50.70 | 37.80 | 60.50 | 6.73 |
| Gordon River | Lake Diana | 17B | Chlorophyll-a, Corrected | 20-Oct | 21-Sep | 12 | 39.4 | 35.6 | 23.3 | 83.2 | 17.0 | 12 | 39.4 | 35.6 | 23.3 | 83.2 | 17.0 |

## Appendix B – Water Quality Summary Statistics for Naples Stormwater Stations

| Drainage Basin | Lake Name | Station ID | Parameter | POR | | | | | | | | FY20-21 (October 2020-September 2021) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First Sample | Last Sample | Sample Count | Mean | Median | Min | Max | SD | Sample Count | Mean | Median | Min | Max | SD |
| Gordon River | Lake Diana | 17B | Color, Apparent | 20-Oct | 21-Sep | 12 | 118 | 110 | 80 | 160 | 27 | 12 | 118 | 110 | 80 | 160 | 27 |
| Gordon River | Lake Diana | 17B | Color pH | 20-Oct | 21-Sep | 12 | 7.61 | 7.72 | 6.93 | 7.90 | 0.29 | 12 | 7.61 | 7.72 | 6.93 | 7.90 | 0.29 |
| Gordon River | Lake Diana | 17B | Conductivity | 20-Oct | 21-Sep | 12 | 351 | 355 | 264 | 458 | 53 | 12 | 351 | 355 | 264 | 458 | 53 |
| Gordon River | Lake Diana | 17B | Copper | 20-Oct | 21-Sep | 12 | 1.23 | 1.08 | 0.17 | 3.36 | 0.95 | 12 | 1.23 | 1.08 | 0.17 | 3.36 | 0.95 |
| Gordon River | Lake Diana | 17B | Dissolved Oxygen | 20-Oct | 21-Sep | 12 | 4.16 | 4.56 | 1.21 | 6.59 | 1.55 | 12 | 4.16 | 4.56 | 1.21 | 6.59 | 1.55 |
| Gordon River | Lake Diana | 17B | Dissolved Organic Carbon | 20-Oct | 21-Sep | 12 | 12.98 | 13.00 | 8.58 | 21.90 | 3.38 | 12 | 12.98 | 13.00 | 8.58 | 21.90 | 3.38 |
| Gordon River | Lake Diana | 17B | Dissolved Oxygen, Saturation | 20-Oct | 21-Sep | 12 | 49.0 | 49.5 | 15.3 | 82.0 | 19.1 | 12 | 49.0 | 49.5 | 15.3 | 82.0 | 19.1 |
| Gordon River | Lake Diana | 17B | E. coli | 20-Oct | 21-Sep | 12 | 1480 | 660 | 203 | 5794 | 1963 | 12 | 1480 | 660 | 203 | 5794 | 1963 |
| Gordon River | Lake Diana | 17B | Enterococci | 20-Oct | 21-Sep | 12 | 1082 | 340 | 150 | 4400 | 1539 | 12 | 1082 | 340 | 150 | 4400 | 1539 |
| Gordon River | Lake Diana | 17B | Total Hardness, CaCO3 | 20-Oct | 21-Sep | 12 | 150.5 | 143.0 | 107.0 | 270.0 | 42.0 | 12 | 150.5 | 143.0 | 107.0 | 270.0 | 42.0 |
| Gordon River | Lake Diana | 17B | Magnesium | 20-Nov | 21-Sep | 11 | 3.79 | 3.84 | 2.98 | 5.48 | 0.72 | 11 | 3.79 | 3.84 | 2.98 | 5.48 | 0.72 |
| Gordon River | Lake Diana | 17B | Ammonia | 20-Oct | 21-Sep | 12 | 0.08 | 0.02 | 0.00 | 0.68 | 0.19 | 12 | 0.08 | 0.02 | 0.00 | 0.68 | 0.19 |
| Gordon River | Lake Diana | 17B | Nitrate+Nitrite | 20-Oct | 21-Sep | 12 | 0.02 | 0.00 | 0.00 | 0.21 | 0.06 | 12 | 0.02 | 0.00 | 0.00 | 0.21 | 0.06 |
| Gordon River | Lake Diana | 17B | Orthophosphate | 20-Oct | 21-Sep | 12 | 0.12 | 0.13 | 0.05 | 0.25 | 0.05 | 12 | 0.12 | 0.13 | 0.05 | 0.25 | 0.05 |
| Gordon River | Lake Diana | 17B | pH | 20-Oct | 21-Sep | 12 | 7.6 | 7.5 | 7.1 | 8.4 | 0.4 | 12.0 | 7.6 | 7.5 | 7.1 | 8.4 | 0.4 |
| Gordon River | Lake Diana | 17B | Salinity | 20-Oct | 21-Sep | 12 | 0.17 | 0.17 | 0.09 | 0.22 | 0.03 | 12 | 0.17 | 0.17 | 0.09 | 0.22 | 0.03 |
| Gordon River | Lake Diana | 17B | Temperature | 20-Oct | 21-Sep | 12 | 24.4 | 26.3 | 16.0 | 27.6 | 3.8 | 12.0 | 24.4 | 26.3 | 16.0 | 27.6 | 3.8 |
| Gordon River | Lake Diana | 17B | Total Kjeldahl Nitrogen | 20-Oct | 21-Sep | 12 | 1.33 | 1.29 | 0.36 | 2.29 | 0.47 | 12 | 1.33 | 1.29 | 0.36 | 2.29 | 0.47 |
| Gordon River | Lake Diana | 17B | Total Nitrogen | 20-Oct | 21-Sep | 12 | 1.35 | 1.34 | 0.36 | 2.29 | 0.47 | 12 | 1.35 | 1.34 | 0.36 | 2.29 | 0.47 |
| Gordon River | Lake Diana | 17B | Total Organic Carbon | 20-Oct | 21-Sep | 12 | 14.07 | 14.15 | 10.00 | 21.30 | 2.96 | 12 | 14.07 | 14.15 | 10.00 | 21.30 | 2.96 |
| Gordon River | Lake Diana | 17B | Total Phosphorus | 20-Oct | 21-Sep | 12 | 0.19 | 0.19 | 0.05 | 0.32 | 0.06 | 12 | 0.19 | 0.19 | 0.05 | 0.32 | 0.06 |
| Gordon River | Lake Diana | 17B | Total Suspended Solids | 20-Oct | 21-Sep | 12 | 7.2 | 6.0 | 3.4 | 12.0 | 3.4 | 12 | 7.2 | 6.0 | 3.4 | 12.0 | 3.4 |
| Gordon River | Lake Diana | 17B | Turbidity | 20-Oct | 21-Sep | 12 | 3.9 | 3.6 | 2.6 | 6.0 | 1.2 | 12 | 3.9 | 3.6 | 2.6 | 6.0 | 1.2 |
| Gordon River | Lake Manor | 22B | Calcium | 20-Nov | 21-Sep | 11 | 65.32 | 68.50 | 42.00 | 91.40 | 17.81 | 11 | 65.32 | 68.50 | 42.00 | 91.40 | 17.81 |
| Gordon River | Lake Manor | 22B | Chlorophyll-a, Corrected | 14-Dec | 21-Sep | 67 | 15.8 | 15.2 | 2.0 | 54.8 | 10.7 | 12 | 14.9 | 10.4 | 2.0 | 48.1 | 13.8 |

**Appendix B – Water Quality Summary Statistics for Naples Stormwater Stations**

| Drainage Basin | Lake Name | Station ID | Parameter | POR | | | | | | | | FY20-21 (October 2020-September 2021) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First Sample | Last Sample | Sample Count | Mean | Median | Min | Max | SD | Sample Count | Mean | Median | Min | Max | SD |
| Gordon River | Lake Manor | 22B | Color, Apparent | 20-Oct | 21-Sep | 12 | 83 | 80 | 50 | 100 | 13 | 12 | 83 | 80 | 50 | 100 | 13 |
| Gordon River | Lake Manor | 22B | Color pH | 20-Oct | 21-Sep | 12 | 7.69 | 7.71 | 7.29 | 8.06 | 0.20 | 12 | 7.69 | 7.71 | 7.29 | 8.06 | 0.20 |
| Gordon River | Lake Manor | 22B | Conductivity | 14-Dec | 21-Sep | 67 | 2490 | 1792 | 385 | 15352 | 2830 | 12 | 1532 | 1060 | 452 | 5878 | 1521 |
| Gordon River | Lake Manor | 22B | Copper | 14-Dec | 21-Sep | 67 | 2.04 | 1.36 | 0.14 | 25.60 | 3.48 | 12 | 2.24 | 1.75 | 0.17 | 8.17 | 2.09 |
| Gordon River | Lake Manor | 22B | Dissolved Oxygen | 14-Dec | 21-Sep | 67 | 4.94 | 4.81 | 0.23 | 10.95 | 2.09 | 12 | 3.59 | 3.58 | 2.46 | 5.36 | 0.78 |
| Gordon River | Lake Manor | 22B | Dissolved Organic Carbon | 20-Oct | 21-Sep | 12 | 10.85 | 11.95 | 3.86 | 14.40 | 3.53 | 12 | 10.85 | 11.95 | 3.86 | 14.40 | 3.53 |
| Gordon River | Lake Manor | 22B | Dissolved Oxygen, Saturation | 14-Dec | 21-Sep | 67 | 61.1 | 57.9 | 2.8 | 150.6 | 25.7 | 12 | 44.3 | 43.3 | 33.1 | 57.9 | 7.8 |
| Gordon River | Lake Manor | 22B | E. coli | 20-Oct | 21-Sep | 12 | 582 | 440 | 109 | 2359 | 611 | 12 | 582 | 440 | 109 | 2359 | 611 |
| Gordon River | Lake Manor | 22B | Enterococci | 14-Dec | 21-Sep | 67 | 476 | 110 | 10 | 5200 | 1063 | 12 | 411 | 135 | 60 | 2400 | 664 |
| Gordon River | Lake Manor | 22B | Fecal Coliform | 14-Dec | 20-Sep | 55 | 600 | 150 | 10 | 13100 | 1882 | - | - | - | - | - | - |
| Gordon River | Lake Manor | 22B | Total Hardness, CaCO3 | 14-Dec | 21-Sep | 53 | 388.7 | 291.0 | 122.0 | 2266.0 | 396.7 | 12 | 280.4 | 233.0 | 124.0 | 770.0 | 181.9 |
| Gordon River | Lake Manor | 22B | Magnesium | 20-Nov | 21-Sep | 11 | 17.72 | 14.80 | 3.77 | 61.70 | 16.04 | 11 | 17.72 | 14.80 | 3.77 | 61.70 | 16.04 |
| Gordon River | Lake Manor | 22B | Ammonia | 14-Dec | 21-Sep | 67 | 0.04 | 0.00 | 0.00 | 0.39 | 0.06 | 12 | 0.05 | 0.03 | 0.00 | 0.13 | 0.04 |
| Gordon River | Lake Manor | 22B | Nitrate+Nitrite | 14-Dec | 21-Sep | 67 | 0.04 | 0.01 | 0.00 | 0.39 | 0.06 | 12 | 0.08 | 0.03 | 0.00 | 0.39 | 0.11 |
| Gordon River | Lake Manor | 22B | Orthophosphate | 14-Dec | 21-Sep | 67 | 0.04 | 0.01 | 0.00 | 0.39 | 0.06 | 12 | 0.05 | 0.03 | 0.01 | 0.11 | 0.03 |
| Gordon River | Lake Manor | 22B | pH | 14-Dec | 21-Sep | 67 | 0.0 | 0.0 | 0.0 | 0.4 | 0.1 | 12.0 | 67.2 | 7.5 | 7.1 | 725.0 | 207.1 |
| Gordon River | Lake Manor | 22B | Salinity | 14-Dec | 21-Sep | 67 | 0.04 | 0.01 | 0.00 | 0.39 | 0.06 | 12 | 0.78 | 0.53 | 0.21 | 3.10 | 0.81 |
| Gordon River | Lake Manor | 22B | Temperature | 14-Dec | 21-Sep | 67 | 0.0 | 0.0 | 0.0 | 0.4 | 0.1 | 12.0 | 26.1 | 27.5 | 18.9 | 29.6 | 3.4 |
| Gordon River | Lake Manor | 22B | Total Kjeldahl Nitrogen | 14-Dec | 21-Sep | 67 | 0.86 | 0.81 | 0.36 | 2.83 | 0.35 | 12 | 0.74 | 0.70 | 0.49 | 1.71 | 0.32 |
| Gordon River | Lake Manor | 22B | Total Nitrogen | 14-Dec | 21-Sep | 67 | 0.90 | 0.85 | 0.36 | 2.84 | 0.36 | 12 | 0.82 | 0.73 | 0.51 | 1.77 | 0.34 |
| Gordon River | Lake Manor | 22B | Total Organic Carbon | 20-Oct | 21-Sep | 12 | 11.16 | 12.05 | 4.52 | 15.20 | 3.19 | 12 | 11.16 | 12.05 | 4.52 | 15.20 | 3.19 |
| Gordon River | Lake Manor | 22B | Total Phosphorus | 14-Dec | 21-Sep | 67 | 0.08 | 0.08 | 0.00 | 0.27 | 0.05 | 12 | 0.08 | 0.08 | 0.03 | 0.14 | 0.03 |
| Gordon River | Lake Manor | 22B | Total Suspended Solids | 14-Dec | 21-Sep | 67 | 3.4 | 2.9 | 0.3 | 10.7 | 2.2 | 12 | 3.1 | 3.6 | 0.3 | 5.6 | 1.9 |
| Gordon River | Lake Manor | 22B | Turbidity | 14-Dec | 21-Sep | 67 | 2.7 | 2.1 | 0.9 | 16.4 | 2.2 | 12 | 1.7 | 1.6 | 0.9 | 2.9 | 0.6 |
| Gordon River | Mandarin Lake | 6B | Calcium | 20-Nov | 21-Sep | 11 | 82.16 | 87.10 | 57.50 | 105.00 | 15.51 | 11 | 82.16 | 87.10 | 57.50 | 105.00 | 15.51 |

## Appendix B – Water Quality Summary Statistics for Naples Stormwater Stations

| Drainage Basin | Lake Name | Station ID | Parameter | POR | | | | | | | | FY20-21 (October 2020-September 2021) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First Sample | Last Sample | Sample Count | Mean | Median | Min | Max | SD | Sample Count | Mean | Median | Min | Max | SD |
| Gordon River | Mandarin Lake | 6B | Chlorophyll-a, Corrected | 14-Dec | 21-Sep | 43 | 22.2 | 17.0 | 1.2 | 80.0 | 16.4 | 12 | 19.7 | 16.4 | 9.8 | 38.6 | 9.1 |
| Gordon River | Mandarin Lake | 6B | Color, Apparent | 20-Oct | 21-Sep | 12 | 111 | 105 | 80 | 180 | 28 | 12 | 111 | 105 | 80 | 180 | 28 |
| Gordon River | Mandarin Lake | 6B | Color pH | 20-Oct | 21-Sep | 12 | 7.57 | 7.57 | 7.10 | 7.89 | 0.25 | 12 | 7.57 | 7.57 | 7.10 | 7.89 | 0.25 |
| Gordon River | Mandarin Lake | 6B | Conductivity | 14-Dec | 21-Sep | 43 | 682 | 703 | 504 | 846 | 72 | 12 | 659 | 701 | 543 | 730 | 75 |
| Gordon River | Mandarin Lake | 6B | Copper | 14-Dec | 21-Sep | 43 | 3.31 | 0.92 | 0.17 | 86.20 | 13.06 | 12 | 1.19 | 1.25 | 0.17 | 2.42 | 0.79 |
| Gordon River | Mandarin Lake | 6B | Dissolved Oxygen | 14-Dec | 21-Sep | 43 | 4.71 | 4.65 | 0.56 | 9.09 | 2.36 | 12 | 2.72 | 2.59 | 1.02 | 4.59 | 0.91 |
| Gordon River | Mandarin Lake | 6B | Dissolved Organic Carbon | 20-Oct | 21-Sep | 12 | 13.19 | 14.05 | 5.53 | 17.30 | 3.49 | 12 | 13.19 | 14.05 | 5.53 | 17.30 | 3.49 |
| Gordon River | Mandarin Lake | 6B | Dissolved Oxygen, Saturation | 14-Dec | 21-Sep | 43 | 58.5 | 60.3 | 7.2 | 124.5 | 29.6 | 12 | 33.3 | 32.4 | 13.2 | 55.1 | 10.8 |
| Gordon River | Mandarin Lake | 6B | E. coli | 20-Oct | 21-Sep | 12 | 279 | 208 | 41 | 744 | 234 | 12 | 279 | 208 | 41 | 744 | 234 |
| Gordon River | Mandarin Lake | 6B | Enterococci | 14-Dec | 21-Sep | 43 | 270 | 140 | 5 | 2300 | 385 | 12 | 218 | 150 | 20 | 720 | 216 |
| Gordon River | Mandarin Lake | 6B | Fecal Coliform | 14-Dec | 20-Aug | 31 | 1138 | 170 | 10 | 19400 | 3452 | - | - | - | - | - | - |
| Gordon River | Mandarin Lake | 6B | Total Hardness, CaCO3 | 14-Dec | 21-Sep | 32 | 224.9 | 236.0 | 160.0 | 291.0 | 30.3 | 12 | 227.9 | 239.5 | 160.0 | 291.0 | 40.3 |
| Gordon River | Mandarin Lake | 6B | Magnesium | 20-Nov | 21-Sep | 11 | 5.31 | 5.47 | 3.99 | 6.88 | 0.94 | 11 | 5.31 | 5.47 | 3.99 | 6.88 | 0.94 |
| Gordon River | Mandarin Lake | 6B | Ammonia | 14-Dec | 21-Sep | 43 | 0.02 | 0.01 | 0.00 | 0.12 | 0.02 | 12 | 0.02 | 0.01 | 0.00 | 0.12 | 0.03 |
| Gordon River | Mandarin Lake | 6B | Nitrate+Nitrite | 14-Dec | 21-Sep | 43 | 0.02 | 0.00 | 0.00 | 0.32 | 0.06 | 12 | 0.01 | 0.00 | 0.00 | 0.02 | 0.01 |
| Gordon River | Mandarin Lake | 6B | Orthophosphate | 14-Dec | 21-Sep | 43 | 0.04 | 0.03 | 0.00 | 0.10 | 0.02 | 12 | 0.04 | 0.04 | 0.01 | 0.08 | 0.02 |
| Gordon River | Mandarin Lake | 6B | pH | 14-Dec | 21-Sep | 43 | 7.6 | 7.5 | 7.0 | 8.5 | 0.3 | 12.0 | 7.4 | 7.3 | 7.0 | 7.7 | 0.2 |
| Gordon River | Mandarin Lake | 6B | Salinity | 14-Dec | 21-Sep | 43 | 0.33 | 0.34 | 0.24 | 0.41 | 0.04 | 12 | 0.32 | 0.34 | 0.26 | 0.35 | 0.04 |
| Gordon River | Mandarin Lake | 6B | Temperature | 14-Dec | 21-Sep | 43 | 26.1 | 27.0 | 18.7 | 32.7 | 3.6 | 12.0 | 25.6 | 26.7 | 18.7 | 28.5 | 3.1 |
| Gordon River | Mandarin Lake | 6B | Total Kjeldahl Nitrogen | 14-Dec | 21-Sep | 43 | 1.01 | 0.92 | 0.25 | 1.87 | 0.29 | 12 | 0.78 | 0.82 | 0.25 | 0.91 | 0.17 |
| Gordon River | Mandarin Lake | 6B | Total Nitrogen | 14-Dec | 21-Sep | 43 | 1.03 | 0.93 | 0.25 | 1.87 | 0.31 | 12 | 0.79 | 0.83 | 0.25 | 0.91 | 0.17 |
| Gordon River | Mandarin Lake | 6B | Total Organic Carbon | 20-Oct | 21-Sep | 12 | 14.21 | 14.70 | 8.48 | 20.40 | 3.39 | 12 | 14.21 | 14.70 | 8.48 | 20.40 | 3.39 |
| Gordon River | Mandarin Lake | 6B | Total Phosphorus | 14-Dec | 21-Sep | 43 | 0.08 | 0.08 | 0.01 | 0.16 | 0.04 | 12 | 0.06 | 0.06 | 0.01 | 0.12 | 0.03 |
| Gordon River | Mandarin Lake | 6B | Total Suspended Solids | 14-Dec | 21-Sep | 43 | 6.3 | 5.2 | 1.5 | 24.0 | 4.5 | 12 | 3.6 | 3.5 | 1.5 | 7.6 | 1.7 |
| Gordon River | Mandarin Lake | 6B | Turbidity | 14-Dec | 21-Sep | 43 | 3.8 | 3.1 | 1.1 | 13.0 | 2.2 | 12 | 2.2 | 2.3 | 1.1 | 3.1 | 0.6 |

## Appendix B – Water Quality Summary Statistics for Naples Stormwater Stations

| Drainage Basin | Lake Name | Station ID | Parameter | POR | | | | | | | | FY20-21 (October 2020-September 2021) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First Sample | Last Sample | Sample Count | Mean | Median | Min | Max | SD | Sample Count | Mean | Median | Min | Max | SD |
| Gordon River | NCH Lake | 26B | Calcium | 20-Nov | 21-Sep | 11 | 45.27 | 44.40 | 19.60 | 78.20 | 17.67 | 11 | 45.27 | 44.40 | 19.60 | 78.20 | 17.67 |
| Gordon River | NCH Lake | 26B | Chlorophyll-a, Corrected | 14-Dec | 21-Sep | 67 | 48.2 | 29.7 | 11.0 | 779.0 | 93.7 | 12 | 49.9 | 47.5 | 16.5 | 104.0 | 25.7 |
| Gordon River | NCH Lake | 26B | Color, Apparent | 20-Oct | 21-Sep | 12 | 95 | 95 | 40 | 140 | 33 | 12 | 95 | 95 | 40 | 140 | 33 |
| Gordon River | NCH Lake | 26B | Color pH | 20-Oct | 21-Sep | 12 | 7.86 | 7.88 | 7.41 | 8.17 | 0.26 | 12 | 7.86 | 7.88 | 7.41 | 8.17 | 0.26 |
| Gordon River | NCH Lake | 26B | Conductivity | 14-Dec | 21-Sep | 67 | 597 | 576 | 333 | 964 | 129 | 12 | 647 | 726 | 333 | 792 | 157 |
| Gordon River | NCH Lake | 26B | Copper | 14-Dec | 21-Sep | 67 | 65.31 | 43.70 | 7.24 | 436.00 | 67.07 | 12 | 37.35 | 41.30 | 17.20 | 60.50 | 14.83 |
| Gordon River | NCH Lake | 26B | Dissolved Oxygen | 14-Dec | 21-Sep | 67 | 5.30 | 5.13 | 0.62 | 8.72 | 1.88 | 12 | 5.75 | 5.33 | 4.07 | 8.71 | 1.58 |
| Gordon River | NCH Lake | 26B | Dissolved Organic Carbon | 20-Oct | 21-Sep | 12 | 11.87 | 13.90 | 3.01 | 17.40 | 4.64 | 12 | 11.87 | 13.90 | 3.01 | 17.40 | 4.64 |
| Gordon River | NCH Lake | 26B | Dissolved Oxygen, Saturation | 14-Dec | 21-Sep | 67 | 63.5 | 65.8 | 10.4 | 103.2 | 18.3 | 12 | 68.5 | 66.6 | 49.7 | 100.8 | 15.2 |
| Gordon River | NCH Lake | 26B | E. coli | 20-Oct | 21-Sep | 12 | 589 | 529 | 155 | 1112 | 296 | 12 | 589 | 529 | 155 | 1112 | 296 |
| Gordon River | NCH Lake | 26B | Enterococci | 14-Dec | 21-Sep | 67 | 892 | 470 | 5 | 20000 | 2481 | 12 | 315 | 230 | 5 | 1150 | 332 |
| Gordon River | NCH Lake | 26B | Fecal Coliform | 14-Dec | 20-Sep | 55 | 885 | 340 | 60 | 11400 | 1695 | - | - | - | - | - | - |
| Gordon River | NCH Lake | 26B | Total Hardness, CaCO3 | 14-Dec | 21-Sep | 53 | 153.8 | 157.0 | 65.5 | 255.0 | 41.6 | 12 | 152.4 | 162.5 | 65.5 | 255.0 | 54.3 |
| Gordon River | NCH Lake | 26B | Magnesium | 20-Nov | 21-Sep | 11 | 9.43 | 10.20 | 4.02 | 14.40 | 3.58 | 11 | 9.43 | 10.20 | 4.02 | 14.40 | 3.58 |
| Gordon River | NCH Lake | 26B | Ammonia | 14-Dec | 21-Sep | 67 | 0.02 | 0.00 | 0.00 | 0.19 | 0.04 | 12 | 0.02 | 0.01 | 0.00 | 0.11 | 0.03 |
| Gordon River | NCH Lake | 26B | Nitrate+Nitrite | 14-Dec | 21-Sep | 67 | 0.02 | 0.01 | 0.00 | 0.19 | 0.03 | 12 | 0.01 | 0.00 | 0.00 | 0.05 | 0.01 |
| Gordon River | NCH Lake | 26B | Orthophosphate | 14-Dec | 21-Sep | 67 | 0.03 | 0.02 | 0.00 | 0.12 | 0.03 | 12 | 0.02 | 0.02 | 0.00 | 0.04 | 0.01 |
| Gordon River | NCH Lake | 26B | pH | 14-Dec | 21-Sep | 67 | 7.7 | 7.7 | 5.9 | 8.5 | 0.4 | 12.0 | 7.5 | 7.5 | 5.9 | 8.0 | 0.6 |
| Gordon River | NCH Lake | 26B | Salinity | 14-Dec | 21-Sep | 67 | 0.29 | 0.28 | 0.16 | 0.54 | 0.07 | 12 | 0.31 | 0.35 | 0.16 | 0.39 | 0.08 |
| Gordon River | NCH Lake | 26B | Temperature | 14-Dec | 21-Sep | 67 | 24.5 | 25.4 | 14.5 | 30.7 | 4.1 | 12.0 | 24.6 | 25.9 | 17.0 | 27.9 | 3.4 |
| Gordon River | NCH Lake | 26B | Total Kjeldahl Nitrogen | 14-Dec | 21-Sep | 67 | 1.27 | 1.16 | 0.25 | 7.74 | 0.93 | 12 | 1.12 | 1.27 | 0.25 | 1.53 | 0.39 |
| Gordon River | NCH Lake | 26B | Total Nitrogen | 14-Dec | 21-Sep | 67 | 1.29 | 1.19 | 0.25 | 7.75 | 0.93 | 12 | 1.13 | 1.27 | 0.25 | 1.53 | 0.39 |
| Gordon River | NCH Lake | 26B | Total Organic Carbon | 20-Oct | 21-Sep | 12 | 12.33 | 14.35 | 3.20 | 17.40 | 4.60 | 12 | 12.33 | 14.35 | 3.20 | 17.40 | 4.60 |
| Gordon River | NCH Lake | 26B | Total Phosphorus | 14-Dec | 21-Sep | 67 | 0.09 | 0.08 | 0.00 | 0.29 | 0.06 | 12 | 0.09 | 0.09 | 0.04 | 0.13 | 0.03 |
| Gordon River | NCH Lake | 26B | Total Suspended Solids | 14-Dec | 21-Sep | 67 | 10.6 | 8.4 | 0.3 | 74.0 | 10.5 | 12 | 8.5 | 9.4 | 0.3 | 14.5 | 4.6 |

| Drainage Basin | Lake Name | Station ID | Parameter | POR | | | | | | | | FY20-21 (October 2020-September 2021) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First Sample | Last Sample | Sample Count | Mean | Median | Min | Max | SD | Sample Count | Mean | Median | Min | Max | SD |
| Gordon River | NCH Lake | 26B | Turbidity | 14-Dec | 21-Sep | 67 | 5.6 | 5.0 | 1.4 | 22.3 | 3.3 | 12 | 4.3 | 4.6 | 1.4 | 6.5 | 1.4 |
| Gordon River | Sun Lake Terrace | 15B | Calcium | 20-Nov | 21-Sep | 11 | 70.37 | 72.10 | 55.00 | 84.00 | 9.47 | 11 | 70.37 | 72.10 | 55.00 | 84.00 | 9.47 |
| Gordon River | Sun Lake Terrace | 15B | Chlorophyll-a, Corrected | 14-Dec | 21-Sep | 43 | 14.8 | 12.6 | 0.1 | 41.0 | 10.0 | 12 | 13.4 | 12.1 | 6.7 | 29.8 | 6.6 |
| Gordon River | Sun Lake Terrace | 15B | Color, Apparent | 20-Oct | 21-Sep | 12 | 116 | 120 | 70 | 200 | 35 | 12 | 116 | 120 | 70 | 200 | 35 |
| Gordon River | Sun Lake Terrace | 15B | Color pH | 20-Oct | 21-Sep | 12 | 8.01 | 8.09 | 7.52 | 8.39 | 0.26 | 12 | 8.01 | 8.09 | 7.52 | 8.39 | 0.26 |
| Gordon River | Sun Lake Terrace | 15B | Conductivity | 14-Dec | 21-Sep | 43 | 470 | 487 | 334 | 550 | 52 | 12 | 416 | 407 | 334 | 490 | 52 |
| Gordon River | Sun Lake Terrace | 15B | Copper | 14-Dec | 21-Sep | 43 | 7.37 | 4.65 | 0.17 | 65.70 | 10.31 | 12 | 5.00 | 4.51 | 0.17 | 12.90 | 3.39 |
| Gordon River | Sun Lake Terrace | 15B | Dissolved Oxygen | 14-Dec | 21-Sep | 43 | 5.74 | 5.67 | 1.52 | 10.83 | 2.04 | 12 | 4.74 | 4.70 | 1.54 | 6.87 | 1.68 |
| Gordon River | Sun Lake Terrace | 15B | Dissolved Organic Carbon | 20-Oct | 21-Sep | 12 | 14.58 | 15.05 | 10.10 | 20.60 | 2.98 | 12 | 14.58 | 15.05 | 10.10 | 20.60 | 2.98 |
| Gordon River | Sun Lake Terrace | 15B | Dissolved Oxygen, Saturation | 14-Dec | 21-Sep | 43 | 71.1 | 67.6 | 20.0 | 117.8 | 24.0 | 12 | 57.9 | 59.7 | 20.0 | 84.2 | 18.7 |
| Gordon River | Sun Lake Terrace | 15B | E. coli | 20-Oct | 21-Sep | 12 | 1203 | 584 | 185 | 8664 | 2368 | 12 | 1203 | 584 | 185 | 8664 | 2368 |
| Gordon River | Sun Lake Terrace | 15B | Enterococci | 14-Dec | 21-Sep | 43 | 409 | 200 | 5 | 4300 | 753 | 12 | 694 | 320 | 30 | 4300 | 1192 |
| Gordon River | Sun Lake Terrace | 15B | Fecal Coliform | 14-Dec | 20-Aug | 31 | 795 | 280 | 40 | 14400 | 2538 | - | - | - | - | - | - |
| Gordon River | Sun Lake Terrace | 15B | Total Hardness, CaCO3 | 14-Dec | 21-Sep | 32 | 186.8 | 186.0 | 149.0 | 231.0 | 18.7 | 12 | 189.8 | 191.5 | 149.0 | 231.0 | 24.7 |
| Gordon River | Sun Lake Terrace | 15B | Magnesium | 20-Nov | 21-Sep | 11 | 3.59 | 3.52 | 2.87 | 5.08 | 0.61 | 11 | 3.59 | 3.52 | 2.87 | 5.08 | 0.61 |
| Gordon River | Sun Lake Terrace | 15B | Ammonia | 14-Dec | 21-Sep | 43 | 0.04 | 0.01 | 0.00 | 0.27 | 0.06 | 12 | 0.06 | 0.03 | 0.00 | 0.23 | 0.07 |
| Gordon River | Sun Lake Terrace | 15B | Nitrate+Nitrite | 14-Dec | 21-Sep | 43 | 0.07 | 0.02 | 0.00 | 0.42 | 0.11 | 12 | 0.08 | 0.02 | 0.00 | 0.42 | 0.13 |
| Gordon River | Sun Lake Terrace | 15B | Orthophosphate | 14-Dec | 21-Sep | 43 | 0.01 | 0.01 | 0.00 | 0.06 | 0.01 | 12 | 0.01 | 0.02 | 0.00 | 0.04 | 0.01 |
| Gordon River | Sun Lake Terrace | 15B | pH | 14-Dec | 21-Sep | 43 | 7.9 | 8.0 | 6.8 | 8.5 | 0.4 | 12.0 | 8.0 | 7.9 | 7.3 | 8.5 | 0.3 |
| Gordon River | Sun Lake Terrace | 15B | Salinity | 14-Dec | 21-Sep | 43 | 0.22 | 0.23 | 0.11 | 0.27 | 0.03 | 12 | 0.19 | 0.19 | 0.11 | 0.24 | 0.04 |
| Gordon River | Sun Lake Terrace | 15B | Temperature | 14-Dec | 21-Sep | 43 | 26.5 | 26.3 | 17.8 | 32.9 | 3.9 | 12.0 | 26.0 | 27.0 | 18.5 | 29.1 | 3.5 |
| Gordon River | Sun Lake Terrace | 15B | Total Kjeldahl Nitrogen | 14-Dec | 21-Sep | 43 | 1.06 | 1.02 | 0.28 | 1.99 | 0.30 | 12 | 0.97 | 0.98 | 0.28 | 1.52 | 0.32 |
| Gordon River | Sun Lake Terrace | 15B | Total Nitrogen | 14-Dec | 21-Sep | 43 | 1.13 | 1.09 | 0.32 | 2.03 | 0.32 | 12 | 1.05 | 1.05 | 0.32 | 1.94 | 0.38 |
| Gordon River | Sun Lake Terrace | 15B | Total Organic Carbon | 20-Oct | 21-Sep | 12 | 15.88 | 15.20 | 11.20 | 23.60 | 3.43 | 12 | 15.88 | 15.20 | 11.20 | 23.60 | 3.43 |
| Gordon River | Sun Lake Terrace | 15B | Total Phosphorus | 14-Dec | 21-Sep | 43 | 0.05 | 0.04 | 0.00 | 0.36 | 0.06 | 12 | 0.05 | 0.05 | 0.01 | 0.12 | 0.03 |

| Drainage Basin | Lake Name | Station ID | Parameter | POR | | | | | | | | FY20-21 (October 2020-September 2021) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First Sample | Last Sample | Sample Count | Mean | Median | Min | Max | SD | Sample Count | Mean | Median | Min | Max | SD |
| Gordon River | Sun Lake Terrace | 15B | Total Suspended Solids | 14-Dec | 21-Sep | 43 | 6.0 | 4.5 | 1.0 | 28.0 | 5.1 | 12 | 5.0 | 5.2 | 1.0 | 9.2 | 3.1 |
| Gordon River | Sun Lake Terrace | 15B | Turbidity | 14-Dec | 21-Sep | 43 | 3.7 | 2.7 | 0.9 | 11.2 | 2.6 | 12 | 2.6 | 2.3 | 0.9 | 6.7 | 1.6 |
| Gordon River | Thurner | 16B | Calcium | 20-Nov | 21-Sep | 11 | 72.49 | 72.50 | 57.80 | 90.10 | 10.88 | 11 | 72.49 | 72.50 | 57.80 | 90.10 | 10.88 |
| Gordon River | Thurner | 16B | Chlorophyll-a, Corrected | 20-Oct | 21-Sep | 12 | 31.1 | 25.5 | 18.4 | 51.4 | 12.8 | 12 | 31.1 | 25.5 | 18.4 | 51.4 | 12.8 |
| Gordon River | Thurner | 16B | Color, Apparent | 20-Oct | 21-Sep | 12 | 124 | 130 | 80 | 160 | 26 | 12 | 124 | 130 | 80 | 160 | 26 |
| Gordon River | Thurner | 16B | Color pH | 20-Oct | 21-Sep | 12 | 7.87 | 7.84 | 7.45 | 8.25 | 0.28 | 12 | 7.87 | 7.84 | 7.45 | 8.25 | 0.28 |
| Gordon River | Thurner | 16B | Conductivity | 20-Oct | 21-Sep | 12 | 2731 | 446 | 320 | 27993 | 7956 | 12 | 2731 | 446 | 320 | 27993 | 7956 |
| Gordon River | Thurner | 16B | Copper | 20-Oct | 21-Sep | 12 | 5.78 | 4.63 | 0.17 | 12.90 | 4.38 | 12 | 5.78 | 4.63 | 0.17 | 12.90 | 4.38 |
| Gordon River | Thurner | 16B | Dissolved Oxygen | 20-Oct | 21-Sep | 12 | 4.61 | 4.75 | 2.44 | 7.60 | 1.67 | 12 | 4.61 | 4.75 | 2.44 | 7.60 | 1.67 |
| Gordon River | Thurner | 16B | Dissolved Organic Carbon | 20-Oct | 21-Sep | 12 | 15.45 | 16.65 | 6.10 | 20.10 | 4.12 | 12 | 15.45 | 16.65 | 6.10 | 20.10 | 4.12 |
| Gordon River | Thurner | 16B | Dissolved Oxygen, Saturation | 20-Oct | 21-Sep | 12 | 57.4 | 59.4 | 31.6 | 86.7 | 19.4 | 12 | 57.4 | 59.4 | 31.6 | 86.7 | 19.4 |
| Gordon River | Thurner | 16B | E. coli | 20-Oct | 21-Sep | 12 | 1457 | 307 | 110 | 12997 | 3643 | 12 | 1457 | 307 | 110 | 12997 | 3643 |
| Gordon River | Thurner | 16B | Enterococci | 20-Oct | 21-Sep | 12 | 493 | 225 | 30 | 2400 | 691 | 12 | 493 | 225 | 30 | 2400 | 691 |
| Gordon River | Thurner | 16B | Total Hardness, CaCO3 | 20-Oct | 21-Sep | 12 | 210.9 | 198.0 | 162.0 | 360.0 | 54.6 | 12 | 210.9 | 198.0 | 162.0 | 360.0 | 54.6 |
| Gordon River | Thurner | 16B | Magnesium | 20-Nov | 21-Sep | 11 | 3.94 | 3.90 | 2.79 | 5.67 | 0.81 | 11 | 3.94 | 3.90 | 2.79 | 5.67 | 0.81 |
| Gordon River | Thurner | 16B | Ammonia | 20-Oct | 21-Sep | 12 | 0.04 | 0.02 | 0.00 | 0.09 | 0.04 | 12 | 0.04 | 0.02 | 0.00 | 0.09 | 0.04 |
| Gordon River | Thurner | 16B | Nitrate+Nitrite | 20-Oct | 21-Sep | 12 | 0.03 | 0.00 | 0.00 | 0.20 | 0.06 | 12 | 0.03 | 0.00 | 0.00 | 0.20 | 0.06 |
| Gordon River | Thurner | 16B | Orthophosphate | 20-Oct | 21-Sep | 12 | 0.02 | 0.01 | 0.01 | 0.05 | 0.02 | 12 | 0.02 | 0.01 | 0.01 | 0.05 | 0.02 |
| Gordon River | Thurner | 16B | pH | 20-Oct | 21-Sep | 12 | 7.8 | 7.9 | 7.4 | 8.2 | 0.3 | 12.0 | 7.8 | 7.9 | 7.4 | 8.2 | 0.3 |
| Gordon River | Thurner | 16B | Salinity | 20-Oct | 21-Sep | 12 | 1.61 | 0.21 | 0.11 | 17.17 | 4.90 | 12 | 1.61 | 0.21 | 0.11 | 17.17 | 4.90 |
| Gordon River | Thurner | 16B | Temperature | 20-Oct | 21-Sep | 12 | 26.2 | 27.8 | 18.4 | 28.9 | 3.5 | 12.0 | 26.2 | 27.8 | 18.4 | 28.9 | 3.5 |
| Gordon River | Thurner | 16B | Total Kjeldahl Nitrogen | 20-Oct | 21-Sep | 12 | 1.32 | 1.34 | 1.05 | 1.59 | 0.17 | 12 | 1.32 | 1.34 | 1.05 | 1.59 | 0.17 |
| Gordon River | Thurner | 16B | Total Nitrogen | 20-Oct | 21-Sep | 12 | 1.35 | 1.37 | 1.05 | 1.59 | 0.18 | 12 | 1.35 | 1.37 | 1.05 | 1.59 | 0.18 |
| Gordon River | Thurner | 16B | Total Organic Carbon | 20-Oct | 21-Sep | 12 | 17.17 | 16.80 | 12.60 | 22.30 | 3.01 | 12 | 17.17 | 16.80 | 12.60 | 22.30 | 3.01 |
| Gordon River | Thurner | 16B | Total Phosphorus | 20-Oct | 21-Sep | 12 | 0.07 | 0.07 | 0.03 | 0.10 | 0.02 | 12 | 0.07 | 0.07 | 0.03 | 0.10 | 0.02 |

## Appendix B – Water Quality Summary Statistics for Naples Stormwater Stations

| Drainage Basin | Lake Name | Station ID | Parameter | POR | | | | | | | | FY20-21 (October 2020-September 2021) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First Sample | Last Sample | Sample Count | Mean | Median | Min | Max | SD | Sample Count | Mean | Median | Min | Max | SD |
| Gordon River | Thurner | 16B | Total Suspended Solids | 20-Oct | 21-Sep | 12 | 9.5 | 9.2 | 3.0 | 19.5 | 5.0 | 12 | 9.5 | 9.2 | 3.0 | 19.5 | 5.0 |
| Gordon River | Thurner | 16B | Turbidity | 20-Oct | 21-Sep | 12 | 4.6 | 4.0 | 3.4 | 7.5 | 1.3 | 12 | 4.6 | 4.0 | 3.4 | 7.5 | 1.3 |
| Gordon River | Willow | 21B | Calcium | 20-Nov | 21-Sep | 11 | 86.02 | 86.80 | 67.30 | 117.00 | 13.89 | 11 | 86.02 | 86.80 | 67.30 | 117.00 | 13.89 |
| Gordon River | Willow | 21B | Chlorophyll-a, Corrected | 20-Oct | 21-Sep | 12 | 22.2 | 16.4 | 4.4 | 63.0 | 20.3 | 12 | 22.2 | 16.4 | 4.4 | 63.0 | 20.3 |
| Gordon River | Willow | 21B | Color, Apparent | 20-Oct | 21-Sep | 12 | 165 | 170 | 120 | 200 | 27 | 12 | 165 | 170 | 120 | 200 | 27 |
| Gordon River | Willow | 21B | Color pH | 20-Oct | 21-Sep | 12 | 7.76 | 7.77 | 7.28 | 8.17 | 0.26 | 12 | 7.76 | 7.77 | 7.28 | 8.17 | 0.26 |
| Gordon River | Willow | 21B | Conductivity | 20-Oct | 21-Sep | 12 | 618 | 619 | 576 | 647 | 22 | 12 | 618 | 619 | 576 | 647 | 22 |
| Gordon River | Willow | 21B | Copper | 20-Oct | 21-Sep | 12 | 1.15 | 1.12 | 0.17 | 2.32 | 0.71 | 12 | 1.15 | 1.12 | 0.17 | 2.32 | 0.71 |
| Gordon River | Willow | 21B | Dissolved Oxygen | 20-Oct | 21-Sep | 12 | 4.51 | 4.78 | 0.94 | 8.84 | 2.11 | 12 | 4.51 | 4.78 | 0.94 | 8.84 | 2.11 |
| Gordon River | Willow | 21B | Dissolved Organic Carbon | 20-Oct | 21-Sep | 12 | 19.73 | 20.35 | 10.80 | 25.10 | 4.44 | 12 | 19.73 | 20.35 | 10.80 | 25.10 | 4.44 |
| Gordon River | Willow | 21B | Dissolved Oxygen, Saturation | 20-Oct | 21-Sep | 12 | 54.5 | 58.4 | 12.0 | 102.5 | 24.4 | 12 | 54.5 | 58.4 | 12.0 | 102.5 | 24.4 |
| Gordon River | Willow | 21B | E. coli | 20-Oct | 21-Sep | 12 | 534 | 369 | 86 | 1553 | 428 | 12 | 534 | 369 | 86 | 1553 | 428 |
| Gordon River | Willow | 21B | Enterococci | 20-Oct | 21-Sep | 12 | 293 | 270 | 40 | 780 | 243 | 12 | 293 | 270 | 40 | 780 | 243 |
| Gordon River | Willow | 21B | Total Hardness, CaCO3 | 20-Oct | 21-Sep | 12 | 226.2 | 230.5 | 179.0 | 310.0 | 36.0 | 12 | 226.2 | 230.5 | 179.0 | 310.0 | 36.0 |
| Gordon River | Willow | 21B | Magnesium | 20-Nov | 21-Sep | 11 | 3.30 | 3.35 | 2.51 | 4.29 | 0.58 | 11 | 3.30 | 3.35 | 2.51 | 4.29 | 0.58 |
| Gordon River | Willow | 21B | Ammonia | 20-Oct | 21-Sep | 12 | 0.05 | 0.03 | 0.00 | 0.15 | 0.05 | 12 | 0.05 | 0.03 | 0.00 | 0.15 | 0.05 |
| Gordon River | Willow | 21B | Nitrate+Nitrite | 20-Oct | 21-Sep | 12 | 0.01 | 0.00 | 0.00 | 0.03 | 0.01 | 12 | 0.01 | 0.00 | 0.00 | 0.03 | 0.01 |
| Gordon River | Willow | 21B | Orthophosphate | 20-Oct | 21-Sep | 12 | 0.03 | 0.02 | 0.00 | 0.09 | 0.03 | 12 | 0.03 | 0.02 | 0.00 | 0.09 | 0.03 |
| Gordon River | Willow | 21B | pH | 20-Oct | 21-Sep | 12 | 7.4 | 7.4 | 6.8 | 8.1 | 0.4 | 12.0 | 7.4 | 7.4 | 6.8 | 8.1 | 0.4 |
| Gordon River | Willow | 21B | Salinity | 20-Oct | 21-Sep | 12 | 0.30 | 0.30 | 0.28 | 0.31 | 0.01 | 12 | 0.30 | 0.30 | 0.28 | 0.31 | 0.01 |
| Gordon River | Willow | 21B | Temperature | 20-Oct | 21-Sep | 12 | 25.4 | 27.0 | 17.7 | 28.5 | 3.3 | 12.0 | 25.4 | 27.0 | 17.7 | 28.5 | 3.3 |
| Gordon River | Willow | 21B | Total Kjeldahl Nitrogen | 20-Oct | 21-Sep | 12 | 1.06 | 1.02 | 0.65 | 1.86 | 0.30 | 12 | 1.06 | 1.02 | 0.65 | 1.86 | 0.30 |
| Gordon River | Willow | 21B | Total Nitrogen | 20-Oct | 21-Sep | 12 | 0.98 | 1.01 | 0.03 | 1.88 | 0.42 | 12 | 0.98 | 1.01 | 0.03 | 1.88 | 0.42 |
| Gordon River | Willow | 21B | Total Organic Carbon | 20-Oct | 21-Sep | 12 | 20.95 | 20.85 | 17.80 | 24.20 | 2.00 | 12 | 20.95 | 20.85 | 17.80 | 24.20 | 2.00 |
| Gordon River | Willow | 21B | Total Phosphorus | 20-Oct | 21-Sep | 12 | 0.05 | 0.05 | 0.02 | 0.09 | 0.02 | 12 | 0.05 | 0.05 | 0.02 | 0.09 | 0.02 |

| Drainage Basin | Lake Name | Station ID | Parameter | POR | | | | | | | | FY20-21 (October 2020-September 2021) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First Sample | Last Sample | Sample Count | Mean | Median | Min | Max | SD | Sample Count | Mean | Median | Min | Max | SD |
| Gordon River | Willow | 21B | Total Suspended Solids | 20-Oct | 21-Sep | 12 | 3.8 | 3.1 | 0.3 | 8.7 | 2.9 | 12 | 3.8 | 3.1 | 0.3 | 8.7 | 2.9 |
| Gordon River | Willow | 21B | Turbidity | 20-Oct | 21-Sep | 12 | 2.0 | 1.9 | 0.6 | 4.1 | 1.0 | 12 | 2.0 | 1.9 | 0.6 | 4.1 | 1.0 |
| Gulf of Mexico | Alligator Lake | 10B | Calcium | 20-Nov | 21-Sep | 11 | 94.98 | 91.00 | 55.80 | 141.00 | 30.48 | 11 | 94.98 | 91.00 | 55.80 | 141.00 | 30.48 |
| Gulf of Mexico | Alligator Lake | 10B | Chlorophyll-a, Corrected | 14-Dec | 21-Sep | 37 | 23.9 | 18.3 | 0.6 | 91.5 | 21.2 | 12 | 11.2 | 9.0 | 0.6 | 23.6 | 8.8 |
| Gulf of Mexico | Alligator Lake | 10B | Color, Apparent | 20-Oct | 21-Sep | 12 | 70 | 70 | 40 | 100 | 15 | 12 | 70 | 70 | 40 | 100 | 15 |
| Gulf of Mexico | Alligator Lake | 10B | Color pH | 20-Oct | 21-Sep | 12 | 7.75 | 7.71 | 7.53 | 8.12 | 0.16 | 12 | 7.75 | 7.71 | 7.53 | 8.12 | 0.16 |
| Gulf of Mexico | Alligator Lake | 10B | Conductivity | 14-Dec | 21-Sep | 37 | 9020 | 8203 | 1338 | 26404 | 5081 | 12 | 7405 | 6693 | 1338 | 17054 | 4845 |
| Gulf of Mexico | Alligator Lake | 10B | Copper | 14-Dec | 21-Sep | 37 | 2.52 | 1.43 | 0.14 | 22.30 | 4.61 | 12 | 1.58 | 1.18 | 0.14 | 5.04 | 1.59 |
| Gulf of Mexico | Alligator Lake | 10B | Dissolved Oxygen | 14-Dec | 21-Sep | 37 | 6.01 | 5.87 | 2.02 | 10.52 | 2.05 | 12 | 5.42 | 5.41 | 2.21 | 8.95 | 1.99 |
| Gulf of Mexico | Alligator Lake | 10B | Dissolved Organic Carbon | 20-Oct | 21-Sep | 12 | 11.38 | 12.30 | 5.78 | 14.10 | 2.39 | 12 | 11.38 | 12.30 | 5.78 | 14.10 | 2.39 |
| Gulf of Mexico | Alligator Lake | 10B | Dissolved Oxygen, Saturation | 14-Dec | 21-Sep | 37 | 77.2 | 75.5 | 27.7 | 122.1 | 26.0 | 12 | 70.3 | 66.8 | 27.7 | 120.4 | 28.0 |
| Gulf of Mexico | Alligator Lake | 10B | E. coli | 20-Oct | 21-Sep | 12 | 387 | 168 | 31 | 1223 | 386 | 12 | 387 | 168 | 31 | 1223 | 386 |
| Gulf of Mexico | Alligator Lake | 10B | Enterococci | 14-Dec | 21-Sep | 37 | 186 | 50 | 5 | 2000 | 361 | 12 | 370 | 90 | 5 | 2000 | 588 |
| Gulf of Mexico | Alligator Lake | 10B | Fecal Coliform | 14-Dec | 20-Aug | 25 | 111 | 50 | 5 | 1080 | 215 | - | - | - | - | - | - |
| Gulf of Mexico | Alligator Lake | 10B | Total Hardness, CaCO3 | 15-Jul | 21-Sep | 23 | 944.1 | 886.0 | 210.0 | 2755.0 | 570.1 | 12 | 869.8 | 881.0 | 210.0 | 2000.0 | 518.5 |
| Gulf of Mexico | Alligator Lake | 10B | Magnesium | 20-Nov | 21-Sep | 11 | 129.15 | 125.00 | 17.20 | 250.00 | 78.63 | 11 | 129.15 | 125.00 | 17.20 | 250.00 | 78.63 |
| Gulf of Mexico | Alligator Lake | 10B | Ammonia | 14-Dec | 21-Sep | 37 | 0.06 | 0.02 | 0.00 | 0.24 | 0.07 | 12 | 0.13 | 0.15 | 0.01 | 0.23 | 0.07 |
| Gulf of Mexico | Alligator Lake | 10B | Nitrate+Nitrite | 14-Dec | 21-Sep | 37 | 0.02 | 0.01 | 0.00 | 0.24 | 0.04 | 12 | 0.04 | 0.02 | 0.00 | 0.24 | 0.07 |
| Gulf of Mexico | Alligator Lake | 10B | Orthophosphate | 14-Dec | 21-Sep | 37 | 0.06 | 0.06 | 0.00 | 0.13 | 0.04 | 12 | 0.09 | 0.09 | 0.06 | 0.13 | 0.02 |
| Gulf of Mexico | Alligator Lake | 10B | pH | 14-Dec | 21-Sep | 37 | 7.7 | 7.6 | 7.3 | 8.4 | 0.3 | 12.0 | 7.8 | 7.8 | 7.4 | 8.4 | 0.4 |
| Gulf of Mexico | Alligator Lake | 10B | Salinity | 14-Dec | 21-Sep | 37 | 5.10 | 4.56 | 0.66 | 16.17 | 3.12 | 12 | 4.10 | 3.65 | 0.66 | 9.97 | 2.85 |
| Gulf of Mexico | Alligator Lake | 10B | Temperature | 14-Dec | 21-Sep | 37 | 26.7 | 26.7 | 19.7 | 32.8 | 3.9 | 12.0 | 27.2 | 28.6 | 20.1 | 30.7 | 3.5 |
| Gulf of Mexico | Alligator Lake | 10B | Total Kjeldahl Nitrogen | 14-Dec | 21-Sep | 37 | 1.14 | 1.07 | 0.53 | 1.97 | 0.35 | 12 | 0.95 | 0.91 | 0.53 | 1.93 | 0.37 |
| Gulf of Mexico | Alligator Lake | 10B | Total Nitrogen | 14-Dec | 21-Sep | 37 | 1.16 | 1.08 | 0.53 | 1.98 | 0.35 | 12 | 1.00 | 0.92 | 0.53 | 1.96 | 0.38 |
| Gulf of Mexico | Alligator Lake | 10B | Total Organic Carbon | 20-Oct | 21-Sep | 12 | 12.58 | 12.65 | 7.49 | 18.20 | 2.91 | 12 | 12.58 | 12.65 | 7.49 | 18.20 | 2.91 |

## Appendix B – Water Quality Summary Statistics for Naples Stormwater Stations

| Drainage Basin | Lake Name | Station ID | Parameter | POR | | | | | | | | FY20-21 (October 2020-September 2021) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First Sample | Last Sample | Sample Count | Mean | Median | Min | Max | SD | Sample Count | Mean | Median | Min | Max | SD |
| Gulf of Mexico | Alligator Lake | 10B | Total Phosphorus | 14-Dec | 21-Sep | 37 | 0.10 | 0.10 | 0.01 | 0.20 | 0.04 | 12 | 0.11 | 0.11 | 0.07 | 0.14 | 0.02 |
| Gulf of Mexico | Alligator Lake | 10B | Total Suspended Solids | 14-Dec | 21-Sep | 37 | 6.4 | 5.8 | 0.3 | 14.8 | 3.9 | 12 | 4.3 | 3.0 | 0.3 | 14.8 | 4.5 |
| Gulf of Mexico | Alligator Lake | 10B | Turbidity | 14-Dec | 21-Sep | 37 | 9.9 | 3.9 | 0.6 | 204.0 | 32.9 | 12 | 19.2 | 2.5 | 0.6 | 204.0 | 58.2 |
| Gulf of Mexico | North Lake | 8B | Calcium | 20-Nov | 21-Sep | 11 | 75.32 | 76.50 | 47.80 | 106.00 | 19.56 | 11 | 75.32 | 76.50 | 47.80 | 106.00 | 19.56 |
| Gulf of Mexico | North Lake | 8B | Chlorophyll-a, Corrected | 17-Oct | 21-Sep | 48 | 88.1 | 67.1 | 25.9 | 249.0 | 57.5 | 12 | 79.2 | 57.1 | 40.0 | 155.0 | 42.8 |
| Gulf of Mexico | North Lake | 8B | Color, Apparent | 20-Oct | 21-Sep | 12 | 116 | 105 | 60 | 200 | 41 | 12 | 116 | 105 | 60 | 200 | 41 |
| Gulf of Mexico | North Lake | 8B | Color pH | 20-Oct | 21-Sep | 12 | 7.87 | 7.91 | 7.44 | 8.25 | 0.24 | 12 | 7.87 | 7.91 | 7.44 | 8.25 | 0.24 |
| Gulf of Mexico | North Lake | 8B | Conductivity | 17-Oct | 21-Sep | 48 | 642 | 636 | 429 | 1218 | 114 | 12 | 657 | 649 | 429 | 1218 | 202 |
| Gulf of Mexico | North Lake | 8B | Copper | 17-Oct | 21-Sep | 48 | 6.13 | 2.94 | 0.17 | 43.10 | 9.12 | 12 | 5.40 | 1.81 | 0.17 | 43.10 | 11.94 |
| Gulf of Mexico | North Lake | 8B | Dissolved Oxygen | 17-Oct | 21-Sep | 48 | 6.37 | 6.54 | 1.86 | 11.45 | 2.53 | 12 | 7.56 | 7.62 | 3.13 | 11.27 | 2.65 |
| Gulf of Mexico | North Lake | 8B | Dissolved Organic Carbon | 20-Oct | 21-Sep | 12 | 12.47 | 14.00 | 4.62 | 17.60 | 4.30 | 12 | 12.47 | 14.00 | 4.62 | 17.60 | 4.30 |
| Gulf of Mexico | North Lake | 8B | Dissolved Oxygen, Saturation | 17-Oct | 21-Sep | 48 | 78.2 | 80.5 | 23.9 | 140.2 | 29.4 | 12 | 93.5 | 95.8 | 40.7 | 140.2 | 31.1 |
| Gulf of Mexico | North Lake | 8B | E. coli | 20-Oct | 21-Sep | 12 | 767 | 302 | 63 | 5475 | 1499 | 12 | 767 | 302 | 63 | 5475 | 1499 |
| Gulf of Mexico | North Lake | 8B | Enterococci | 17-Oct | 21-Sep | 48 | 938 | 250 | 50 | 9000 | 1581 | 12 | 966 | 150 | 70 | 3200 | 1234 |
| Gulf of Mexico | North Lake | 8B | Fecal Coliform | 17-Oct | 20-Sep | 36 | 968 | 385 | 5 | 8900 | 1679 | - | - | - | - | - | - |
| Gulf of Mexico | North Lake | 8B | Total Hardness, CaCO3 | 18-Mar | 21-Sep | 43 | 228.8 | 206.0 | 142.0 | 814.0 | 104.6 | 12 | 298.3 | 225.5 | 170.0 | 814.0 | 180.0 |
| Gulf of Mexico | North Lake | 8B | Magnesium | 20-Nov | 21-Sep | 11 | 28.56 | 10.90 | 6.74 | 134.00 | 38.06 | 11 | 28.56 | 10.90 | 6.74 | 134.00 | 38.06 |
| Gulf of Mexico | North Lake | 8B | Ammonia | 17-Oct | 21-Sep | 48 | 0.03 | 0.01 | 0.00 | 0.21 | 0.04 | 12 | 0.04 | 0.01 | 0.00 | 0.16 | 0.05 |
| Gulf of Mexico | North Lake | 8B | Nitrate+Nitrite | 17-Oct | 21-Sep | 48 | 0.08 | 0.01 | 0.00 | 1.88 | 0.28 | 12 | 0.03 | 0.00 | 0.00 | 0.15 | 0.05 |
| Gulf of Mexico | North Lake | 8B | Orthophosphate | 17-Oct | 21-Sep | 48 | 0.05 | 0.04 | 0.00 | 0.14 | 0.03 | 12 | 0.05 | 0.04 | 0.01 | 0.12 | 0.03 |
| Gulf of Mexico | North Lake | 8B | pH | 17-Oct | 21-Sep | 48 | 7.9 | 7.8 | 7.2 | 8.6 | 0.3 | 12.0 | 8.1 | 8.2 | 7.5 | 8.6 | 0.3 |
| Gulf of Mexico | North Lake | 8B | Salinity | 17-Oct | 21-Sep | 48 | 0.31 | 0.31 | 0.21 | 0.60 | 0.06 | 12 | 0.32 | 0.32 | 0.21 | 0.60 | 0.10 |
| Gulf of Mexico | North Lake | 8B | Temperature | 17-Oct | 21-Sep | 48 | 26.2 | 27.4 | 16.4 | 32.0 | 4.3 | 12.0 | 27.2 | 28.1 | 20.3 | 32.0 | 3.4 |
| Gulf of Mexico | North Lake | 8B | Total Kjeldahl Nitrogen | 17-Oct | 21-Sep | 48 | 3.52 | 1.96 | 1.11 | 46.40 | 6.57 | 12 | 5.40 | 1.51 | 1.32 | 46.40 | 12.92 |
| Gulf of Mexico | North Lake | 8B | Total Nitrogen | 17-Oct | 21-Sep | 48 | 3.60 | 1.97 | 1.13 | 46.50 | 6.60 | 12 | 5.43 | 1.52 | 1.37 | 46.50 | 12.94 |

**Appendix B – Water Quality Summary Statistics for Naples Stormwater Stations**

| Drainage Basin | Lake Name | Station ID | Parameter | POR | | | | | | | | FY20-21 (October 2020-September 2021) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First Sample | Last Sample | Sample Count | Mean | Median | Min | Max | SD | Sample Count | Mean | Median | Min | Max | SD |
| Gulf of Mexico | North Lake | 8B | Total Organic Carbon | 20-Oct | 21-Sep | 12 | 14.01 | 14.70 | 7.25 | 19.70 | 3.47 | 12 | 14.01 | 14.70 | 7.25 | 19.70 | 3.47 |
| Gulf of Mexico | North Lake | 8B | Total Phosphorus | 17-Oct | 21-Sep | 48 | 0.25 | 0.15 | 0.01 | 3.00 | 0.44 | 12 | 0.36 | 0.12 | 0.03 | 3.00 | 0.83 |
| Gulf of Mexico | North Lake | 8B | Total Suspended Solids | 17-Oct | 21-Sep | 48 | 37.2 | 15.0 | 0.8 | 354.0 | 65.6 | 12 | 21.3 | 9.4 | 2.6 | 129.0 | 35.2 |
| Gulf of Mexico | North Lake | 8B | Turbidity | 17-Oct | 21-Sep | 48 | - | - | - | - | - | 12 | 6.2 | 4.4 | 3.4 | 16.0 | 3.9 |
| Gulf of Mexico | South Lake | 9B | Calcium | 20-Nov | 21-Sep | 11 | 67.46 | 71.70 | 48.10 | 80.90 | 12.16 | 11 | 67.46 | 71.70 | 48.10 | 80.90 | 12.16 |
| Gulf of Mexico | South Lake | 9B | Chlorophyll-a, Corrected | 14-Dec | 21-Sep | 67 | 66.8 | 46.0 | 3.3 | 1018.0 | 124.3 | 12 | 37.5 | 36.6 | 3.3 | 82.5 | 20.2 |
| Gulf of Mexico | South Lake | 9B | Color, Apparent | 20-Oct | 21-Sep | 12 | 105 | 100 | 60 | 200 | 38 | 12 | 105 | 100 | 60 | 200 | 38 |
| Gulf of Mexico | South Lake | 9B | Color pH | 20-Oct | 21-Sep | 12 | 8.23 | 8.21 | 7.81 | 8.61 | 0.27 | 12 | 8.23 | 8.21 | 7.81 | 8.61 | 0.27 |
| Gulf of Mexico | South Lake | 9B | Conductivity | 14-Dec | 21-Sep | 67 | 618 | 618 | 48 | 859 | 109 | 12 | 563 | 578 | 455 | 649 | 69 |
| Gulf of Mexico | South Lake | 9B | Copper | 14-Dec | 21-Sep | 67 | 7.31 | 5.39 | 0.17 | 47.20 | 8.05 | 12 | 4.96 | 5.35 | 0.17 | 9.33 | 2.88 |
| Gulf of Mexico | South Lake | 9B | Dissolved Oxygen | 14-Dec | 21-Sep | 67 | 7.69 | 7.38 | 2.02 | 19.82 | 3.08 | 12 | 8.88 | 9.28 | 4.04 | 11.45 | 2.36 |
| Gulf of Mexico | South Lake | 9B | Dissolved Organic Carbon | 20-Oct | 21-Sep | 12 | 11.66 | 13.00 | 3.32 | 15.40 | 3.80 | 12 | 11.66 | 13.00 | 3.32 | 15.40 | 3.80 |
| Gulf of Mexico | South Lake | 9B | Dissolved Oxygen, Saturation | 14-Dec | 21-Sep | 67 | 93.5 | 91.3 | 12.0 | 235.8 | 38.0 | 12 | 111.9 | 110.6 | 57.6 | 148.9 | 30.0 |
| Gulf of Mexico | South Lake | 9B | E. coli | 20-Oct | 21-Sep | 12 | 205 | 231 | 41 | 420 | 112 | 12 | 205 | 231 | 41 | 420 | 112 |
| Gulf of Mexico | South Lake | 9B | Enterococci | 14-Dec | 21-Sep | 67 | 239 | 150 | 20 | 2100 | 292 | 12 | 244 | 260 | 20 | 470 | 151 |
| Gulf of Mexico | South Lake | 9B | Fecal Coliform | 14-Dec | 20-Sep | 55 | 410 | 140 | 10 | 6100 | 994 | - | - | - | - | - | - |
| Gulf of Mexico | South Lake | 9B | Total Hardness, CaCO3 | 14-Dec | 21-Sep | 53 | 200.2 | 202.0 | 140.0 | 263.0 | 27.4 | 12 | 195.7 | 208.0 | 140.0 | 233.0 | 34.3 |
| Gulf of Mexico | South Lake | 9B | Magnesium | 20-Nov | 21-Sep | 11 | 6.42 | 6.19 | 3.82 | 9.56 | 1.85 | 11 | 6.42 | 6.19 | 3.82 | 9.56 | 1.85 |
| Gulf of Mexico | South Lake | 9B | Ammonia | 14-Dec | 21-Sep | 67 | 0.09 | 0.01 | 0.00 | 2.21 | 0.31 | 12 | 0.03 | 0.02 | 0.00 | 0.15 | 0.04 |
| Gulf of Mexico | South Lake | 9B | Nitrate+Nitrite | 14-Dec | 21-Sep | 67 | 0.03 | 0.02 | 0.00 | 0.29 | 0.05 | 12 | 0.02 | 0.00 | 0.00 | 0.14 | 0.04 |
| Gulf of Mexico | South Lake | 9B | Orthophosphate | 14-Dec | 21-Sep | 67 | 0.07 | 0.04 | 0.01 | 0.28 | 0.06 | 12 | 0.05 | 0.03 | 0.01 | 0.12 | 0.04 |
| Gulf of Mexico | South Lake | 9B | pH | 14-Dec | 21-Sep | 67 | 8.1 | 8.0 | 7.1 | 8.9 | 0.3 | 12.0 | 8.3 | 8.4 | 7.7 | 8.9 | 0.4 |
| Gulf of Mexico | South Lake | 9B | Salinity | 14-Dec | 21-Sep | 67 | 0.30 | 0.30 | 0.02 | 0.44 | 0.06 | 12 | 0.27 | 0.28 | 0.22 | 0.31 | 0.03 |
| Gulf of Mexico | South Lake | 9B | Temperature | 14-Dec | 21-Sep | 67 | 26.6 | 27.6 | 16.1 | 33.6 | 4.3 | 12.0 | 27.6 | 28.9 | 20.6 | 31.4 | 3.5 |
| Gulf of Mexico | South Lake | 9B | Total Kjeldahl Nitrogen | 14-Dec | 21-Sep | 67 | 1.83 | 1.52 | 0.50 | 9.60 | 1.18 | 12 | 1.49 | 1.28 | 0.50 | 3.92 | 0.87 |

## Appendix B – Water Quality Summary Statistics for Naples Stormwater Stations

| Drainage Basin | Lake Name | Station ID | Parameter | POR | | | | | | | | FY20-21 (October 2020-September 2021) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First Sample | Last Sample | Sample Count | Mean | Median | Min | Max | SD | Sample Count | Mean | Median | Min | Max | SD |
| Gulf of Mexico | South Lake | 9B | Total Nitrogen | 14-Dec | 21-Sep | 67 | 1.83 | 1.53 | 0.03 | 9.63 | 1.21 | 12 | 1.51 | 1.30 | 0.50 | 4.06 | 0.91 |
| Gulf of Mexico | South Lake | 9B | Total Organic Carbon | 20-Oct | 21-Sep | 12 | 12.44 | 13.05 | 5.73 | 17.00 | 3.14 | 12 | 12.44 | 13.05 | 5.73 | 17.00 | 3.14 |
| Gulf of Mexico | South Lake | 9B | Total Phosphorus | 14-Dec | 21-Sep | 67 | 0.17 | 0.13 | 0.01 | 0.69 | 0.13 | 12 | 0.09 | 0.08 | 0.03 | 0.16 | 0.03 |
| Gulf of Mexico | South Lake | 9B | Total Suspended Solids | 14-Dec | 21-Sep | 67 | 12.1 | 9.8 | 1.5 | 57.0 | 9.2 | 12 | 8.9 | 8.0 | 2.5 | 18.0 | 4.5 |
| Gulf of Mexico | South Lake | 9B | Turbidity | 14-Dec | 21-Sep | 67 | 9.0 | 6.1 | 2.1 | 109.0 | 13.5 | 12 | 4.4 | 4.1 | 2.1 | 7.6 | 1.7 |
| Moorings Bay | Colonnade Lake | 3B | Calcium | 20-Nov | 21-Sep | 11 | 63.18 | 69.20 | 39.00 | 79.10 | 13.43 | 11 | 63.18 | 69.20 | 39.00 | 79.10 | 13.43 |
| Moorings Bay | Colonnade Lake | 3B | Chlorophyll-a, Corrected | 14-Dec | 21-Sep | 67 | 39.3 | 19.3 | 4.7 | 492.0 | 70.4 | 12 | 13.6 | 9.5 | 4.7 | 32.6 | 9.2 |
| Moorings Bay | Colonnade Lake | 3B | Color, Apparent | 20-Oct | 21-Sep | 12 | 132 | 135 | 100 | 160 | 25 | 12 | 132 | 135 | 100 | 160 | 25 |
| Moorings Bay | Colonnade Lake | 3B | Color pH | 20-Oct | 21-Sep | 12 | 7.65 | 7.71 | 7.21 | 7.96 | 0.21 | 12 | 7.65 | 7.71 | 7.21 | 7.96 | 0.21 |
| Moorings Bay | Colonnade Lake | 3B | Conductivity | 14-Dec | 21-Sep | 67 | 1229 | 936 | 94 | 6462 | 968 | 12 | 960 | 745 | 429 | 2847 | 676 |
| Moorings Bay | Colonnade Lake | 3B | Copper | 14-Dec | 21-Sep | 67 | 4.47 | 3.92 | 0.17 | 23.60 | 3.53 | 12 | 4.12 | 3.42 | 0.17 | 13.80 | 3.63 |
| Moorings Bay | Colonnade Lake | 3B | Dissolved Oxygen | 14-Dec | 21-Sep | 67 | 5.74 | 5.88 | 0.69 | 10.48 | 2.18 | 12 | 4.56 | 4.55 | 0.98 | 6.58 | 1.52 |
| Moorings Bay | Colonnade Lake | 3B | Dissolved Organic Carbon | 20-Oct | 21-Sep | 12 | 12.55 | 11.90 | 7.30 | 17.30 | 3.22 | 12 | 12.55 | 11.90 | 7.30 | 17.30 | 3.22 |
| Moorings Bay | Colonnade Lake | 3B | Dissolved Oxygen, Saturation | 14-Dec | 21-Sep | 67 | 70.2 | 71.2 | 1.2 | 119.6 | 23.7 | 12 | 58.8 | 60.6 | 39.8 | 71.8 | 10.1 |
| Moorings Bay | Colonnade Lake | 3B | E. coli | 20-Oct | 21-Sep | 12 | 150 | 115 | 10 | 565 | 148 | 12 | 150 | 115 | 10 | 565 | 148 |
| Moorings Bay | Colonnade Lake | 3B | Enterococci | 14-Dec | 21-Sep | 67 | 341 | 150 | 10 | 4600 | 650 | 12 | 167 | 90 | 20 | 860 | 234 |
| Moorings Bay | Colonnade Lake | 3B | Fecal Coliform | 14-Dec | 20-Sep | 55 | 480 | 220 | 5 | 4900 | 787 | - | - | - | - | - | - |
| Moorings Bay | Colonnade Lake | 3B | Total Hardness, CaCO3 | 14-Dec | 21-Sep | 53 | 228.7 | 216.0 | 102.0 | 457.0 | 78.3 | 12 | 216.4 | 216.0 | 122.0 | 331.0 | 66.0 |
| Moorings Bay | Colonnade Lake | 3B | Magnesium | 20-Nov | 21-Sep | 11 | 11.75 | 10.30 | 4.67 | 27.20 | 6.99 | 11 | 11.75 | 10.30 | 4.67 | 27.20 | 6.99 |
| Moorings Bay | Colonnade Lake | 3B | Ammonia | 14-Dec | 21-Sep | 67 | 0.09 | 0.03 | 0.00 | 0.40 | 0.11 | 12 | 0.17 | 0.15 | 0.00 | 0.32 | 0.12 |
| Moorings Bay | Colonnade Lake | 3B | Nitrate+Nitrite | 14-Dec | 21-Sep | 67 | 0.06 | 0.02 | 0.00 | 0.69 | 0.10 | 12 | 0.09 | 0.06 | 0.00 | 0.28 | 0.08 |
| Moorings Bay | Colonnade Lake | 3B | Orthophosphate | 14-Dec | 21-Sep | 67 | 0.05 | 0.04 | 0.00 | 0.15 | 0.03 | 12 | 0.06 | 0.06 | 0.01 | 0.12 | 0.04 |
| Moorings Bay | Colonnade Lake | 3B | pH | 14-Dec | 21-Sep | 67 | 7.6 | 7.6 | 7.1 | 8.1 | 0.3 | 12.0 | 7.6 | 7.7 | 7.1 | 8.1 | 0.3 |
| Moorings Bay | Colonnade Lake | 3B | Salinity | 14-Dec | 21-Sep | 67 | 0.63 | 0.46 | 0.18 | 3.59 | 0.53 | 12 | 0.48 | 0.37 | 0.20 | 1.47 | 0.37 |
| Moorings Bay | Colonnade Lake | 3B | Temperature | 14-Dec | 21-Sep | 67 | 25.5 | 26.7 | 16.9 | 31.6 | 3.8 | 12.0 | 25.4 | 26.3 | 18.6 | 28.3 | 3.2 |

| Drainage Basin | Lake Name | Station ID | Parameter | POR | | | | | | | | FY20-21 (October 2020-September 2021) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First Sample | Last Sample | Sample Count | Mean | Median | Min | Max | SD | Sample Count | Mean | Median | Min | Max | SD |
| Moorings Bay | Colonnade Lake | 3B | Total Kjeldahl Nitrogen | 14-Dec | 21-Sep | 67 | 1.08 | 1.01 | 0.59 | 2.52 | 0.30 | 12 | 0.96 | 0.93 | 0.59 | 1.66 | 0.26 |
| Moorings Bay | Colonnade Lake | 3B | Total Nitrogen | 14-Dec | 21-Sep | 67 | 1.14 | 1.06 | 0.62 | 2.52 | 0.31 | 12 | 1.05 | 1.03 | 0.62 | 1.80 | 0.30 |
| Moorings Bay | Colonnade Lake | 3B | Total Organic Carbon | 20-Oct | 21-Sep | 12 | 14.48 | 15.00 | 8.63 | 21.10 | 3.52 | 12 | 14.48 | 15.00 | 8.63 | 21.10 | 3.52 |
| Moorings Bay | Colonnade Lake | 3B | Total Phosphorus | 14-Dec | 21-Sep | 67 | 0.11 | 0.10 | 0.00 | 0.25 | 0.05 | 12 | 0.09 | 0.08 | 0.02 | 0.16 | 0.04 |
| Moorings Bay | Colonnade Lake | 3B | Total Suspended Solids | 14-Dec | 21-Sep | 67 | 5.1 | 4.4 | 0.3 | 15.3 | 3.1 | 12 | 4.1 | 4.0 | 0.3 | 11.0 | 3.1 |
| Moorings Bay | Colonnade Lake | 3B | Turbidity | 14-Dec | 21-Sep | 67 | 4.2 | 3.8 | 0.8 | 13.7 | 2.6 | 12 | 2.8 | 2.4 | 0.8 | 5.1 | 1.5 |
| Moorings Bay | Devils Lake | 1SE-B | Calcium | 20-Nov | 21-Sep | 11 | 62.88 | 65.50 | 45.70 | 81.70 | 9.87 | 11 | 62.88 | 65.50 | 45.70 | 81.70 | 9.87 |
| Moorings Bay | Devils Lake | 1SE-B | Chlorophyll-a, Corrected | 14-Dec | 21-Sep | 67 | 6.0 | 4.4 | 0.1 | 36.9 | 6.2 | 12 | 7.5 | 5.7 | 3.5 | 25.6 | 6.1 |
| Moorings Bay | Devils Lake | 1SE-B | Color, Apparent | 20-Oct | 21-Sep | 12 | 164 | 160 | 120 | 200 | 22 | 12 | 164 | 160 | 120 | 200 | 22 |
| Moorings Bay | Devils Lake | 1SE-B | Color pH | 20-Oct | 21-Sep | 12 | 7.76 | 7.82 | 7.20 | 8.03 | 0.23 | 12 | 7.76 | 7.82 | 7.20 | 8.03 | 0.23 |
| Moorings Bay | Devils Lake | 1SE-B | Conductivity | 14-Dec | 21-Sep | 67 | 849 | 530 | 318 | 10278 | 1475 | 12 | 461 | 485 | 318 | 549 | 84 |
| Moorings Bay | Devils Lake | 1SE-B | Copper | 14-Dec | 21-Sep | 67 | 43.63 | 14.80 | 0.17 | 1160.00 | 142.07 | 12 | 20.15 | 14.45 | 4.00 | 62.50 | 16.74 |
| Moorings Bay | Devils Lake | 1SE-B | Dissolved Oxygen | 14-Dec | 21-Sep | 67 | 6.13 | 6.33 | 1.61 | 10.10 | 1.81 | 12 | 5.39 | 5.02 | 3.92 | 10.10 | 1.58 |
| Moorings Bay | Devils Lake | 1SE-B | Dissolved Organic Carbon | 20-Oct | 21-Sep | 12 | 18.64 | 19.45 | 11.60 | 25.70 | 3.71 | 12 | 18.64 | 19.45 | 11.60 | 25.70 | 3.71 |
| Moorings Bay | Devils Lake | 1SE-B | Dissolved Oxygen, Saturation | 14-Dec | 21-Sep | 67 | 75.4 | 78.8 | 20.8 | 110.5 | 20.3 | 12 | 65.1 | 63.0 | 50.8 | 107.3 | 14.4 |
| Moorings Bay | Devils Lake | 1SE-B | E. coli | 20-Oct | 21-Sep | 12 | 41 | 31 | 5 | 122 | 38 | 12 | 41 | 31 | 5 | 122 | 38 |
| Moorings Bay | Devils Lake | 1SE-B | Enterococci | 14-Dec | 21-Sep | 67 | 363 | 60 | 5 | 12500 | 1573 | 12 | 70 | 35 | 10 | 230 | 71 |
| Moorings Bay | Devils Lake | 1SE-B | Fecal Coliform | 14-Dec | 20-Sep | 55 | 227 | 70 | 5 | 2400 | 447 | - | - | - | - | - | - |
| Moorings Bay | Devils Lake | 1SE-B | Total Hardness, CaCO3 | 14-Dec | 21-Sep | 53 | 205.1 | 167.0 | 120.0 | 997.0 | 153.2 | 12 | 177.8 | 181.0 | 130.0 | 233.0 | 24.8 |
| Moorings Bay | Devils Lake | 1SE-B | Magnesium | 20-Nov | 21-Sep | 11 | 5.34 | 4.77 | 3.82 | 10.00 | 1.73 | 11 | 5.34 | 4.77 | 3.82 | 10.00 | 1.73 |
| Moorings Bay | Devils Lake | 1SE-B | Ammonia | 14-Dec | 21-Sep | 67 | 0.04 | 0.02 | 0.00 | 0.25 | 0.05 | 12 | 0.06 | 0.04 | 0.00 | 0.17 | 0.06 |
| Moorings Bay | Devils Lake | 1SE-B | Nitrate+Nitrite | 14-Dec | 21-Sep | 67 | 0.06 | 0.03 | 0.00 | 0.28 | 0.08 | 12 | 0.06 | 0.05 | 0.00 | 0.26 | 0.07 |
| Moorings Bay | Devils Lake | 1SE-B | Orthophosphate | 14-Dec | 21-Sep | 67 | 0.01 | 0.01 | 0.00 | 0.10 | 0.02 | 12 | 0.01 | 0.01 | 0.00 | 0.04 | 0.01 |
| Moorings Bay | Devils Lake | 1SE-B | pH | 14-Dec | 21-Sep | 67 | 7.7 | 7.8 | 6.8 | 8.4 | 0.3 | 12.0 | 7.4 | 7.4 | 6.8 | 8.2 | 0.5 |
| Moorings Bay | Devils Lake | 1SE-B | Salinity | 14-Dec | 21-Sep | 67 | 0.43 | 0.25 | 0.12 | 5.84 | 0.83 | 12 | 0.22 | 0.23 | 0.12 | 0.26 | 0.05 |

## Appendix B – Water Quality Summary Statistics for Naples Stormwater Stations

| Drainage Basin | Lake Name | Station ID | Parameter | POR | | | | | | | | FY20-21 (October 2020-September 2021) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First Sample | Last Sample | Sample Count | Mean | Median | Min | Max | SD | Sample Count | Mean | Median | Min | Max | SD |
| Moorings Bay | Devils Lake | 1SE-B | Temperature | 14-Dec | 21-Sep | 67 | 26.3 | 27.9 | 15.9 | 33.4 | 4.3 | 12.0 | 25.7 | 27.0 | 18.4 | 29.0 | 3.5 |
| Moorings Bay | Devils Lake | 1SE-B | Total Kjeldahl Nitrogen | 14-Dec | 21-Sep | 67 | 1.03 | 1.02 | 0.58 | 1.81 | 0.21 | 12 | 0.99 | 0.96 | 0.58 | 1.62 | 0.25 |
| Moorings Bay | Devils Lake | 1SE-B | Total Nitrogen | 14-Dec | 21-Sep | 67 | 1.08 | 1.04 | 0.03 | 1.99 | 0.27 | 12 | 1.05 | 1.02 | 0.77 | 1.69 | 0.23 |
| Moorings Bay | Devils Lake | 1SE-B | Total Organic Carbon | 20-Oct | 21-Sep | 12 | 20.99 | 21.00 | 16.20 | 28.00 | 3.03 | 12 | 20.99 | 21.00 | 16.20 | 28.00 | 3.03 |
| Moorings Bay | Devils Lake | 1SE-B | Total Phosphorus | 14-Dec | 21-Sep | 67 | 0.05 | 0.04 | 0.00 | 0.21 | 0.03 | 12 | 0.03 | 0.04 | 0.00 | 0.06 | 0.02 |
| Moorings Bay | Devils Lake | 1SE-B | Total Suspended Solids | 14-Dec | 21-Sep | 67 | 2.1 | 1.5 | 0.3 | 12.3 | 2.2 | 12 | 2.8 | 1.7 | 0.3 | 7.6 | 2.7 |
| Moorings Bay | Devils Lake | 1SE-B | Turbidity | 14-Dec | 21-Sep | 67 | 2.0 | 1.8 | 1.0 | 12.3 | 1.5 | 12 | 2.0 | 2.1 | 1.0 | 3.1 | 0.7 |
| Moorings Bay | Hidden | 4B | Calcium | 20-Nov | 21-Sep | 11 | 57.75 | 60.00 | 35.90 | 70.40 | 10.78 | 11 | 57.75 | 60.00 | 35.90 | 70.40 | 10.78 |
| Moorings Bay | Hidden | 4B | Chlorophyll-a, Corrected | 20-Oct | 21-Sep | 12 | 23.5 | 26.2 | 5.0 | 38.0 | 12.0 | 12 | 23.5 | 26.2 | 5.0 | 38.0 | 12.0 |
| Moorings Bay | Hidden | 4B | Color, Apparent | 20-Oct | 21-Sep | 12 | 157 | 160 | 100 | 200 | 31 | 12 | 157 | 160 | 100 | 200 | 31 |
| Moorings Bay | Hidden | 4B | Color pH | 20-Oct | 21-Sep | 12 | 7.50 | 7.56 | 7.17 | 7.77 | 0.20 | 12 | 7.50 | 7.56 | 7.17 | 7.77 | 0.20 |
| Moorings Bay | Hidden | 4B | Conductivity | 20-Oct | 21-Sep | 12 | 443 | 422 | 333 | 578 | 88 | 12 | 443 | 422 | 333 | 578 | 88 |
| Moorings Bay | Hidden | 4B | Copper | 20-Oct | 21-Sep | 12 | 8.46 | 7.64 | 0.17 | 23.60 | 5.80 | 12 | 8.46 | 7.64 | 0.17 | 23.60 | 5.80 |
| Moorings Bay | Hidden | 4B | Dissolved Oxygen | 20-Oct | 21-Sep | 12 | 5.27 | 5.06 | 3.61 | 6.74 | 1.21 | 12 | 5.27 | 5.06 | 3.61 | 6.74 | 1.21 |
| Moorings Bay | Hidden | 4B | Dissolved Organic Carbon | 20-Oct | 21-Sep | 12 | 13.41 | 13.45 | 6.57 | 18.70 | 3.52 | 12 | 13.41 | 13.45 | 6.57 | 18.70 | 3.52 |
| Moorings Bay | Hidden | 4B | Dissolved Oxygen, Saturation | 20-Oct | 21-Sep | 12 | 63.4 | 62.7 | 46.0 | 86.1 | 13.5 | 12 | 63.4 | 62.7 | 46.0 | 86.1 | 13.5 |
| Moorings Bay | Hidden | 4B | E. coli | 20-Oct | 21-Sep | 12 | 1004 | 671 | 161 | 3873 | 1069 | 12 | 1004 | 671 | 161 | 3873 | 1069 |
| Moorings Bay | Hidden | 4B | Enterococci | 20-Oct | 21-Sep | 12 | 554 | 400 | 50 | 1600 | 426 | 12 | 554 | 400 | 50 | 1600 | 426 |
| Moorings Bay | Hidden | 4B | Total Hardness, $CaCO_3$ | 20-Oct | 21-Sep | 12 | 164.9 | 172.0 | 102.0 | 198.0 | 28.9 | 12 | 164.9 | 172.0 | 102.0 | 198.0 | 28.9 |
| Moorings Bay | Hidden | 4B | Magnesium | 20-Nov | 21-Sep | 11 | 4.80 | 5.02 | 2.95 | 6.35 | 0.89 | 11 | 4.80 | 5.02 | 2.95 | 6.35 | 0.89 |
| Moorings Bay | Hidden | 4B | Ammonia | 20-Oct | 21-Sep | 12 | 0.09 | 0.10 | 0.00 | 0.17 | 0.07 | 12 | 0.09 | 0.10 | 0.00 | 0.17 | 0.07 |
| Moorings Bay | Hidden | 4B | Nitrate+Nitrite | 20-Oct | 21-Sep | 12 | 0.06 | 0.05 | 0.00 | 0.21 | 0.06 | 12 | 0.06 | 0.05 | 0.00 | 0.21 | 0.06 |
| Moorings Bay | Hidden | 4B | Orthophosphate | 20-Oct | 21-Sep | 12 | 0.04 | 0.03 | 0.01 | 0.11 | 0.03 | 12 | 0.04 | 0.03 | 0.01 | 0.11 | 0.03 |
| Moorings Bay | Hidden | 4B | pH | 20-Oct | 21-Sep | 12 | 7.5 | 7.5 | 7.2 | 8.0 | 0.3 | 12.0 | 7.5 | 7.5 | 7.2 | 8.0 | 0.3 |
| Moorings Bay | Hidden | 4B | Salinity | 20-Oct | 21-Sep | 12 | 0.22 | 0.21 | 0.13 | 0.31 | 0.06 | 12 | 0.22 | 0.21 | 0.13 | 0.31 | 0.06 |

## Appendix B – Water Quality Summary Statistics for Naples Stormwater Stations

| Drainage Basin | Lake Name | Station ID | Parameter | POR | | | | | | | | FY20-21 (October 2020-September 2021) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First Sample | Last Sample | Sample Count | Mean | Median | Min | Max | SD | Sample Count | Mean | Median | Min | Max | SD |
| Moorings Bay | Hidden | 4B | Temperature | 20-Oct | 21-Sep | 12 | 25.3 | 26.2 | 18.9 | 28.1 | 2.9 | 12.0 | 25.3 | 26.2 | 18.9 | 28.1 | 2.9 |
| Moorings Bay | Hidden | 4B | Total Kjeldahl Nitrogen | 20-Oct | 21-Sep | 12 | 0.78 | 0.75 | 0.27 | 1.35 | 0.29 | 12 | 0.78 | 0.75 | 0.27 | 1.35 | 0.29 |
| Moorings Bay | Hidden | 4B | Total Nitrogen | 20-Oct | 21-Sep | 12 | 0.84 | 0.83 | 0.37 | 1.40 | 0.28 | 12 | 0.84 | 0.83 | 0.37 | 1.40 | 0.28 |
| Moorings Bay | Hidden | 4B | Total Organic Carbon | 20-Oct | 21-Sep | 12 | 15.13 | 15.80 | 9.10 | 22.40 | 3.89 | 12 | 15.13 | 15.80 | 9.10 | 22.40 | 3.89 |
| Moorings Bay | Hidden | 4B | Total Phosphorus | 20-Oct | 21-Sep | 12 | 0.07 | 0.07 | 0.03 | 0.14 | 0.03 | 12 | 0.07 | 0.07 | 0.03 | 0.14 | 0.03 |
| Moorings Bay | Hidden | 4B | Total Suspended Solids | 20-Oct | 21-Sep | 12 | 5.6 | 5.9 | 1.5 | 11.3 | 3.3 | 12 | 5.6 | 5.9 | 1.5 | 11.3 | 3.3 |
| Moorings Bay | Hidden | 4B | Turbidity | 20-Oct | 21-Sep | 12 | 3.2 | 3.2 | 1.7 | 7.5 | 1.5 | 12 | 3.2 | 3.2 | 1.7 | 7.5 | 1.5 |
| Moorings Bay | Lake Suzanne | 5B | Calcium | 20-Nov | 21-Sep | 11 | 48.92 | 55.90 | 28.60 | 62.40 | 13.24 | 11 | 48.92 | 55.90 | 28.60 | 62.40 | 13.24 |
| Moorings Bay | Lake Suzanne | 5B | Chlorophyll-a, Corrected | 14-Dec | 21-Sep | 67 | 35.0 | 22.4 | 0.7 | 290.0 | 49.1 | 12 | 34.3 | 33.5 | 16.6 | 58.3 | 15.0 |
| Moorings Bay | Lake Suzanne | 5B | Color, Apparent | 20-Oct | 21-Sep | 12 | 115 | 105 | 60 | 160 | 33 | 12 | 115 | 105 | 60 | 160 | 33 |
| Moorings Bay | Lake Suzanne | 5B | Color pH | 20-Oct | 21-Sep | 12 | 7.78 | 7.85 | 7.45 | 8.05 | 0.21 | 12 | 7.78 | 7.85 | 7.45 | 8.05 | 0.21 |
| Moorings Bay | Lake Suzanne | 5B | Conductivity | 14-Dec | 21-Sep | 67 | 476 | 476 | 229 | 777 | 114 | 12 | 385 | 379 | 229 | 502 | 103 |
| Moorings Bay | Lake Suzanne | 5B | Copper | 14-Dec | 21-Sep | 67 | 7.96 | 4.82 | 0.17 | 42.80 | 8.44 | 12 | 11.57 | 8.36 | 1.79 | 41.40 | 10.85 |
| Moorings Bay | Lake Suzanne | 5B | Dissolved Oxygen | 14-Dec | 21-Sep | 67 | 6.58 | 6.88 | 1.52 | 11.36 | 2.35 | 12 | 5.71 | 5.41 | 3.14 | 8.41 | 1.70 |
| Moorings Bay | Lake Suzanne | 5B | Dissolved Organic Carbon | 20-Oct | 21-Sep | 12 | 9.88 | 11.70 | 1.36 | 14.50 | 3.97 | 12 | 9.88 | 11.70 | 1.36 | 14.50 | 3.97 |
| Moorings Bay | Lake Suzanne | 5B | Dissolved Oxygen, Saturation | 14-Dec | 21-Sep | 67 | 81.4 | 78.8 | 19.5 | 150.4 | 29.1 | 12 | 70.2 | 68.5 | 40.6 | 100.2 | 20.1 |
| Moorings Bay | Lake Suzanne | 5B | E. coli | 20-Oct | 21-Sep | 12 | 172 | 86 | 41 | 663 | 202 | 12 | 172 | 86 | 41 | 663 | 202 |
| Moorings Bay | Lake Suzanne | 5B | Enterococci | 14-Dec | 21-Sep | 67 | 318 | 210 | 10 | 3100 | 480 | 12 | 242 | 215 | 40 | 810 | 215 |
| Moorings Bay | Lake Suzanne | 5B | Fecal Coliform | 14-Dec | 20-Sep | 55 | 836 | 160 | 5 | 10700 | 1958 | - | - | - | - | - | - |
| Moorings Bay | Lake Suzanne | 5B | Total Hardness, CaCO3 | 14-Dec | 21-Sep | 53 | 149.5 | 148.0 | 80.0 | 225.0 | 32.4 | 12 | 141.6 | 158.5 | 80.9 | 179.0 | 36.8 |
| Moorings Bay | Lake Suzanne | 5B | Magnesium | 20-Nov | 21-Sep | 11 | 4.34 | 4.72 | 2.29 | 5.79 | 1.28 | 11 | 4.34 | 4.72 | 2.29 | 5.79 | 1.28 |
| Moorings Bay | Lake Suzanne | 5B | Ammonia | 14-Dec | 21-Sep | 67 | 0.07 | 0.04 | 0.00 | 0.35 | 0.08 | 12 | 0.06 | 0.02 | 0.00 | 0.21 | 0.06 |
| Moorings Bay | Lake Suzanne | 5B | Nitrate+Nitrite | 14-Dec | 21-Sep | 67 | 0.09 | 0.07 | 0.00 | 0.37 | 0.08 | 12 | 0.06 | 0.04 | 0.00 | 0.19 | 0.06 |
| Moorings Bay | Lake Suzanne | 5B | Orthophosphate | 14-Dec | 21-Sep | 67 | 0.07 | 0.06 | 0.01 | 0.36 | 0.06 | 12 | 0.05 | 0.05 | 0.01 | 0.09 | 0.03 |
| Moorings Bay | Lake Suzanne | 5B | pH | 14-Dec | 21-Sep | 67 | 7.7 | 7.7 | 6.8 | 8.7 | 0.4 | 12.0 | 7.7 | 7.8 | 7.3 | 8.3 | 0.4 |

| Drainage Basin | Lake Name | Station ID | Parameter | POR | | | | | | | | FY20-21 (October 2020-September 2021) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First Sample | Last Sample | Sample Count | Mean | Median | Min | Max | SD | Sample Count | Mean | Median | Min | Max | SD |
| Moorings Bay | Lake Suzanne | 5B | Salinity | 14-Dec | 21-Sep | 67 | 0.24 | 0.23 | 0.11 | 0.90 | 0.10 | 12 | 0.18 | 0.17 | 0.11 | 0.24 | 0.05 |
| Moorings Bay | Lake Suzanne | 5B | Temperature | 14-Dec | 21-Sep | 67 | 26.4 | 27.5 | 17.6 | 33.1 | 3.8 | 12.0 | 26.0 | 26.8 | 19.3 | 29.5 | 3.1 |
| Moorings Bay | Lake Suzanne | 5B | Total Kjeldahl Nitrogen | 14-Dec | 21-Sep | 67 | 1.06 | 1.01 | 0.16 | 2.48 | 0.40 | 12 | 0.84 | 0.79 | 0.16 | 1.30 | 0.30 |
| Moorings Bay | Lake Suzanne | 5B | Total Nitrogen | 14-Dec | 21-Sep | 67 | 1.14 | 1.11 | 0.19 | 2.50 | 0.42 | 12 | 0.91 | 0.88 | 0.19 | 1.49 | 0.33 |
| Moorings Bay | Lake Suzanne | 5B | Total Organic Carbon | 20-Oct | 21-Sep | 12 | 11.39 | 12.00 | 3.35 | 20.90 | 4.82 | 12 | 11.39 | 12.00 | 3.35 | 20.90 | 4.82 |
| Moorings Bay | Lake Suzanne | 5B | Total Phosphorus | 14-Dec | 21-Sep | 67 | 0.13 | 0.11 | 0.04 | 0.45 | 0.07 | 12 | 0.08 | 0.08 | 0.04 | 0.14 | 0.04 |
| Moorings Bay | Lake Suzanne | 5B | Total Suspended Solids | 14-Dec | 21-Sep | 67 | 6.9 | 6.0 | 1.4 | 28.0 | 4.4 | 12 | 8.3 | 8.4 | 1.5 | 16.9 | 4.8 |
| Moorings Bay | Lake Suzanne | 5B | Turbidity | 14-Dec | 21-Sep | 67 | 5.1 | 4.1 | 1.2 | 24.8 | 3.8 | 12 | 4.5 | 4.4 | 3.0 | 6.7 | 1.1 |
| Moorings Bay | Lowdermilk | 23B | Calcium | 20-Nov | 21-Sep | 11 | 193.03 | 206.00 | 95.10 | 335.00 | 78.39 | 11 | 193.03 | 206.00 | 95.10 | 335.00 | 78.39 |
| Moorings Bay | Lowdermilk | 23B | Chlorophyll-a, Corrected | 20-Oct | 21-Sep | 12 | 20.0 | 10.1 | 2.3 | 124.0 | 33.6 | 12 | 20.0 | 10.1 | 2.3 | 124.0 | 33.6 |
| Moorings Bay | Lowdermilk | 23B | Color, Apparent | 20-Oct | 21-Sep | 12 | 48 | 48 | 30 | 70 | 14 | 12 | 48 | 48 | 30 | 70 | 14 |
| Moorings Bay | Lowdermilk | 23B | Color pH | 20-Oct | 21-Sep | 12 | 7.76 | 7.71 | 7.41 | 8.35 | 0.26 | 12 | 7.76 | 7.71 | 7.41 | 8.35 | 0.26 |
| Moorings Bay | Lowdermilk | 23B | Conductivity | 20-Oct | 21-Sep | 12 | 21962 | 21757 | 412 | 37215 | 10568 | 12 | 21962 | 21757 | 412 | 37215 | 10568 |
| Moorings Bay | Lowdermilk | 23B | Copper | 20-Oct | 21-Sep | 12 | 2.98 | 0.95 | 0.14 | 10.20 | 3.61 | 12 | 2.98 | 0.95 | 0.14 | 10.20 | 3.61 |
| Moorings Bay | Lowdermilk | 23B | Dissolved Oxygen | 20-Oct | 21-Sep | 12 | 4.59 | 4.62 | 2.13 | 7.58 | 1.68 | 12 | 4.59 | 4.62 | 2.13 | 7.58 | 1.68 |
| Moorings Bay | Lowdermilk | 23B | Dissolved Organic Carbon | 20-Oct | 21-Sep | 12 | 8.03 | 7.97 | 1.36 | 11.70 | 2.55 | 12 | 8.03 | 7.97 | 1.36 | 11.70 | 2.55 |
| Moorings Bay | Lowdermilk | 23B | Dissolved Oxygen, Saturation | 20-Oct | 21-Sep | 12 | 60.9 | 56.5 | 25.6 | 106.8 | 24.4 | 12 | 60.9 | 56.5 | 25.6 | 106.8 | 24.4 |
| Moorings Bay | Lowdermilk | 23B | E. coli | 20-Oct | 21-Sep | 12 | 552 | 341 | 74 | 2603 | 681 | 12 | 552 | 341 | 74 | 2603 | 681 |
| Moorings Bay | Lowdermilk | 23B | Enterococci | 20-Oct | 21-Sep | 12 | 193 | 30 | 5 | 710 | 262 | 12 | 193 | 30 | 5 | 710 | 262 |
| Moorings Bay | Lowdermilk | 23B | Total Hardness, CaCO3 | 20-Oct | 21-Sep | 12 | 2509.4 | 2239.5 | 1009.0 | 4370.0 | 1217.5 | 12 | 2509.4 | 2239.5 | 1009.0 | 4370.0 | 1217.5 |
| Moorings Bay | Lowdermilk | 23B | Magnesium | 20-Nov | 21-Sep | 11 | 453.09 | 409.00 | 188.00 | 860.00 | 228.25 | 11 | 453.09 | 409.00 | 188.00 | 860.00 | 228.25 |
| Moorings Bay | Lowdermilk | 23B | Ammonia | 20-Oct | 21-Sep | 12 | 0.21 | 0.12 | 0.00 | 0.73 | 0.24 | 12 | 0.21 | 0.12 | 0.00 | 0.73 | 0.24 |
| Moorings Bay | Lowdermilk | 23B | Nitrate+Nitrite | 20-Oct | 21-Sep | 12 | 0.01 | 0.00 | 0.00 | 0.09 | 0.02 | 12 | 0.01 | 0.00 | 0.00 | 0.09 | 0.02 |
| Moorings Bay | Lowdermilk | 23B | Orthophosphate | 20-Oct | 21-Sep | 12 | 0.04 | 0.03 | 0.02 | 0.10 | 0.02 | 12 | 0.04 | 0.03 | 0.02 | 0.10 | 0.02 |
| Moorings Bay | Lowdermilk | 23B | pH | 20-Oct | 21-Sep | 12 | 7.7 | 7.7 | 7.3 | 8.7 | 0.4 | 12.0 | 7.7 | 7.7 | 7.3 | 8.7 | 0.4 |

## Appendix B – Water Quality Summary Statistics for Naples Stormwater Stations

| Drainage Basin | Lake Name | Station ID | Parameter | POR | | | | | | | | FY20-21 (October 2020-September 2021) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First Sample | Last Sample | Sample Count | Mean | Median | Min | Max | SD | Sample Count | Mean | Median | Min | Max | SD |
| Moorings Bay | Lowdermilk | 23B | Salinity | 20-Oct | 21-Sep | 12 | 13.82 | 12.53 | 0.20 | 23.46 | 7.49 | 12 | 13.82 | 12.53 | 0.20 | 23.46 | 7.49 |
| Moorings Bay | Lowdermilk | 23B | Temperature | 20-Oct | 21-Sep | 12 | 26.9 | 28.7 | 18.8 | 30.6 | 3.8 | 12.0 | 26.9 | 28.7 | 18.8 | 30.6 | 3.8 |
| Moorings Bay | Lowdermilk | 23B | Total Kjeldahl Nitrogen | 20-Oct | 21-Sep | 12 | 0.61 | 0.61 | 0.44 | 0.83 | 0.13 | 12 | 0.61 | 0.61 | 0.44 | 0.83 | 0.13 |
| Moorings Bay | Lowdermilk | 23B | Total Nitrogen | 20-Oct | 21-Sep | 12 | 0.62 | 0.63 | 0.44 | 0.83 | 0.12 | 12 | 0.62 | 0.63 | 0.44 | 0.83 | 0.12 |
| Moorings Bay | Lowdermilk | 23B | Total Organic Carbon | 20-Oct | 21-Sep | 12 | 9.14 | 8.78 | 2.88 | 19.70 | 4.10 | 12 | 9.14 | 8.78 | 2.88 | 19.70 | 4.10 |
| Moorings Bay | Lowdermilk | 23B | Total Phosphorus | 20-Oct | 21-Sep | 12 | 0.08 | 0.07 | 0.03 | 0.12 | 0.02 | 12 | 0.08 | 0.07 | 0.03 | 0.12 | 0.02 |
| Moorings Bay | Lowdermilk | 23B | Total Suspended Solids | 20-Oct | 21-Sep | 12 | 13.2 | 12.2 | 4.0 | 31.2 | 7.2 | 12 | 13.2 | 12.2 | 4.0 | 31.2 | 7.2 |
| Moorings Bay | Lowdermilk | 23B | Turbidity | 20-Oct | 21-Sep | 12 | 2.1 | 2.1 | 0.8 | 3.4 | 0.9 | 12 | 2.1 | 2.1 | 0.8 | 3.4 | 0.9 |
| Moorings Bay | Swan Lake | 2B | Calcium | 20-Nov | 21-Sep | 11 | 49.85 | 52.60 | 30.20 | 63.80 | 10.97 | 11 | 49.85 | 52.60 | 30.20 | 63.80 | 10.97 |
| Moorings Bay | Swan Lake | 2B | Chlorophyll-a, Corrected | 14-Dec | 21-Sep | 61 | 33.8 | 28.3 | 0.1 | 135.0 | 27.2 | 12 | 31.8 | 30.1 | 0.1 | 60.3 | 19.0 |
| Moorings Bay | Swan Lake | 2B | Chemical Oxygen Demand | 21-Feb | 21-Sep | 7 | 38.87 | 30.00 | 18.80 | 106.00 | 30.47 | 7 | 38.87 | 30.00 | 18.80 | 106.00 | 30.47 |
| Moorings Bay | Swan Lake | 2B | Color, Apparent | 20-Oct | 21-Sep | 12 | 111 | 100 | 50 | 250 | 50 | 12 | 111 | 100 | 50 | 250 | 50 |
| Moorings Bay | Swan Lake | 2B | Color pH | 20-Oct | 21-Sep | 12 | 7.89 | 7.91 | 7.27 | 8.94 | 0.46 | 12 | 7.89 | 7.91 | 7.27 | 8.94 | 0.46 |
| Moorings Bay | Swan Lake | 2B | Conductivity | 14-Dec | 21-Sep | 61 | 1947 | 432 | 251 | 42344 | 7140 | 12 | 360 | 360 | 251 | 474 | 79 |
| Moorings Bay | Swan Lake | 2B | Copper | 14-Dec | 21-Sep | 61 | 7.21 | 4.12 | 0.17 | 59.40 | 10.43 | 12 | 4.28 | 3.83 | 0.17 | 12.90 | 3.09 |
| Moorings Bay | Swan Lake | 2B | Dissolved Oxygen | 14-Dec | 21-Sep | 61 | 7.07 | 7.11 | 1.64 | 13.40 | 2.71 | 12 | 5.65 | 5.26 | 2.27 | 8.76 | 1.91 |
| Moorings Bay | Swan Lake | 2B | Dissolved Organic Carbon | 20-Oct | 21-Sep | 12 | 10.70 | 11.30 | 4.19 | 14.80 | 3.15 | 12 | 10.70 | 11.30 | 4.19 | 14.80 | 3.15 |
| Moorings Bay | Swan Lake | 2B | Dissolved Oxygen, Saturation | 14-Dec | 21-Sep | 61 | 87.9 | 86.4 | 22.2 | 168.1 | 33.5 | 12 | 68.2 | 65.2 | 29.6 | 101.8 | 22.3 |
| Moorings Bay | Swan Lake | 2B | E. coli | 20-Oct | 21-Sep | 12 | 120 | 80 | 10 | 393 | 123 | 12 | 120 | 80 | 10 | 393 | 123 |
| Moorings Bay | Swan Lake | 2B | Enterococci | 14-Dec | 21-Sep | 61 | 207 | 80 | 5 | 3600 | 480 | 12 | 96 | 50 | 5 | 350 | 111 |
| Moorings Bay | Swan Lake | 2B | Fecal Coliform | 14-Dec | 20-Sep | 49 | 926 | 240 | 10 | 20000 | 2944 | - | - | - | - | - | - |
| Moorings Bay | Swan Lake | 2B | Total Hardness, CaCO3 | 15-Nov | 21-Sep | 50 | 143.1 | 146.5 | 82.4 | 194.0 | 26.1 | 12 | 144.3 | 154.0 | 85.0 | 188.0 | 31.7 |
| Moorings Bay | Swan Lake | 2B | Magnesium | 20-Nov | 21-Sep | 11 | 4.23 | 4.54 | 2.32 | 6.85 | 1.25 | 11 | 4.23 | 4.54 | 2.32 | 6.85 | 1.25 |
| Moorings Bay | Swan Lake | 2B | Ammonia | 14-Dec | 21-Sep | 61 | 0.05 | 0.01 | 0.00 | 0.62 | 0.11 | 12 | 0.06 | 0.02 | 0.00 | 0.39 | 0.11 |
| Moorings Bay | Swan Lake | 2B | Nitrate+Nitrite | 14-Dec | 21-Sep | 61 | 0.04 | 0.02 | 0.00 | 0.27 | 0.06 | 12 | 0.03 | 0.01 | 0.00 | 0.13 | 0.04 |

## Appendix B – Water Quality Summary Statistics for Naples Stormwater Stations

| Drainage Basin | Lake Name | Station ID | Parameter | POR | | | | | | | | FY20-21 (October 2020-September 2021) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First Sample | Last Sample | Sample Count | Mean | Median | Min | Max | SD | Sample Count | Mean | Median | Min | Max | SD |
| Moorings Bay | Swan Lake | 2B | Orthophosphate | 14-Dec | 21-Sep | 61 | 0.04 | 0.03 | 0.00 | 0.29 | 0.05 | 12 | 0.02 | 0.02 | 0.00 | 0.06 | 0.02 |
| Moorings Bay | Swan Lake | 2B | pH | 14-Dec | 21-Sep | 61 | 7.9 | 7.9 | 7.1 | 8.8 | 0.4 | 12.0 | 7.8 | 7.9 | 7.1 | 8.3 | 0.4 |
| Moorings Bay | Swan Lake | 2B | Salinity | 14-Dec | 21-Sep | 61 | 1.22 | 0.21 | 0.11 | 29.73 | 4.81 | 12 | 0.17 | 0.17 | 0.11 | 0.23 | 0.04 |
| Moorings Bay | Swan Lake | 2B | Temperature | 14-Dec | 21-Sep | 61 | 26.4 | 27.7 | 16.8 | 32.6 | 4.2 | 12.0 | 25.7 | 27.0 | 18.7 | 29.1 | 3.3 |
| Moorings Bay | Swan Lake | 2B | Total Kjeldahl Nitrogen | 14-Dec | 21-Sep | 61 | 1.23 | 1.08 | 0.61 | 2.65 | 0.48 | 12 | 1.23 | 1.07 | 0.62 | 2.65 | 0.58 |
| Moorings Bay | Swan Lake | 2B | Total Nitrogen | 14-Dec | 21-Sep | 61 | 1.27 | 1.11 | 0.61 | 2.67 | 0.48 | 12 | 1.26 | 1.09 | 0.63 | 2.67 | 0.57 |
| Moorings Bay | Swan Lake | 2B | Total Organic Carbon | 20-Oct | 21-Sep | 12 | 11.93 | 11.50 | 5.98 | 19.40 | 3.50 | 12 | 11.93 | 11.50 | 5.98 | 19.40 | 3.50 |
| Moorings Bay | Swan Lake | 2B | Total Phosphorus | 14-Dec | 21-Sep | 61 | 0.11 | 0.09 | 0.01 | 0.39 | 0.08 | 12 | 0.09 | 0.07 | 0.03 | 0.31 | 0.08 |
| Moorings Bay | Swan Lake | 2B | Total Suspended Solids | 14-Dec | 21-Sep | 61 | 5.9 | 5.0 | 0.3 | 18.5 | 3.5 | 12 | 5.2 | 5.3 | 0.3 | 12.0 | 3.8 |
| Moorings Bay | Swan Lake | 2B | Turbidity | 14-Dec | 21-Sep | 61 | 7.1 | 4.8 | 1.5 | 31.0 | 6.3 | 12 | 6.9 | 3.7 | 1.5 | 31.0 | 8.3 |
| Naples Bay | East Lake | 11B | Calcium | 20-Nov | 21-Sep | 11 | 72.69 | 68.20 | 50.30 | 94.70 | 15.40 | 11 | 72.69 | 68.20 | 50.30 | 94.70 | 15.40 |
| Naples Bay | East Lake | 11B | Chlorophyll-a, Corrected | 14-Dec | 21-Sep | 37 | 29.3 | 20.6 | 0.1 | 136.0 | 30.8 | 12 | 45.7 | 29.3 | 0.1 | 136.0 | 45.3 |
| Naples Bay | East Lake | 11B | Color, Apparent | 20-Oct | 21-Sep | 12 | 123 | 120 | 80 | 220 | 42 | 12 | 123 | 120 | 80 | 220 | 42 |
| Naples Bay | East Lake | 11B | Color pH | 20-Oct | 21-Sep | 12 | 7.95 | 7.98 | 7.47 | 8.43 | 0.26 | 12 | 7.95 | 7.98 | 7.47 | 8.43 | 0.26 |
| Naples Bay | East Lake | 11B | Conductivity | 14-Dec | 21-Sep | 37 | 667 | 670 | 516 | 777 | 70 | 12 | 666 | 704 | 516 | 747 | 80 |
| Naples Bay | East Lake | 11B | Copper | 14-Dec | 21-Sep | 37 | 5.59 | 4.50 | 0.17 | 33.00 | 5.84 | 12 | 5.43 | 5.30 | 0.17 | 13.40 | 3.45 |
| Naples Bay | East Lake | 11B | Dissolved Oxygen | 14-Dec | 21-Sep | 37 | 4.50 | 4.63 | 0.16 | 9.03 | 1.97 | 12 | 5.12 | 5.41 | 0.16 | 7.77 | 1.91 |
| Naples Bay | East Lake | 11B | Dissolved Organic Carbon | 20-Oct | 21-Sep | 12 | 13.04 | 13.90 | 4.47 | 21.20 | 4.69 | 12 | 13.04 | 13.90 | 4.47 | 21.20 | 4.69 |
| Naples Bay | East Lake | 11B | Dissolved Oxygen, Saturation | 14-Dec | 21-Sep | 37 | 54.8 | 58.6 | 2.1 | 101.2 | 23.0 | 12 | 63.7 | 64.1 | 2.1 | 101.2 | 24.8 |
| Naples Bay | East Lake | 11B | E. coli | 20-Oct | 21-Sep | 12 | 525 | 550 | 148 | 1054 | 251 | 12 | 525 | 550 | 148 | 1054 | 251 |
| Naples Bay | East Lake | 11B | Enterococci | 14-Dec | 21-Sep | 37 | 473 | 240 | 40 | 3600 | 728 | 12 | 381 | 165 | 60 | 1500 | 467 |
| Naples Bay | East Lake | 11B | Fecal Coliform | 14-Dec | 20-Aug | 25 | 1240 | 840 | 170 | 6400 | 1338 | - | - | - | - | - | - |
| Naples Bay | East Lake | 11B | Total Hardness, $CaCO_3$ | 14-Dec | 21-Sep | 32 | 204.5 | 199.0 | 145.0 | 284.0 | 33.0 | 12 | 214.6 | 208.5 | 145.0 | 284.0 | 46.9 |
| Naples Bay | East Lake | 11B | Magnesium | 20-Nov | 21-Sep | 11 | 6.48 | 6.79 | 3.88 | 10.70 | 1.90 | 11 | 6.48 | 6.79 | 3.88 | 10.70 | 1.90 |
| Naples Bay | East Lake | 11B | Ammonia | 14-Dec | 21-Sep | 37 | 0.04 | 0.02 | 0.00 | 0.75 | 0.12 | 12 | 0.08 | 0.01 | 0.00 | 0.75 | 0.21 |

## Appendix B – Water Quality Summary Statistics for Naples Stormwater Stations

| Drainage Basin | Lake Name | Station ID | Parameter | POR | | | | | | | | FY20-21 (October 2020-September 2021) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First Sample | Last Sample | Sample Count | Mean | Median | Min | Max | SD | Sample Count | Mean | Median | Min | Max | SD |
| Naples Bay | East Lake | 11B | Nitrate+Nitrite | 14-Dec | 21-Sep | 37 | 0.04 | 0.02 | 0.00 | 0.34 | 0.06 | 12 | 0.01 | 0.00 | 0.00 | 0.02 | 0.01 |
| Naples Bay | East Lake | 11B | Orthophosphate | 14-Dec | 21-Sep | 37 | 0.05 | 0.04 | 0.00 | 0.21 | 0.04 | 12 | 0.02 | 0.02 | 0.00 | 0.05 | 0.02 |
| Naples Bay | East Lake | 11B | pH | 14-Dec | 21-Sep | 37 | 7.7 | 7.7 | 7.1 | 8.1 | 0.2 | 12.0 | 7.6 | 7.7 | 7.2 | 8.0 | 0.2 |
| Naples Bay | East Lake | 11B | Salinity | 14-Dec | 21-Sep | 37 | 0.32 | 0.33 | 0.25 | 0.38 | 0.04 | 12 | 0.32 | 0.34 | 0.25 | 0.37 | 0.04 |
| Naples Bay | East Lake | 11B | Temperature | 14-Dec | 21-Sep | 37 | 25.6 | 26.0 | 16.8 | 31.7 | 4.1 | 12.0 | 26.3 | 27.9 | 18.8 | 29.9 | 3.5 |
| Naples Bay | East Lake | 11B | Total Kjeldahl Nitrogen | 14-Dec | 21-Sep | 37 | 1.14 | 1.02 | 0.46 | 4.62 | 0.71 | 12 | 1.45 | 1.00 | 0.46 | 4.62 | 1.17 |
| Naples Bay | East Lake | 11B | Total Nitrogen | 14-Dec | 21-Sep | 37 | 1.18 | 1.03 | 0.46 | 4.62 | 0.70 | 12 | 1.45 | 1.00 | 0.46 | 4.62 | 1.17 |
| Naples Bay | East Lake | 11B | Total Organic Carbon | 20-Oct | 21-Sep | 12 | 13.64 | 14.50 | 7.60 | 17.30 | 3.40 | 12 | 13.64 | 14.50 | 7.60 | 17.30 | 3.40 |
| Naples Bay | East Lake | 11B | Total Phosphorus | 14-Dec | 21-Sep | 37 | 0.10 | 0.08 | 0.02 | 0.40 | 0.07 | 12 | 0.06 | 0.05 | 0.03 | 0.10 | 0.02 |
| Naples Bay | East Lake | 11B | Total Suspended Solids | 14-Dec | 21-Sep | 37 | 5.2 | 5.0 | 0.3 | 14.4 | 3.5 | 12 | 6.7 | 6.0 | 0.7 | 14.4 | 4.1 |
| Naples Bay | East Lake | 11B | Turbidity | 14-Dec | 21-Sep | 37 | 3.5 | 2.7 | 0.8 | 12.1 | 2.6 | 12 | 4.7 | 3.1 | 1.9 | 12.1 | 3.6 |
| Naples Bay | Half Moon Lake | 24B | Chlorophyll-a, Corrected | 14-Dec | 20-Aug | 25 | 126.9 | 113.0 | 55.6 | 255.0 | 54.2 | - | - | - | - | - | - |
| Naples Bay | Half Moon Lake | 24B | Conductivity | 14-Dec | 20-Aug | 25 | 1328 | 1309 | 1085 | 1593 | 113 | - | - | - | - | - | - |
| Naples Bay | Half Moon Lake | 24B | Copper | 14-Dec | 20-Aug | 25 | 3.01 | 2.13 | 0.50 | 13.00 | 3.01 | - | - | - | - | - | - |
| Naples Bay | Half Moon Lake | 24B | Dissolved Oxygen | 14-Dec | 20-Aug | 25 | 4.71 | 4.22 | 0.87 | 10.66 | 2.74 | - | - | - | - | - | - |
| Naples Bay | Half Moon Lake | 24B | Dissolved Oxygen, Saturation | 14-Dec | 20-Aug | 25 | 56.4 | 51.2 | 12.1 | 127.7 | 30.2 | - | - | - | - | - | - |
| Naples Bay | Half Moon Lake | 24B | Enterococci | 14-Dec | 20-Aug | 25 | 873 | 450 | 110 | 3300 | 910 | - | - | - | - | - | - |
| Naples Bay | Half Moon Lake | 24B | Fecal Coliform | 14-Dec | 20-Aug | 25 | 897 | 430 | 70 | 5100 | 1194 | - | - | - | - | - | - |
| Naples Bay | Half Moon Lake | 24B | Total Hardness, CaCO3 | 14-Dec | 20-Aug | 20 | 324.7 | 316.0 | 271.0 | 512.0 | 48.1 | - | - | - | - | - | - |
| Naples Bay | Half Moon Lake | 24B | Ammonia | 14-Dec | 20-Aug | 25 | 0.28 | 0.18 | 0.00 | 1.62 | 0.35 | - | - | - | - | - | - |
| Naples Bay | Half Moon Lake | 24B | Nitrate+Nitrite | 14-Dec | 20-Aug | 25 | 0.21 | 0.06 | 0.00 | 0.71 | 0.24 | - | - | - | - | - | - |
| Naples Bay | Half Moon Lake | 24B | Orthophosphate | 14-Dec | 20-Aug | 25 | 1.51 | 1.61 | 0.44 | 2.70 | 0.62 | - | - | - | - | - | - |
| Naples Bay | Half Moon Lake | 24B | pH | 14-Dec | 20-Aug | 25 | 8.2 | 8.1 | 6.9 | 8.8 | 0.5 | - | - | - | - | - | - |
| Naples Bay | Half Moon Lake | 24B | Salinity | 14-Dec | 20-Aug | 25 | 0.66 | 0.65 | 0.59 | 0.80 | 0.05 | - | - | - | - | - | - |
| Naples Bay | Half Moon Lake | 24B | Temperature | 14-Dec | 20-Aug | 25 | 25.3 | 25.1 | 17.5 | 31.7 | 4.1 | - | - | - | - | - | - |

## Appendix B – Water Quality Summary Statistics for Naples Stormwater Stations

| Drainage Basin | Lake Name | Station ID | Parameter | POR | | | | | | | | FY20-21 (October 2020-September 2021) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First Sample | Last Sample | Sample Count | Mean | Median | Min | Max | SD | Sample Count | Mean | Median | Min | Max | SD |
| Naples Bay | Half Moon Lake | 24B | Total Kjeldahl Nitrogen | 14-Dec | 20-Aug | 25 | 3.46 | 3.35 | 0.68 | 5.29 | 0.91 | - | - | - | - | - | - |
| Naples Bay | Half Moon Lake | 24B | Total Nitrogen | 14-Dec | 20-Aug | 25 | 3.67 | 3.62 | 0.72 | 5.72 | 0.97 | - | - | - | - | - | - |
| Naples Bay | Half Moon Lake | 24B | Total Phosphorus | 14-Dec | 20-Aug | 25 | 2.16 | 2.17 | 0.98 | 5.54 | 0.91 | - | - | - | - | - | - |
| Naples Bay | Half Moon Lake | 24B | Total Suspended Solids | 14-Dec | 20-Aug | 25 | 22.8 | 21.3 | 10.6 | 40.8 | 8.9 | - | - | - | - | - | - |
| Naples Bay | Half Moon Lake | 24B | Turbidity | 14-Dec | 20-Aug | 25 | 11.2 | 10.4 | 6.2 | 21.2 | 3.8 | - | - | - | - | - | - |
| Naples Bay | Lake 13 | 13B | Calcium | 20-Nov | 21-Sep | 11 | 164.45 | 110.00 | 55.70 | 485.00 | 128.45 | 11 | 164.45 | 110.00 | 55.70 | 485.00 | 128.45 |
| Naples Bay | Lake 13 | 13B | Chlorophyll-a, Corrected | 20-Oct | 21-Sep | 12 | 58.3 | 52.7 | 6.4 | 177.0 | 49.7 | 12 | 58.3 | 52.7 | 6.4 | 177.0 | 49.7 |
| Naples Bay | Lake 13 | 13B | Color, Apparent | 20-Oct | 21-Sep | 12 | 161 | 170 | 70 | 400 | 95 | 12 | 161 | 170 | 70 | 400 | 95 |
| Naples Bay | Lake 13 | 13B | Color pH | 20-Oct | 21-Sep | 12 | 7.62 | 7.73 | 7.28 | 7.87 | 0.22 | 12 | 7.62 | 7.73 | 7.28 | 7.87 | 0.22 |
| Naples Bay | Lake 13 | 13B | Conductivity | 20-Oct | 21-Sep | 12 | 14823 | 7898 | 2001 | 43426 | 14847 | 12 | 14823 | 7898 | 2001 | 43426 | 14847 |
| Naples Bay | Lake 13 | 13B | Copper | 20-Oct | 21-Sep | 12 | 0.71 | 0.76 | 0.14 | 1.20 | 0.39 | 12 | 0.71 | 0.76 | 0.14 | 1.20 | 0.39 |
| Naples Bay | Lake 13 | 13B | Dissolved Oxygen | 20-Oct | 21-Sep | 12 | 4.46 | 3.02 | 0.20 | 18.30 | 4.84 | 12 | 4.46 | 3.02 | 0.20 | 18.30 | 4.84 |
| Naples Bay | Lake 13 | 13B | Dissolved Organic Carbon | 20-Oct | 21-Sep | 12 | 12.70 | 11.85 | 5.74 | 21.50 | 5.06 | 12 | 12.70 | 11.85 | 5.74 | 21.50 | 5.06 |
| Naples Bay | Lake 13 | 13B | Dissolved Oxygen, Saturation | 20-Oct | 21-Sep | 12 | 54.0 | 28.5 | 2.9 | 274.2 | 72.7 | 12 | 54.0 | 28.5 | 2.9 | 274.2 | 72.7 |
| Naples Bay | Lake 13 | 13B | E. coli | 20-Oct | 21-Sep | 12 | 1761 | 454 | 134 | 7701 | 2423 | 12 | 1761 | 454 | 134 | 7701 | 2423 |
| Naples Bay | Lake 13 | 13B | Enterococci | 20-Oct | 21-Sep | 12 | 538 | 245 | 10 | 2600 | 734 | 12 | 538 | 245 | 10 | 2600 | 734 |
| Naples Bay | Lake 13 | 13B | Total Hardness, CaCO3 | 20-Oct | 21-Sep | 12 | 1488.9 | 842.5 | 334.0 | 4771.0 | 1474.1 | 12 | 1488.9 | 842.5 | 334.0 | 4771.0 | 1474.1 |
| Naples Bay | Lake 13 | 13B | Magnesium | 20-Nov | 21-Sep | 11 | 285.02 | 209.00 | 37.70 | 868.00 | 294.97 | 11 | 285.02 | 209.00 | 37.70 | 868.00 | 294.97 |
| Naples Bay | Lake 13 | 13B | Ammonia | 20-Oct | 21-Sep | 12 | 0.18 | 0.12 | 0.00 | 0.65 | 0.20 | 12 | 0.18 | 0.12 | 0.00 | 0.65 | 0.20 |
| Naples Bay | Lake 13 | 13B | Nitrate+Nitrite | 20-Oct | 21-Sep | 12 | 0.01 | 0.01 | 0.00 | 0.09 | 0.02 | 12 | 0.01 | 0.01 | 0.00 | 0.09 | 0.02 |
| Naples Bay | Lake 13 | 13B | Orthophosphate | 20-Oct | 21-Sep | 12 | 0.07 | 0.09 | 0.01 | 0.13 | 0.04 | 12 | 0.07 | 0.09 | 0.01 | 0.13 | 0.04 |
| Naples Bay | Lake 13 | 13B | pH | 20-Oct | 21-Sep | 12 | 7.5 | 7.4 | 6.9 | 8.7 | 0.4 | 12.0 | 7.5 | 7.4 | 6.9 | 8.7 | 0.4 |
| Naples Bay | Lake 13 | 13B | Salinity | 20-Oct | 21-Sep | 12 | 9.00 | 4.36 | 1.01 | 27.87 | 9.50 | 12 | 9.00 | 4.36 | 1.01 | 27.87 | 9.50 |
| Naples Bay | Lake 13 | 13B | Temperature | 20-Oct | 21-Sep | 12 | 27.5 | 29.1 | 19.1 | 31.4 | 4.0 | 12.0 | 27.5 | 29.1 | 19.1 | 31.4 | 4.0 |
| Naples Bay | Lake 13 | 13B | Total Kjeldahl Nitrogen | 20-Oct | 21-Sep | 12 | 1.29 | 0.98 | 0.10 | 2.53 | 0.79 | 12 | 1.29 | 0.98 | 0.10 | 2.53 | 0.79 |

## Appendix B – Water Quality Summary Statistics for Naples Stormwater Stations

| Drainage Basin | Lake Name | Station ID | Parameter | POR | | | | | | | | FY20-21 (October 2020-September 2021) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First Sample | Last Sample | Sample Count | Mean | Median | Min | Max | SD | Sample Count | Mean | Median | Min | Max | SD |
| Naples Bay | Lake 13 | 13B | Total Nitrogen | 20-Oct | 21-Sep | 12 | 1.31 | 0.99 | 0.10 | 2.55 | 0.79 | 12 | 1.31 | 0.99 | 0.10 | 2.55 | 0.79 |
| Naples Bay | Lake 13 | 13B | Total Organic Carbon | 20-Oct | 21-Sep | 12 | 14.20 | 13.00 | 6.19 | 23.60 | 5.41 | 12 | 14.20 | 13.00 | 6.19 | 23.60 | 5.41 |
| Naples Bay | Lake 13 | 13B | Total Phosphorus | 20-Oct | 21-Sep | 12 | 0.13 | 0.13 | 0.01 | 0.24 | 0.07 | 12 | 0.13 | 0.13 | 0.01 | 0.24 | 0.07 |
| Naples Bay | Lake 13 | 13B | Total Suspended Solids | 20-Oct | 21-Sep | 12 | 12.8 | 10.8 | 1.6 | 44.8 | 10.8 | 12 | 12.8 | 10.8 | 1.6 | 44.8 | 10.8 |
| Naples Bay | Lake 13 | 13B | Turbidity | 20-Oct | 21-Sep | 12 | 6.9 | 5.0 | 2.9 | 19.5 | 4.7 | 12 | 6.9 | 5.0 | 2.9 | 19.5 | 4.7 |
| Naples Bay | Lantern Lake | 14B | Calcium | 20-Nov | 21-Sep | 11 | 151.55 | 144.00 | 96.10 | 255.00 | 42.49 | 11 | 151.55 | 144.00 | 96.10 | 255.00 | 42.49 |
| Naples Bay | Lantern Lake | 14B | Chlorophyll-a, Corrected | 14-Dec | 21-Sep | 37 | 63.3 | 51.4 | 1.9 | 266.0 | 47.0 | 12 | 47.0 | 43.3 | 1.9 | 109.0 | 29.8 |
| Naples Bay | Lantern Lake | 14B | Color, Apparent | 20-Oct | 21-Sep | 12 | 115 | 120 | 30 | 180 | 38 | 12 | 115 | 120 | 30 | 180 | 38 |
| Naples Bay | Lantern Lake | 14B | Color pH | 20-Oct | 21-Sep | 12 | 7.82 | 7.74 | 7.53 | 8.31 | 0.27 | 12 | 7.82 | 7.74 | 7.53 | 8.31 | 0.27 |
| Naples Bay | Lantern Lake | 14B | Conductivity | 14-Dec | 21-Sep | 37 | 8369 | 8573 | 5526 | 13598 | 1487 | 12 | 8439 | 8627 | 5892 | 10846 | 1472 |
| Naples Bay | Lantern Lake | 14B | Copper | 14-Dec | 21-Sep | 37 | 6.53 | 3.07 | 0.14 | 99.30 | 16.14 | 12 | 1.89 | 1.40 | 0.14 | 4.48 | 1.65 |
| Naples Bay | Lantern Lake | 14B | Dissolved Oxygen | 14-Dec | 21-Sep | 37 | 5.36 | 4.68 | 1.49 | 12.37 | 2.89 | 12 | 5.28 | 4.78 | 1.72 | 10.28 | 2.70 |
| Naples Bay | Lantern Lake | 14B | Dissolved Organic Carbon | 20-Oct | 21-Sep | 12 | 6.91 | 7.12 | 3.59 | 9.79 | 1.73 | 12 | 6.91 | 7.12 | 3.59 | 9.79 | 1.73 |
| Naples Bay | Lantern Lake | 14B | Dissolved Oxygen, Saturation | 14-Dec | 21-Sep | 37 | 67.2 | 60.2 | 19.3 | 147.2 | 34.3 | 12 | 68.8 | 58.4 | 22.9 | 137.9 | 35.5 |
| Naples Bay | Lantern Lake | 14B | E. coli | 20-Oct | 21-Sep | 12 | 597 | 382 | 120 | 2909 | 758 | 12 | 597 | 382 | 120 | 2909 | 758 |
| Naples Bay | Lantern Lake | 14B | Enterococci | 14-Dec | 21-Sep | 37 | 419 | 150 | 20 | 5000 | 914 | 12 | 578 | 95 | 20 | 5000 | 1411 |
| Naples Bay | Lantern Lake | 14B | Fecal Coliform | 14-Dec | 20-Aug | 25 | 407 | 160 | 20 | 2500 | 630 | - | - | - | - | - | - |
| Naples Bay | Lantern Lake | 14B | Total Hardness, CaCO3 | 18-May | 21-Sep | 22 | 1164.9 | 1147.0 | 611.0 | 1950.0 | 293.0 | 12 | 1174.0 | 1128.5 | 611.0 | 1950.0 | 356.0 |
| Naples Bay | Lantern Lake | 14B | Magnesium | 20-Nov | 21-Sep | 11 | 185.14 | 183.00 | 90.50 | 320.00 | 60.04 | 11 | 185.14 | 183.00 | 90.50 | 320.00 | 60.04 |
| Naples Bay | Lantern Lake | 14B | Ammonia | 14-Dec | 21-Sep | 37 | 0.13 | 0.05 | 0.00 | 0.97 | 0.21 | 12 | 0.20 | 0.08 | 0.01 | 0.70 | 0.22 |
| Naples Bay | Lantern Lake | 14B | Nitrate+Nitrite | 14-Dec | 21-Sep | 37 | 0.04 | 0.01 | 0.00 | 0.26 | 0.06 | 12 | 0.01 | 0.01 | 0.00 | 0.09 | 0.02 |
| Naples Bay | Lantern Lake | 14B | Orthophosphate | 14-Dec | 21-Sep | 37 | 0.27 | 0.20 | 0.00 | 0.68 | 0.20 | 12 | 0.26 | 0.20 | 0.05 | 0.55 | 0.18 |
| Naples Bay | Lantern Lake | 14B | pH | 14-Dec | 21-Sep | 37 | 7.7 | 7.7 | 7.1 | 8.6 | 0.4 | 12.0 | 7.7 | 7.5 | 7.3 | 8.6 | 0.4 |
| Naples Bay | Lantern Lake | 14B | Salinity | 14-Dec | 21-Sep | 37 | 4.74 | 4.78 | 2.95 | 7.88 | 1.01 | 12 | 4.68 | 4.79 | 3.16 | 6.10 | 0.88 |
| Naples Bay | Lantern Lake | 14B | Temperature | 14-Dec | 21-Sep | 37 | 26.4 | 26.6 | 18.6 | 32.1 | 3.8 | 12.0 | 27.5 | 28.3 | 20.4 | 31.6 | 3.5 |

| Drainage Basin | Lake Name | Station ID | Parameter | POR | | | | | | | | FY20-21 (October 2020-September 2021) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First Sample | Last Sample | Sample Count | Mean | Median | Min | Max | SD | Sample Count | Mean | Median | Min | Max | SD |
| Naples Bay | Lantern Lake | 14B | Total Kjeldahl Nitrogen | 14-Dec | 21-Sep | 37 | 1.70 | 1.63 | 0.95 | 2.56 | 0.43 | 12 | 1.46 | 1.40 | 0.95 | 2.20 | 0.37 |
| Naples Bay | Lantern Lake | 14B | Total Nitrogen | 14-Dec | 21-Sep | 37 | 1.73 | 1.64 | 0.95 | 2.75 | 0.46 | 12 | 1.47 | 1.41 | 0.95 | 2.20 | 0.37 |
| Naples Bay | Lantern Lake | 14B | Total Organic Carbon | 20-Oct | 21-Sep | 12 | 8.80 | 7.74 | 6.42 | 12.40 | 2.20 | 12 | 8.80 | 7.74 | 6.42 | 12.40 | 2.20 |
| Naples Bay | Lantern Lake | 14B | Total Phosphorus | 14-Dec | 21-Sep | 37 | 0.43 | 0.38 | 0.06 | 1.04 | 0.25 | 12 | 0.36 | 0.35 | 0.08 | 0.64 | 0.18 |
| Naples Bay | Lantern Lake | 14B | Total Suspended Solids | 14-Dec | 21-Sep | 37 | 18.9 | 13.7 | 4.0 | 58.0 | 14.3 | 12 | 13.5 | 10.3 | 6.5 | 32.0 | 8.0 |
| Naples Bay | Lantern Lake | 14B | Turbidity | 14-Dec | 21-Sep | 37 | 10.4 | 10.4 | 2.5 | 24.2 | 5.4 | 12 | 7.0 | 6.3 | 2.5 | 15.3 | 3.7 |
| Naples Bay | Spring Lake | 11C | Calcium | 20-Nov | 21-Sep | 11 | 71.38 | 69.30 | 46.90 | 91.80 | 16.13 | 11 | 71.38 | 69.30 | 46.90 | 91.80 | 16.13 |
| Naples Bay | Spring Lake | 11C | Chlorophyll-a, Corrected | 20-Oct | 21-Sep | 12 | 75.6 | 37.8 | 9.0 | 323.0 | 101.9 | 12 | 75.6 | 37.8 | 9.0 | 323.0 | 101.9 |
| Naples Bay | Spring Lake | 11C | Color, Apparent | 20-Oct | 21-Sep | 12 | 128 | 130 | 80 | 260 | 49 | 12 | 128 | 130 | 80 | 260 | 49 |
| Naples Bay | Spring Lake | 11C | Color pH | 20-Oct | 21-Sep | 12 | 8.22 | 8.27 | 7.49 | 8.94 | 0.41 | 12 | 8.22 | 8.27 | 7.49 | 8.94 | 0.41 |
| Naples Bay | Spring Lake | 11C | Conductivity | 20-Oct | 21-Sep | 12 | 630 | 667 | 456 | 738 | 94 | 12 | 630 | 667 | 456 | 738 | 94 |
| Naples Bay | Spring Lake | 11C | Copper | 20-Oct | 21-Sep | 12 | 6.14 | 6.30 | 0.17 | 12.20 | 4.05 | 12 | 6.14 | 6.30 | 0.17 | 12.20 | 4.05 |
| Naples Bay | Spring Lake | 11C | Dissolved Oxygen | 20-Oct | 21-Sep | 12 | 8.54 | 9.62 | 0.67 | 13.83 | 4.12 | 12 | 8.54 | 9.62 | 0.67 | 13.83 | 4.12 |
| Naples Bay | Spring Lake | 11C | Dissolved Organic Carbon | 20-Oct | 21-Sep | 12 | 13.41 | 14.45 | 4.19 | 22.30 | 4.63 | 12 | 13.41 | 14.45 | 4.19 | 22.30 | 4.63 |
| Naples Bay | Spring Lake | 11C | Dissolved Oxygen, Saturation | 20-Oct | 21-Sep | 12 | 105.7 | 107.8 | 8.7 | 178.7 | 51.0 | 12 | 105.7 | 107.8 | 8.7 | 178.7 | 51.0 |
| Naples Bay | Spring Lake | 11C | E. coli | 20-Oct | 21-Sep | 12 | 554 | 300 | 74 | 1500 | 476 | 12 | 554 | 300 | 74 | 1500 | 476 |
| Naples Bay | Spring Lake | 11C | Enterococci | 20-Oct | 21-Sep | 12 | 448 | 200 | 5 | 2200 | 719 | 12 | 448 | 200 | 5 | 2200 | 719 |
| Naples Bay | Spring Lake | 11C | Total Hardness, CaCO3 | 20-Oct | 21-Sep | 12 | 203.2 | 197.0 | 134.0 | 258.0 | 42.3 | 12 | 203.2 | 197.0 | 134.0 | 258.0 | 42.3 |
| Naples Bay | Spring Lake | 11C | Magnesium | 20-Nov | 21-Sep | 11 | 6.16 | 6.02 | 3.82 | 10.30 | 1.85 | 11 | 6.16 | 6.02 | 3.82 | 10.30 | 1.85 |
| Naples Bay | Spring Lake | 11C | Ammonia | 20-Oct | 21-Sep | 12 | 0.07 | 0.01 | 0.00 | 0.67 | 0.19 | 12 | 0.07 | 0.01 | 0.00 | 0.67 | 0.19 |
| Naples Bay | Spring Lake | 11C | Nitrate+Nitrite | 20-Oct | 21-Sep | 12 | 0.03 | 0.00 | 0.00 | 0.17 | 0.06 | 12 | 0.03 | 0.00 | 0.00 | 0.17 | 0.06 |
| Naples Bay | Spring Lake | 11C | Orthophosphate | 20-Oct | 21-Sep | 12 | 0.02 | 0.02 | 0.00 | 0.06 | 0.02 | 12 | 0.02 | 0.02 | 0.00 | 0.06 | 0.02 |
| Naples Bay | Spring Lake | 11C | pH | 20-Oct | 21-Sep | 12 | 8.0 | 7.9 | 7.2 | 9.0 | 0.6 | 12.0 | 8.0 | 7.9 | 7.2 | 9.0 | 0.6 |
| Naples Bay | Spring Lake | 11C | Salinity | 20-Oct | 21-Sep | 12 | 0.30 | 0.32 | 0.22 | 0.36 | 0.05 | 12 | 0.30 | 0.32 | 0.22 | 0.36 | 0.05 |
| Naples Bay | Spring Lake | 11C | Temperature | 20-Oct | 21-Sep | 12 | 27.0 | 28.6 | 19.9 | 30.3 | 3.4 | 12.0 | 27.0 | 28.6 | 19.9 | 30.3 | 3.4 |

## Appendix B – Water Quality Summary Statistics for Naples Stormwater Stations

| Drainage Basin | Lake Name | Station ID | Parameter | POR | | | | | | | | FY20-21 (October 2020-September 2021) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First Sample | Last Sample | Sample Count | Mean | Median | Min | Max | SD | Sample Count | Mean | Median | Min | Max | SD |
| Naples Bay | Spring Lake | 11C | Total Kjeldahl Nitrogen | 20-Oct | 21-Sep | 12 | 1.52 | 0.95 | 0.73 | 3.78 | 1.07 | 12 | 1.52 | 0.95 | 0.73 | 3.78 | 1.07 |
| Naples Bay | Spring Lake | 11C | Total Nitrogen | 20-Oct | 21-Sep | 12 | 1.55 | 0.95 | 0.73 | 3.95 | 1.11 | 12 | 1.55 | 0.95 | 0.73 | 3.95 | 1.11 |
| Naples Bay | Spring Lake | 11C | Total Organic Carbon | 20-Oct | 21-Sep | 12 | 13.85 | 14.85 | 5.75 | 19.00 | 3.63 | 12 | 13.85 | 14.85 | 5.75 | 19.00 | 3.63 |
| Naples Bay | Spring Lake | 11C | Total Phosphorus | 20-Oct | 21-Sep | 12 | 0.07 | 0.06 | 0.04 | 0.14 | 0.03 | 12 | 0.07 | 0.06 | 0.04 | 0.14 | 0.03 |
| Naples Bay | Spring Lake | 11C | Total Suspended Solids | 20-Oct | 21-Sep | 12 | 7.3 | 5.7 | 0.3 | 17.5 | 4.7 | 12 | 7.3 | 5.7 | 0.3 | 17.5 | 4.7 |
| Naples Bay | Spring Lake | 11C | Turbidity | 20-Oct | 21-Sep | 12 | 6.4 | 3.6 | 2.1 | 24.3 | 6.9 | 12 | 6.4 | 3.6 | 2.1 | 24.3 | 6.9 |
| Pump Stations | Cove Pump | 11-Pump | Calcium | 20-Nov | 21-Sep | 11 | 93.17 | 98.30 | 69.20 | 114.00 | 16.19 | 11 | 93.17 | 98.30 | 69.20 | 114.00 | 16.19 |
| Pump Stations | Cove Pump | 11-Pump | Color, Apparent | 20-Oct | 21-Sep | 12 | 128 | 140 | 90 | 160 | 24 | 12 | 128 | 140 | 90 | 160 | 24 |
| Pump Stations | Cove Pump | 11-Pump | Color pH | 20-Oct | 21-Sep | 12 | 7.54 | 7.54 | 7.22 | 7.79 | 0.15 | 12 | 7.54 | 7.54 | 7.22 | 7.79 | 0.15 |
| Pump Stations | Cove Pump | 11-Pump | Conductivity | 14-Dec | 21-Sep | 36 | 1553 | 1391 | 984 | 3649 | 546 | 12 | 1374 | 1335 | 984 | 1802 | 237 |
| Pump Stations | Cove Pump | 11-Pump | Copper | 14-Dec | 21-Sep | 36 | 2.57 | 1.83 | 0.17 | 15.50 | 2.77 | 12 | 2.12 | 2.10 | 0.17 | 5.73 | 1.41 |
| Pump Stations | Cove Pump | 11-Pump | Dissolved Oxygen | 14-Dec | 21-Sep | 36 | 4.71 | 4.87 | 1.88 | 6.53 | 0.99 | 12 | 4.56 | 4.70 | 3.39 | 5.40 | 0.65 |
| Pump Stations | Cove Pump | 11-Pump | Dissolved Organic Carbon | 20-Oct | 21-Sep | 12 | 14.35 | 13.85 | 8.50 | 20.10 | 3.65 | 12 | 14.35 | 13.85 | 8.50 | 20.10 | 3.65 |
| Pump Stations | Cove Pump | 11-Pump | Dissolved Oxygen, Saturation | 14-Dec | 21-Sep | 36 | 58.7 | 61.7 | 24.7 | 80.4 | 11.9 | 12 | 56.9 | 57.1 | 43.3 | 64.5 | 7.2 |
| Pump Stations | Cove Pump | 11-Pump | E. coli | 20-Oct | 21-Sep | 12 | 546 | 282 | 52 | 3076 | 825 | 12 | 546 | 282 | 52 | 3076 | 825 |
| Pump Stations | Cove Pump | 11-Pump | Enterococci | 14-Dec | 21-Sep | 36 | 3232 | 1750 | 400 | 14900 | 4075 | 12 | 3575 | 2600 | 470 | 14800 | 4048 |
| Pump Stations | Cove Pump | 11-Pump | Fecal Coliform | 14-Dec | 20-Aug | 24 | 3294 | 1200 | 50 | 17900 | 4505 | - | - | - | - | - | - |
| Pump Stations | Cove Pump | 11-Pump | Total Hardness, CaCO3 | 14-Dec | 21-Sep | 32 | 322.0 | 319.0 | 221.0 | 415.0 | 52.0 | 12 | 308.8 | 319.0 | 221.0 | 387.0 | 58.5 |
| Pump Stations | Cove Pump | 11-Pump | Magnesium | 20-Nov | 21-Sep | 11 | 18.63 | 18.70 | 10.70 | 25.30 | 5.24 | 11 | 18.63 | 18.70 | 10.70 | 25.30 | 5.24 |
| Pump Stations | Cove Pump | 11-Pump | Ammonia | 14-Dec | 21-Sep | 36 | 0.32 | 0.31 | 0.17 | 0.52 | 0.07 | 12 | 0.33 | 0.30 | 0.24 | 0.52 | 0.09 |
| Pump Stations | Cove Pump | 11-Pump | Nitrate+Nitrite | 14-Dec | 21-Sep | 36 | 0.31 | 0.30 | 0.11 | 0.50 | 0.09 | 12 | 0.27 | 0.30 | 0.11 | 0.39 | 0.09 |
| Pump Stations | Cove Pump | 11-Pump | Orthophosphate | 14-Dec | 21-Sep | 36 | 0.10 | 0.11 | 0.04 | 0.14 | 0.02 | 12 | 0.09 | 0.10 | 0.04 | 0.12 | 0.03 |
| Pump Stations | Cove Pump | 11-Pump | pH | 14-Dec | 21-Sep | 36 | 7.4 | 7.4 | 7.0 | 7.9 | 0.2 | 12.0 | 7.3 | 7.3 | 7.0 | 7.5 | 0.1 |
| Pump Stations | Cove Pump | 11-Pump | Salinity | 14-Dec | 21-Sep | 36 | 0.78 | 0.70 | 0.48 | 1.92 | 0.29 | 12 | 0.69 | 0.67 | 0.48 | 0.91 | 0.13 |
| Pump Stations | Cove Pump | 11-Pump | Temperature | 14-Dec | 21-Sep | 36 | 26.4 | 26.5 | 22.8 | 29.3 | 1.9 | 12.0 | 26.5 | 26.8 | 22.8 | 29.3 | 2.2 |

## Appendix B – Water Quality Summary Statistics for Naples Stormwater Stations

| Drainage Basin | Lake Name | Station ID | Parameter | POR | | | | | | | | FY20-21 (October 2020-September 2021) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First Sample | Last Sample | Sample Count | Mean | Median | Min | Max | SD | Sample Count | Mean | Median | Min | Max | SD |
| Pump Stations | Cove Pump | 11-Pump | Total Kjeldahl Nitrogen | 14-Dec | 21-Sep | 36 | 1.10 | 1.04 | 0.50 | 2.17 | 0.26 | 12 | 1.10 | 1.00 | 0.50 | 2.17 | 0.39 |
| Pump Stations | Cove Pump | 11-Pump | Total Nitrogen | 14-Dec | 21-Sep | 36 | 1.40 | 1.38 | 0.81 | 2.34 | 0.26 | 12 | 1.37 | 1.32 | 0.81 | 2.34 | 0.37 |
| Pump Stations | Cove Pump | 11-Pump | Total Organic Carbon | 20-Oct | 21-Sep | 12 | 15.27 | 14.90 | 9.06 | 20.50 | 3.10 | 12 | 15.27 | 14.90 | 9.06 | 20.50 | 3.10 |
| Pump Stations | Cove Pump | 11-Pump | Total Phosphorus | 14-Dec | 21-Sep | 36 | 0.13 | 0.13 | 0.06 | 0.21 | 0.03 | 12 | 0.11 | 0.11 | 0.06 | 0.13 | 0.02 |
| Pump Stations | Cove Pump | 11-Pump | Total Suspended Solids | 14-Dec | 21-Sep | 36 | 3.9 | 1.6 | 0.3 | 46.7 | 8.9 | 12 | 2.1 | 1.1 | 0.3 | 5.3 | 2.1 |
| Pump Stations | Cove Pump | 11-Pump | Turbidity | 14-Dec | 21-Sep | 36 | 3.1 | 2.1 | 1.0 | 33.1 | 5.2 | 12 | 1.6 | 1.4 | 1.0 | 3.5 | 0.8 |
| Pump Stations | Port Royal Pump | 14-Pump | Calcium | 20-Nov | 21-Sep | 11 | 166.73 | 144.00 | 100.00 | 286.00 | 64.02 | 11 | 166.73 | 144.00 | 100.00 | 286.00 | 64.02 |
| Pump Stations | Port Royal Pump | 14-Pump | Color, Apparent | 20-Oct | 21-Sep | 12 | 86 | 85 | 20 | 200 | 47 | 12 | 86 | 85 | 20 | 200 | 47 |
| Pump Stations | Port Royal Pump | 14-Pump | Color pH | 20-Oct | 21-Sep | 12 | 7.50 | 7.50 | 7.34 | 7.69 | 0.09 | 12 | 7.50 | 7.50 | 7.34 | 7.69 | 0.09 |
| Pump Stations | Port Royal Pump | 14-Pump | Conductivity | 14-Dec | 21-Sep | 36 | 15877 | 9719 | 3871 | 41261 | 11383 | 12 | 13301 | 7785 | 3871 | 41038 | 12639 |
| Pump Stations | Port Royal Pump | 14-Pump | Copper | 14-Dec | 21-Sep | 36 | 5.13 | 2.34 | 0.12 | 46.00 | 8.74 | 12 | 8.71 | 3.38 | 0.14 | 46.00 | 13.74 |
| Pump Stations | Port Royal Pump | 14-Pump | Dissolved Oxygen | 14-Dec | 21-Sep | 36 | 3.76 | 3.69 | 2.03 | 6.11 | 1.00 | 12 | 3.86 | 3.77 | 2.89 | 4.89 | 0.71 |
| Pump Stations | Port Royal Pump | 14-Pump | Dissolved Organic Carbon | 20-Oct | 21-Sep | 12 | 9.40 | 10.08 | 4.47 | 14.00 | 3.28 | 12 | 9.40 | 10.08 | 4.47 | 14.00 | 3.28 |
| Pump Stations | Port Royal Pump | 14-Pump | Dissolved Oxygen, Saturation | 14-Dec | 21-Sep | 36 | 49.2 | 45.5 | 25.0 | 79.4 | 13.0 | 12 | 50.6 | 47.2 | 36.2 | 66.1 | 10.9 |
| Pump Stations | Port Royal Pump | 14-Pump | E. coli | 20-Oct | 21-Sep | 12 | 300 | 262 | 41 | 583 | 175 | 12 | 300 | 262 | 41 | 583 | 175 |
| Pump Stations | Port Royal Pump | 14-Pump | Enterococci | 14-Dec | 21-Sep | 36 | 1030 | 550 | 80 | 5200 | 1168 | 12 | 832 | 535 | 80 | 2300 | 722 |
| Pump Stations | Port Royal Pump | 14-Pump | Fecal Coliform | 14-Dec | 20-Aug | 24 | 1533 | 475 | 10 | 9500 | 2303 | - | - | - | - | - | - |
| Pump Stations | Port Royal Pump | 14-Pump | Total Hardness, CaCO3 | 18-May | 21-Sep | 22 | 1710.0 | 1319.0 | 545.0 | 3976.0 | 1062.9 | 12 | 1459.4 | 1019.5 | 545.0 | 3976.0 | 1039.6 |
| Pump Stations | Port Royal Pump | 14-Pump | Magnesium | 20-Nov | 21-Sep | 11 | 261.16 | 151.00 | 70.20 | 818.00 | 230.39 | 11 | 261.16 | 151.00 | 70.20 | 818.00 | 230.39 |
| Pump Stations | Port Royal Pump | 14-Pump | Ammonia | 14-Dec | 21-Sep | 36 | 0.37 | 0.34 | 0.00 | 1.10 | 0.20 | 12 | 0.38 | 0.43 | 0.00 | 0.55 | 0.15 |
| Pump Stations | Port Royal Pump | 14-Pump | Nitrate+Nitrite | 14-Dec | 21-Sep | 36 | 0.18 | 0.17 | 0.06 | 0.47 | 0.09 | 12 | 0.22 | 0.19 | 0.06 | 0.47 | 0.11 |
| Pump Stations | Port Royal Pump | 14-Pump | Orthophosphate | 14-Dec | 21-Sep | 36 | 0.36 | 0.32 | 0.06 | 1.15 | 0.21 | 12 | 0.36 | 0.31 | 0.13 | 0.83 | 0.18 |
| Pump Stations | Port Royal Pump | 14-Pump | pH | 14-Dec | 21-Sep | 36 | 7.2 | 7.2 | 6.4 | 7.8 | 0.3 | 12.0 | 7.3 | 7.3 | 7.2 | 7.8 | 0.2 |
| Pump Stations | Port Royal Pump | 14-Pump | Salinity | 14-Dec | 21-Sep | 36 | 9.51 | 5.45 | 2.03 | 26.28 | 7.38 | 12 | 7.93 | 4.30 | 2.03 | 26.22 | 8.27 |
| Pump Stations | Port Royal Pump | 14-Pump | Temperature | 14-Dec | 21-Sep | 36 | 26.2 | 26.1 | 20.2 | 31.0 | 3.0 | 12.0 | 26.5 | 27.0 | 20.9 | 31.0 | 3.0 |

## Appendix B – Water Quality Summary Statistics for Naples Stormwater Stations

| Drainage Basin | Lake Name | Station ID | Parameter | POR | | | | | | | | FY20-21 (October 2020-September 2021) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First Sample | Last Sample | Sample Count | Mean | Median | Min | Max | SD | Sample Count | Mean | Median | Min | Max | SD |
| Pump Stations | Port Royal Pump | 14-Pump | Total Kjeldahl Nitrogen | 14-Dec | 21-Sep | 36 | 1.47 | 1.34 | 0.44 | 4.81 | 0.84 | 12 | 1.17 | 1.04 | 0.44 | 2.11 | 0.45 |
| Pump Stations | Port Royal Pump | 14-Pump | Total Nitrogen | 14-Dec | 21-Sep | 36 | 1.65 | 1.52 | 0.50 | 4.91 | 0.84 | 12 | 1.39 | 1.39 | 0.50 | 2.43 | 0.49 |
| Pump Stations | Port Royal Pump | 14-Pump | Total Organic Carbon | 20-Oct | 21-Sep | 12 | 10.65 | 11.00 | 4.80 | 14.40 | 3.37 | 12 | 10.65 | 11.00 | 4.80 | 14.40 | 3.37 |
| Pump Stations | Port Royal Pump | 14-Pump | Total Phosphorus | 14-Dec | 21-Sep | 36 | 0.43 | 0.43 | 0.12 | 1.21 | 0.23 | 12 | 0.39 | 0.33 | 0.14 | 0.90 | 0.20 |
| Pump Stations | Port Royal Pump | 14-Pump | Total Suspended Solids | 14-Dec | 21-Sep | 36 | 10.5 | 8.5 | 1.0 | 48.4 | 10.6 | 12 | 8.5 | 8.4 | 1.0 | 21.6 | 6.0 |
| Pump Stations | Port Royal Pump | 14-Pump | Turbidity | 14-Dec | 21-Sep | 36 | - | - | - | - | - | 12 | 4.3 | 2.6 | 1.4 | 19.7 | 5.2 |
| Pump Stations | Public Works Pump | PW-Pump | Silver | 14-Dec | 20-Aug | 24 | 0.03 | 0.01 | 0.01 | 0.25 | 0.05 | - | - | - | - | - | - |
| Pump Stations | Public Works Pump | PW-Pump | Aresenic | 14-Dec | 20-Aug | 24 | 2.67 | 3.03 | 0.34 | 5.82 | 1.35 | - | - | - | - | - | - |
| Pump Stations | Public Works Pump | PW-Pump | Barium | 14-Dec | 20-Aug | 24 | 15.88 | 15.05 | 0.02 | 39.80 | 7.29 | - | - | - | - | - | - |
| Pump Stations | Public Works Pump | PW-Pump | Calcium | 20-Nov | 21-Sep | 11 | 97.60 | 102.00 | 68.40 | 133.00 | 21.30 | 11 | 97.60 | 102.00 | 68.40 | 133.00 | 21.30 |
| Pump Stations | Public Works Pump | PW-Pump | Cadmium | 14-Dec | 20-Aug | 24 | 0.67 | 0.45 | 0.45 | 2.20 | 0.46 | - | - | - | - | - | - |
| Pump Stations | Public Works Pump | PW-Pump | Color, Apparent | 20-Oct | 21-Sep | 12 | 135 | 140 | 100 | 160 | 23 | 12 | 135 | 140 | 100 | 160 | 23 |
| Pump Stations | Public Works Pump | PW-Pump | Color pH | 20-Oct | 21-Sep | 12 | 7.53 | 7.56 | 7.28 | 7.69 | 0.11 | 12 | 7.53 | 7.56 | 7.28 | 7.69 | 0.11 |
| Pump Stations | Public Works Pump | PW-Pump | Conductivity | 14-Dec | 21-Sep | 36 | 2528 | 1428 | 720 | 14189 | 2748 | 12 | 1420 | 1382 | 739 | 2867 | 587 |
| Pump Stations | Public Works Pump | PW-Pump | Chromium | 14-Dec | 20-Aug | 24 | 4.43 | 4.05 | 0.00 | 11.50 | 2.52 | - | - | - | - | - | - |
| Pump Stations | Public Works Pump | PW-Pump | Copper | 14-Dec | 21-Sep | 36 | 4.23 | 3.21 | 0.14 | 21.40 | 3.86 | 12 | 2.64 | 2.43 | 1.17 | 5.76 | 1.30 |
| Pump Stations | Public Works Pump | PW-Pump | Dissolved Oxygen | 14-Dec | 21-Sep | 36 | 4.08 | 4.16 | 1.84 | 5.87 | 1.07 | 12 | 4.26 | 4.18 | 3.47 | 5.03 | 0.49 |
| Pump Stations | Public Works Pump | PW-Pump | Dissolved Organic Carbon | 20-Oct | 21-Sep | 12 | 16.19 | 16.30 | 9.90 | 26.10 | 4.52 | 12 | 16.19 | 16.30 | 9.90 | 26.10 | 4.52 |
| Pump Stations | Public Works Pump | PW-Pump | Dissolved Oxygen, Saturation | 14-Dec | 21-Sep | 36 | 51.6 | 53.6 | 23.5 | 74.6 | 13.4 | 12 | 53.6 | 53.5 | 44.8 | 64.8 | 6.4 |
| Pump Stations | Public Works Pump | PW-Pump | E. coli | 20-Oct | 21-Sep | 12 | 514 | 200 | 98 | 1785 | 583 | 12 | 514 | 200 | 98 | 1785 | 583 |
| Pump Stations | Public Works Pump | PW-Pump | Enterococci | 14-Dec | 21-Sep | 36 | 1257 | 440 | 60 | 13400 | 2455 | 12 | 838 | 450 | 120 | 3200 | 1007 |
| Pump Stations | Public Works Pump | PW-Pump | Fecal Coliform | 14-Dec | 20-Aug | 24 | 3296 | 610 | 5 | 20000 | 5025 | - | - | - | - | - | - |
| Pump Stations | Public Works Pump | PW-Pump | Total Hardness, CaCO3 | 15-Feb | 21-Sep | 30 | 428.7 | 333.0 | 132.0 | 1664.0 | 351.4 | 12 | 321.9 | 336.0 | 198.0 | 458.0 | 86.0 |
| Pump Stations | Public Works Pump | PW-Pump | Mercury | 15-May | 20-Feb | 20 | 2.12 | 1.43 | 0.57 | 6.60 | 1.87 | - | - | - | - | - | - |
| Pump Stations | Public Works Pump | PW-Pump | Mercury | 14-Dec | 20-Aug | 4 | 0.06 | 0.02 | 0.00 | 0.20 | 0.10 | - | - | - | - | - | - |

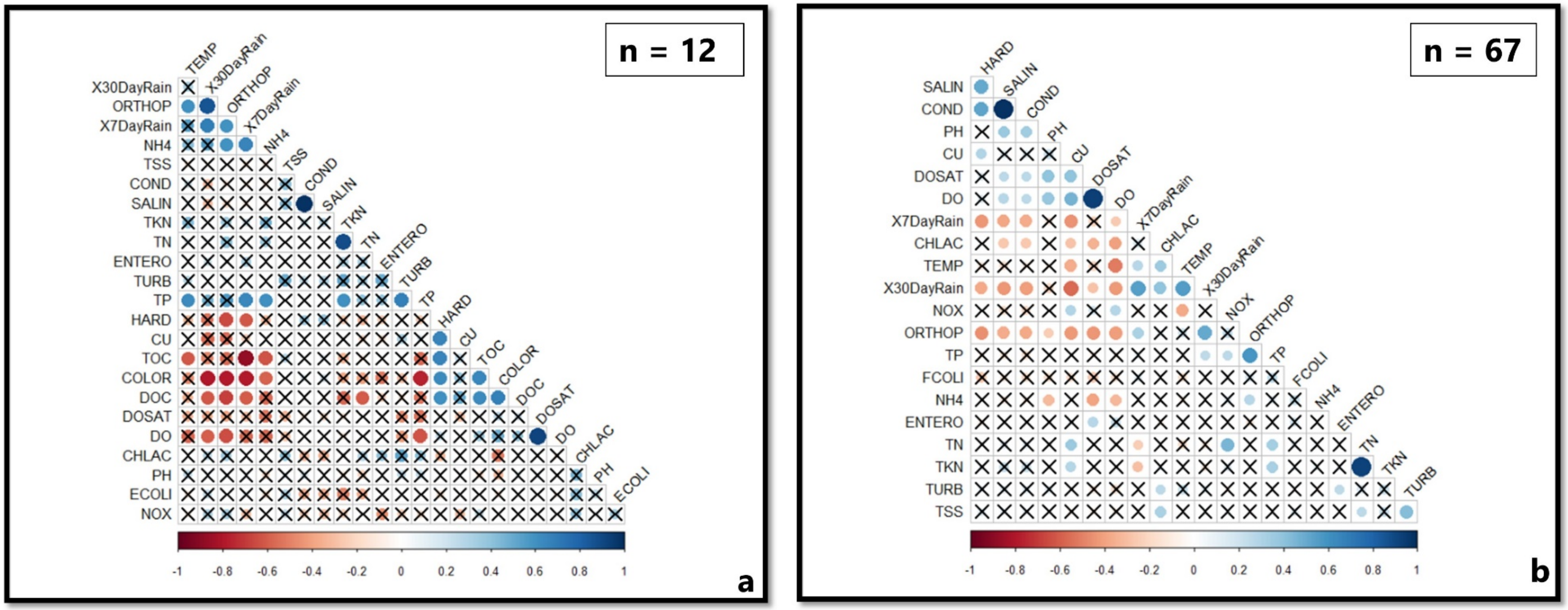
| Drainage Basin | Lake Name | Station ID | Parameter | POR | | | | | | | | FY20-21 (October 2020-September 2021) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | First Sample | Last Sample | Sample Count | Mean | Median | Min | Max | SD | Sample Count | Mean | Median | Min | Max | SD |
| Pump Stations | Public Works Pump | PW-Pump | Magnesium | 20-Nov | 21-Sep | 11 | 18.74 | 16.60 | 6.52 | 51.00 | 12.82 | 11 | 18.74 | 16.60 | 6.52 | 51.00 | 12.82 |
| Pump Stations | Public Works Pump | PW-Pump | Ammonia | 14-Dec | 21-Sep | 36 | 0.34 | 0.35 | 0.10 | 0.54 | 0.09 | 12 | 0.35 | 0.35 | 0.10 | 0.54 | 0.12 |
| Pump Stations | Public Works Pump | PW-Pump | Nitrate+Nitrite | 14-Dec | 21-Sep | 36 | 0.24 | 0.23 | 0.10 | 0.68 | 0.10 | 12 | 0.23 | 0.24 | 0.10 | 0.34 | 0.06 |
| Pump Stations | Public Works Pump | PW-Pump | Orthophosphate | 14-Dec | 21-Sep | 36 | 0.08 | 0.08 | 0.03 | 0.13 | 0.02 | 12 | 0.09 | 0.09 | 0.06 | 0.12 | 0.02 |
| Pump Stations | Public Works Pump | PW-Pump | Lead | 14-Dec | 20-Aug | 24 | 1.38 | 0.34 | 0.34 | 19.10 | 3.83 | - | - | - | - | - | - |
| Pump Stations | Public Works Pump | PW-Pump | pH | 14-Dec | 21-Sep | 36 | 7.3 | 7.3 | 6.9 | 7.8 | 0.2 | 12.0 | 7.3 | 7.3 | 7.1 | 7.5 | 0.1 |
| Pump Stations | Public Works Pump | PW-Pump | Petroleum Range Organics | 14-Dec | 20-May | 14 | 3.91 | 0.05 | 0.03 | 50.00 | 13.28 | - | - | - | - | - | - |
| Pump Stations | Public Works Pump | PW-Pump | Petroleum Range Organics | 18-Feb | 20-Aug | 10 | 50.00 | 50.00 | 50.00 | 50.00 | 0.00 | - | - | - | - | - | - |
| Pump Stations | Public Works Pump | PW-Pump | Salinity | 14-Dec | 21-Sep | 36 | 1.34 | 0.75 | 0.35 | 8.18 | 1.57 | 12 | 0.71 | 0.69 | 0.36 | 1.47 | 0.31 |
| Pump Stations | Public Works Pump | PW-Pump | Selenium | 14-Dec | 20-Aug | 24 | 3.27 | 1.90 | 0.01 | 14.80 | 3.78 | - | - | - | - | - | - |
| Pump Stations | Public Works Pump | PW-Pump | Temperature | 14-Dec | 21-Sep | 36 | 26.8 | 26.9 | 23.8 | 30.4 | 1.8 | 12.0 | 26.7 | 26.8 | 23.8 | 30.4 | 2.0 |
| Pump Stations | Public Works Pump | PW-Pump | Total Kjeldahl Nitrogen | 14-Dec | 21-Sep | 36 | 1.04 | 1.01 | 0.69 | 1.57 | 0.20 | 12 | 1.01 | 1.00 | 0.69 | 1.47 | 0.19 |
| Pump Stations | Public Works Pump | PW-Pump | Total Nitrogen | 14-Dec | 21-Sep | 36 | 1.29 | 1.25 | 0.93 | 1.90 | 0.23 | 12 | 1.24 | 1.25 | 0.98 | 1.70 | 0.18 |
| Pump Stations | Public Works Pump | PW-Pump | Total Organic Carbon | 20-Oct | 21-Sep | 12 | 17.31 | 17.75 | 10.70 | 26.40 | 4.51 | 12 | 17.31 | 17.75 | 10.70 | 26.40 | 4.51 |
| Pump Stations | Public Works Pump | PW-Pump | Total Phosphorus | 14-Dec | 21-Sep | 36 | 0.11 | 0.10 | 0.05 | 0.32 | 0.05 | 12 | 0.10 | 0.09 | 0.07 | 0.18 | 0.03 |
| Pump Stations | Public Works Pump | PW-Pump | Total Suspended Solids | 14-Dec | 21-Sep | 36 | 10.0 | 1.9 | 0.3 | 207.0 | 34.4 | 12 | 2.9 | 2.5 | 0.3 | 6.8 | 2.3 |
| Pump Stations | Public Works Pump | PW-Pump | Turbidity | 14-Dec | 21-Sep | 36 | 12.4 | 2.3 | 0.8 | 273.0 | 45.7 | 12 | 1.9 | 1.7 | 0.8 | 4.6 | 1.2 |

# Appendix C – Water Quality Correlations for Naples Stormwater Stations

wood.

## 1SE-B – Devil's Lake

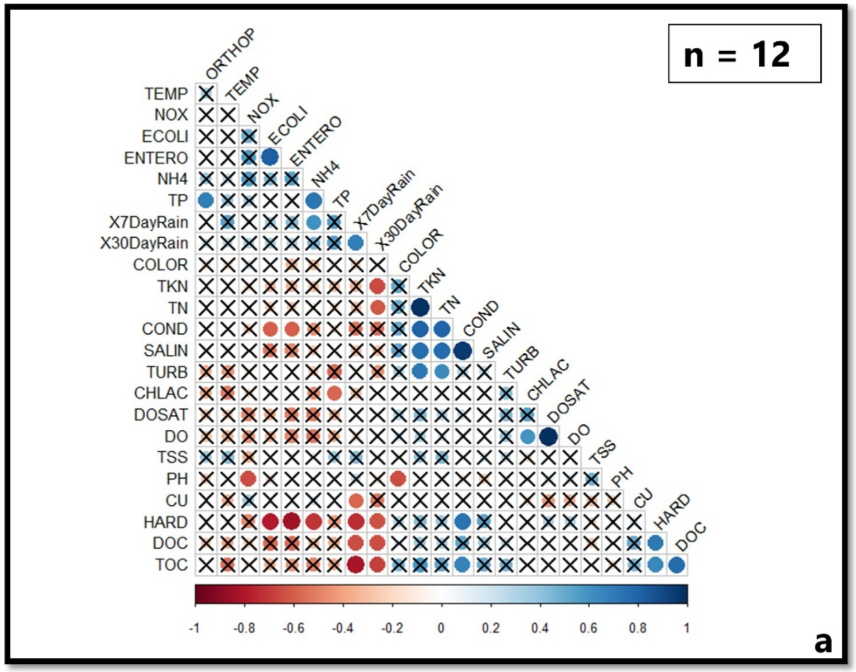
**Oct 2020 – Sept 2021** | **POR**



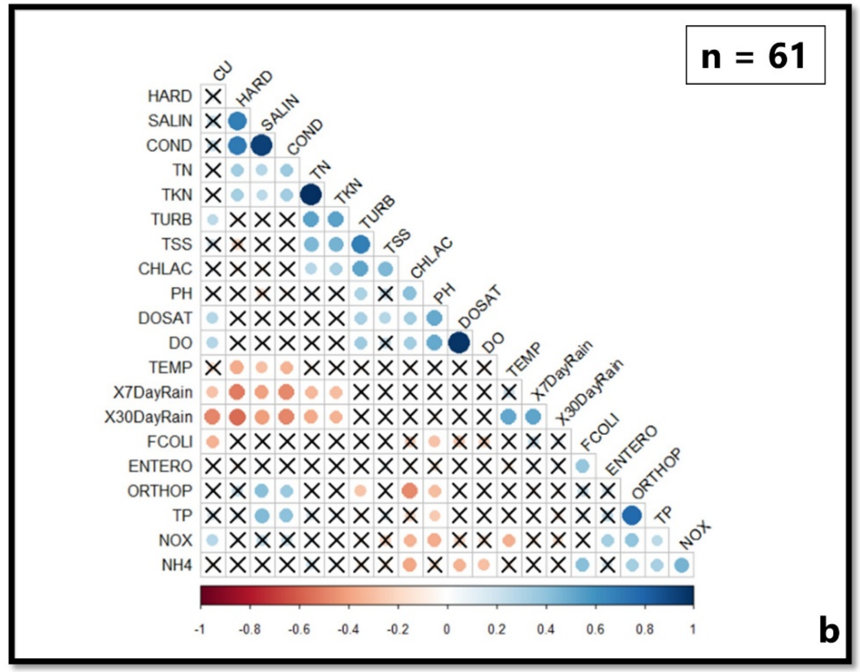

Note:
CHLAC – Corrected Chlorophyll-a | COND – Specific Conductance | CU – Copper| DOC – Dissolved Organic Carbon
DO – Dissolved Oxygen | ECOLI – E. coli | ENTERO – Enterococci | FCOLI = Fecal Coliform| HARD – Hardness| NOX – Nitrate+Nitrite | ORTHOP – Orthophosphate | PH – pH |SALIN – Salinity| TEMP – Temperature | TURB – Turbidity | TKN – Total Kjeldahl Nitrogen | TN – Total Nitrogen | TP – Total Phosphorus | TSS – Total Suspended Solids | X7DayRain – 7-Day rolling antecedent precipitation | X30DayRain – 30-Day rolling antecedent precipitation
X=correlation is not significant, red=negative correlation, blue=positive correlation

# 2B – Swan Lake

## Oct 2020 – Sept 2021




## POR

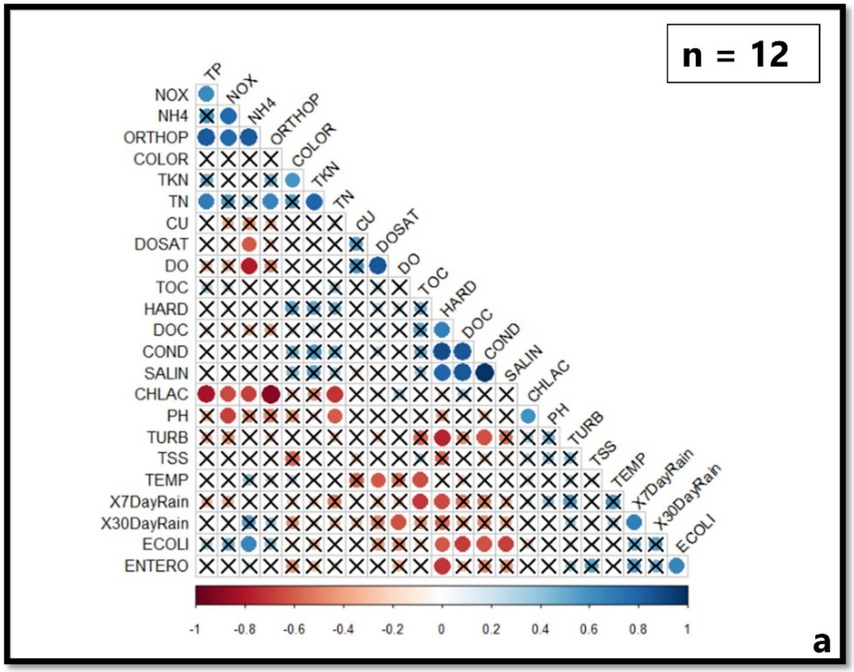


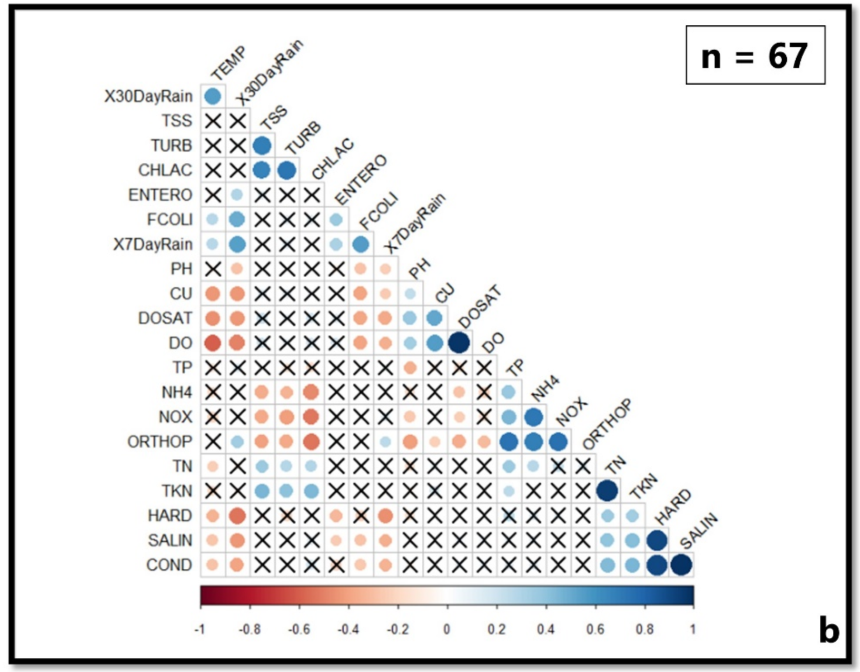

Note:
CHLAC – Corrected Chlorophyll-a | COND – Specific Conductance | CU – Copper| DOC – Dissolved Organic Carbon
DO – Dissolved Oxygen | ECOLI – E. coli | ENTERO – Enterococci | FCOLI = Fecal Coliform| HARD – Hardness| NOX – Nitrate+Nitrite | ORTHOP – Orthophosphate | PH – pH |SALIN – Salinity| TEMP – Temperature | TURB – Turbidity | TKN – Total Kjeldahl Nitrogen | TN – Total Nitrogen | TP – Total Phosphorus | TSS – Total Suspended Solids | X7DayRain – 7-Day rolling antecedent precipitation | X30DayRain – 30-Day rolling antecedent precipitation
X=correlation is not significant, red=negative correlation, blue=positive correlation

## Appendix C – Water Quality Correlations for Naples Stormwater Stations

### 3B – Colonnade Lake

**Oct 2020 – Sept 2021** | **POR**



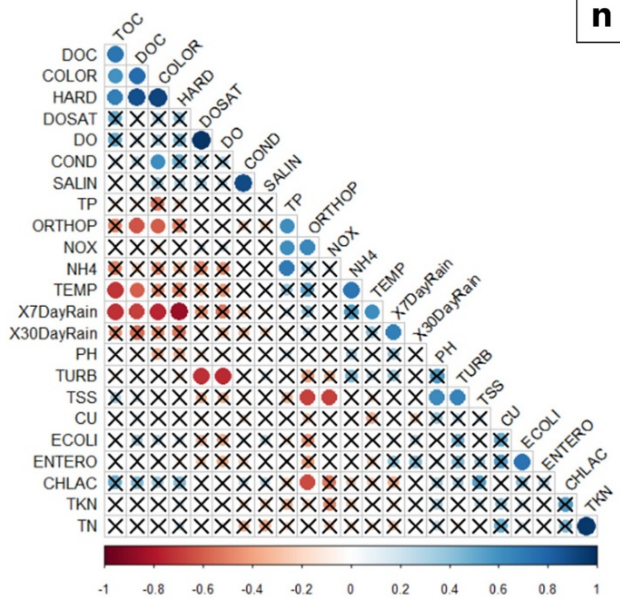




Note:
CHLAC – Corrected Chlorophyll-a | COND – Specific Conductance | CU – Copper| DOC – Dissolved Organic Carbon
DO – Dissolved Oxygen | ECOLI – E. coli | ENTERO – Enterococci | FCOLI = Fecal Coliform| HARD – Hardness| NOX – Nitrate+Nitrite |
ORTHOP – Orthophosphate | PH – pH |SALIN – Salinity| TEMP – Temperature | TURB – Turbidity | TKN – Total Kjeldahl Nitrogen | TN – Total Nitrogen | TP – Total Phosphorus | TSS – Total Suspended Solids | X7DayRain – 7-Day rolling antecedent precipitation | X30DayRain – 30-Day rolling antecedent precipitation
X=correlation is not significant, red=negative correlation, blue=positive correlation

## 4B – Hidden Lake

### Oct 2020 – Sept 2021

n = 12



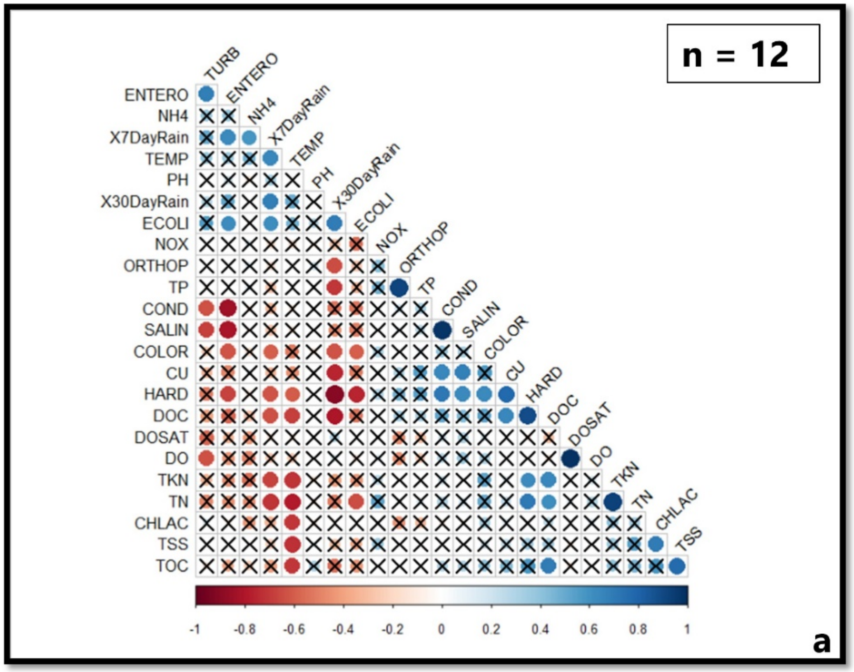

a

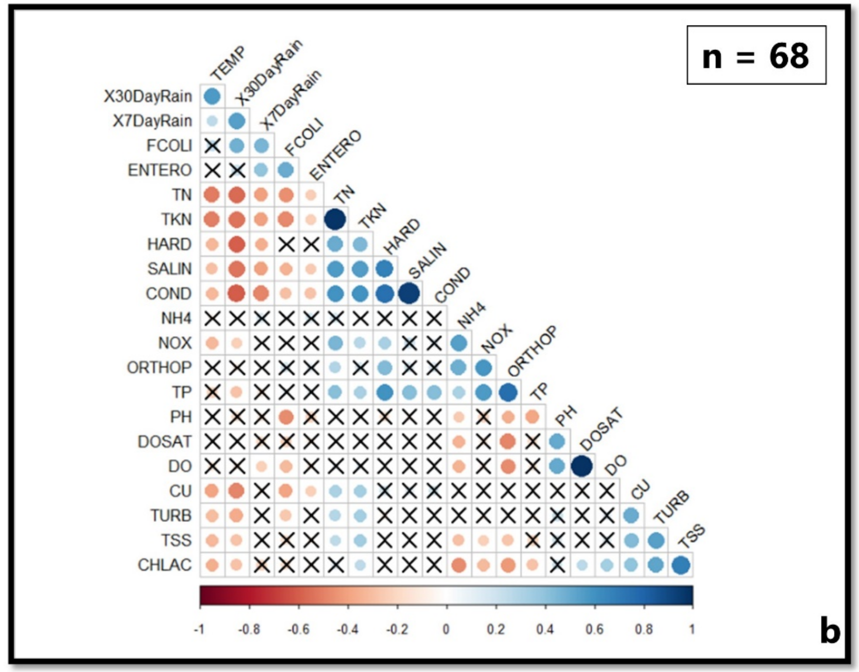
### POR

**Data only available for Oct 2020 – Sept 2021**

Note:
CHLAC – Corrected Chlorophyll-a | COND – Specific Conductance | CU – Copper| DOC – Dissolved Organic Carbon
DO – Dissolved Oxygen | ECOLI – E. coli | ENTERO – Enterococci | FCOLI = Fecal Coliform| HARD – Hardness| NOX – Nitrate+Nitrite | ORTHOP – Orthophosphate | PH – pH |SALIN – Salinity| TEMP – Temperature | TURB – Turbidity | TKN – Total Kjeldahl Nitrogen | TN – Total Nitrogen | TP – Total Phosphorus | TSS – Total Suspended Solids | X7DayRain – 7-Day rolling antecedent precipitation | X30DayRain – 30-Day rolling antecedent precipitation
X=correlation is not significant, red=negative correlation, blue=positive correlation

# 5B – Lake Suzanne



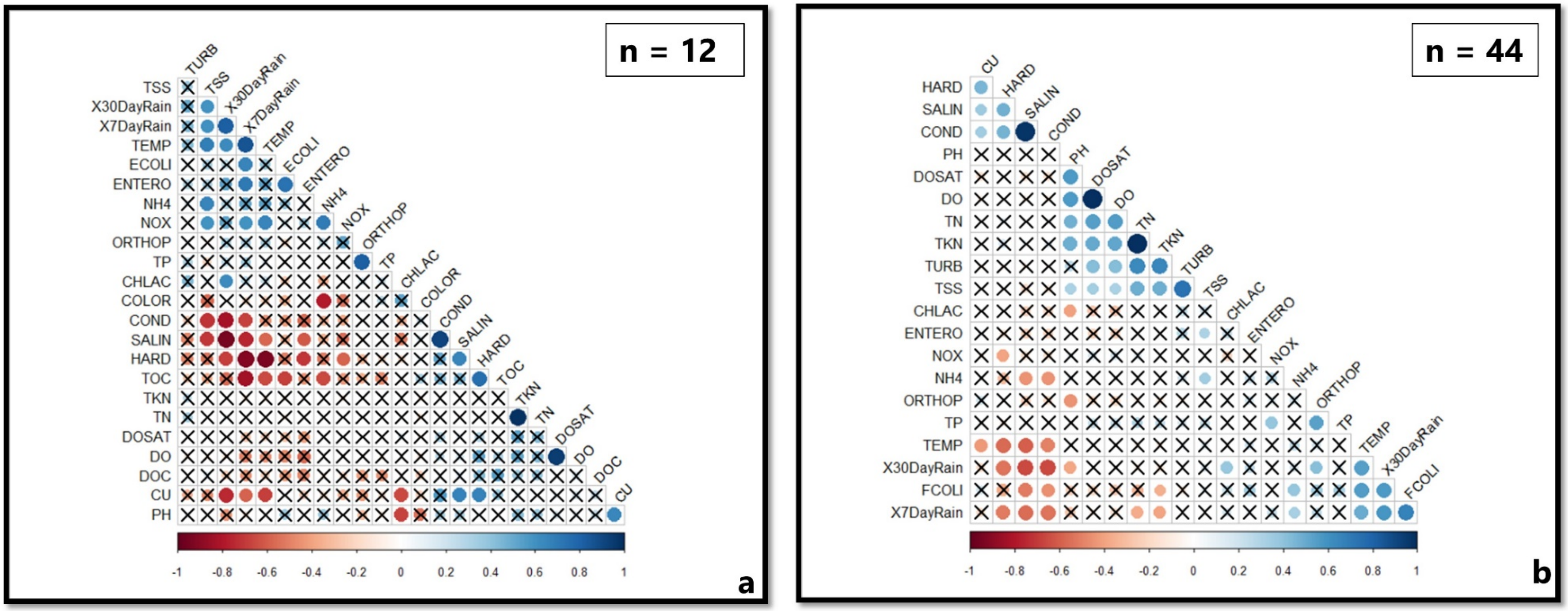




Note:
CHLAC – Corrected Chlorophyll-a | COND – Specific Conductance | CU – Copper| DOC – Dissolved Organic Carbon
DO – Dissolved Oxygen | ECOLI – E. coli | ENTERO – Enterococci | FCOLI = Fecal Coliform| HARD – Hardness| NOX – Nitrate+Nitrite |
ORTHOP – Orthophosphate | PH – pH |SALIN – Salinity| TEMP – Temperature | TURB – Turbidity | TKN – Total Kjeldahl Nitrogen | TN – Total Nitrogen | TP – Total Phosphorus | TSS – Total Suspended Solids | X7DayRain – 7-Day rolling antecedent precipitation | X30DayRain – 30-Day rolling antecedent precipitation
X=correlation is not significant, red=negative correlation, blue=positive correlation

## Appendix C – Water Quality Correlations for Naples Stormwater Stations

# 6B – Mandarin Lake

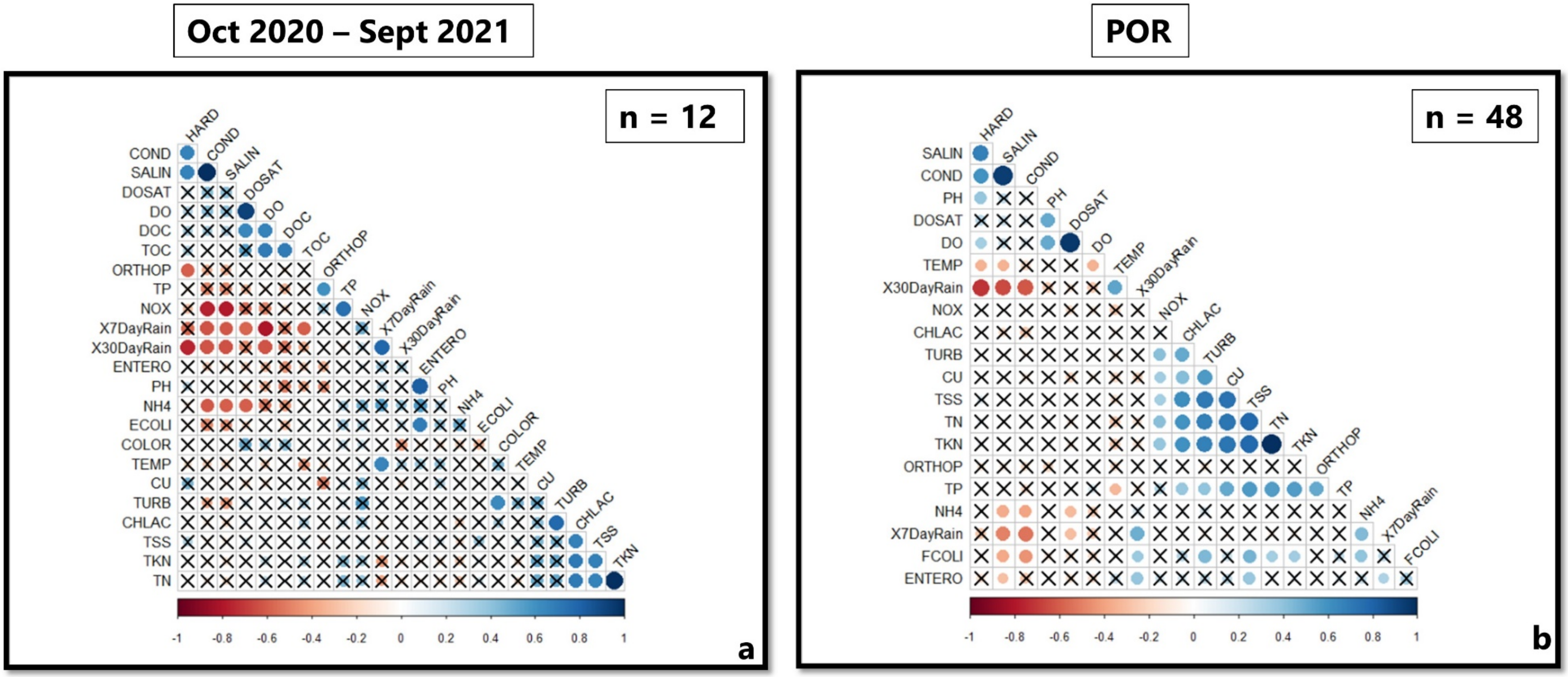
**Oct 2020 – Sept 2021** | **POR**




Note:
CHLAC – Corrected Chlorophyll-a | COND – Specific Conductance | CU – Copper| DOC – Dissolved Organic Carbon
DO – Dissolved Oxygen | ECOLI – E. coli | ENTERO – Enterococci | FCOLI = Fecal Coliform| HARD – Hardness| NOX – Nitrate+Nitrite | ORTHOP – Orthophosphate | PH – pH |SALIN – Salinity| TEMP – Temperature | TURB – Turbidity | TKN – Total Kjeldahl Nitrogen | TN – Total Nitrogen | TP – Total Phosphorus | TSS – Total Suspended Solids | X7DayRain – 7-Day rolling antecedent precipitation | X30DayRain – 30-Day rolling antecedent precipitation
X=correlation is not significant, red=negative correlation, blue=positive correlation

## Appendix C – Water Quality Correlations for Naples Stormwater Stations

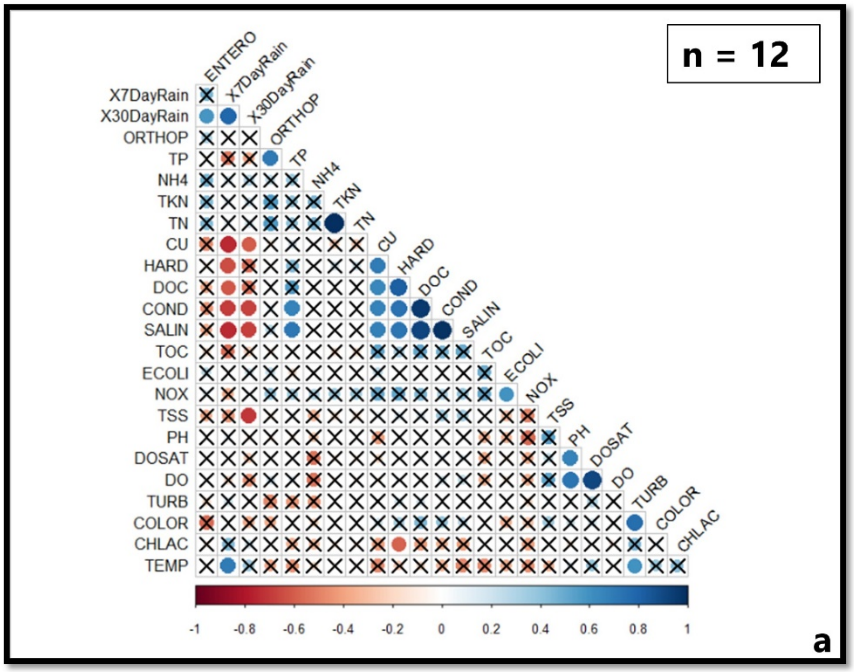
# 8B – North Lake



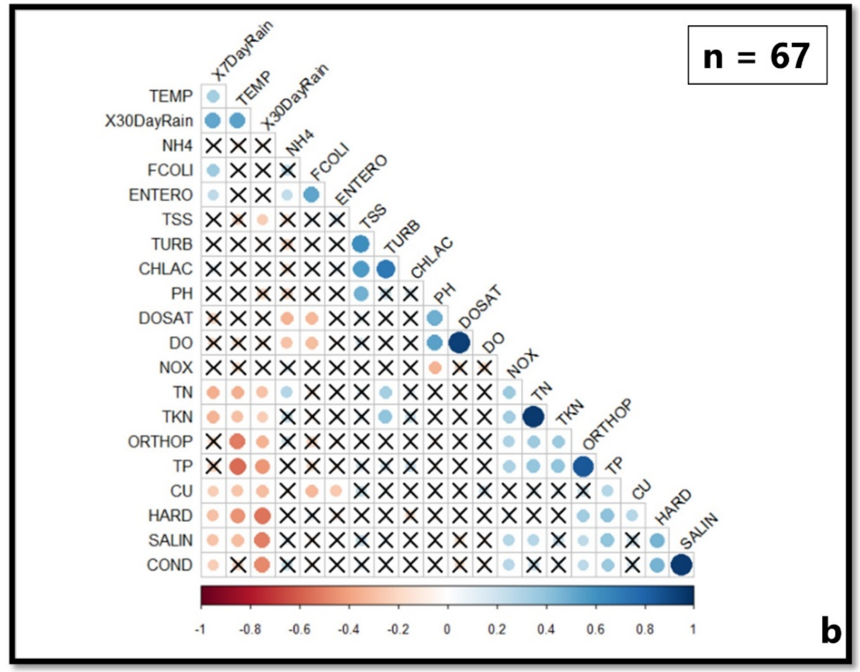

Note:
CHLAC – Corrected Chlorophyll-a | COND – Specific Conductance | CU – Copper| DOC – Dissolved Organic Carbon
DO – Dissolved Oxygen | ECOLI – E. coli | ENTERO – Enterococci | FCOLI = Fecal Coliform| HARD – Hardness| NOX – Nitrate+Nitrite |
ORTHOP – Orthophosphate | PH – pH |SALIN – Salinity| TEMP – Temperature | TURB – Turbidity | TKN – Total Kjeldahl Nitrogen | TN – Total Nitrogen | TP – Total Phosphorus | TSS – Total Suspended Solids | X7DayRain – 7-Day rolling antecedent precipitation | X30DayRain – 30-Day rolling antecedent precipitation
X=correlation is not significant, red=negative correlation, blue=positive correlation

# 9B – South Lake

## Oct 2020 – Sept 2021




## POR

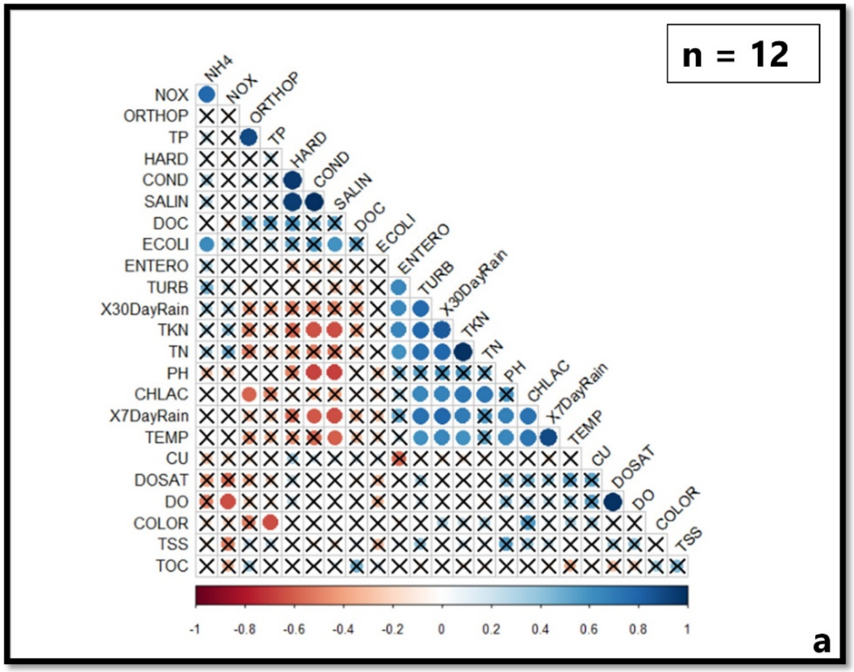



Note:
CHLAC – Corrected Chlorophyll-a | COND – Specific Conductance | CU – Copper| DOC – Dissolved Organic Carbon
DO – Dissolved Oxygen | ECOLI – E. coli | ENTERO – Enterococci | FCOLI = Fecal Coliform| HARD – Hardness| NOX – Nitrate+Nitrite |
ORTHOP – Orthophosphate | PH – pH |SALIN – Salinity| TEMP – Temperature | TURB – Turbidity | TKN – Total Kjeldahl Nitrogen | TN – Total Nitrogen | TP – Total Phosphorus | TSS – Total Suspended Solids | X7DayRain – 7-Day rolling antecedent precipitation | X30DayRain – 30-Day rolling antecedent precipitation
X=correlation is not significant, red=negative correlation, blue=positive correlation

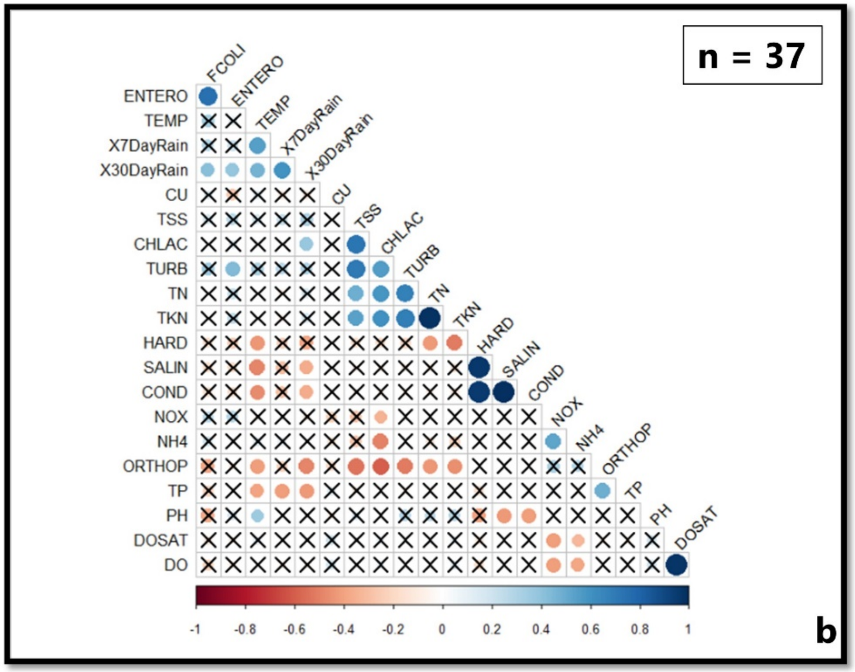
wood.

# 10B – Alligator Lake

## Oct 2020 – Sept 2021



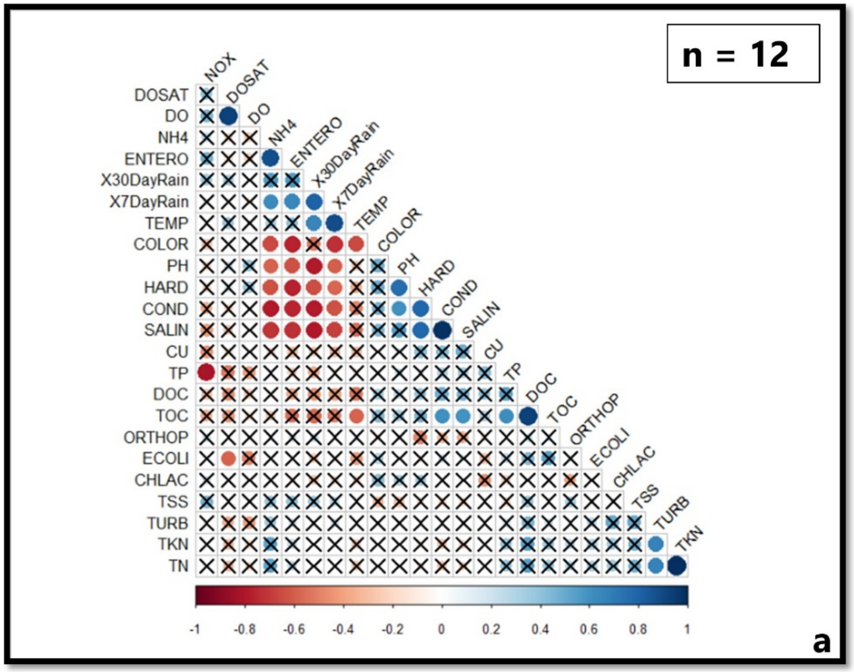

## POR



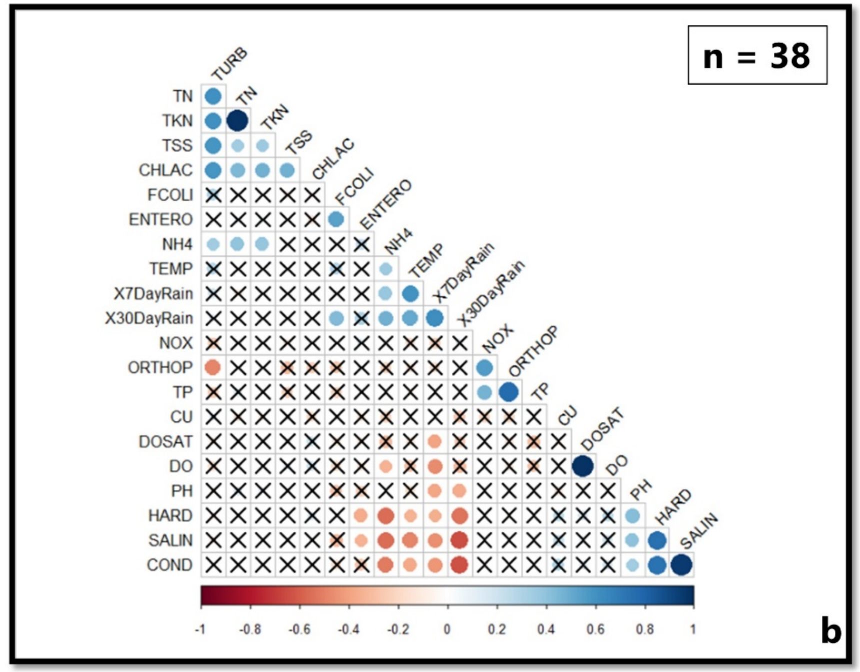

Note:
CHLAC – Corrected Chlorophyll-a | COND – Specific Conductance | CU – Copper| DOC – Dissolved Organic Carbon
DO – Dissolved Oxygen | ECOLI – E. coli | ENTERO – Enterococci | FCOLI = Fecal Coliform| HARD – Hardness| NOX – Nitrate+Nitrite | ORTHOP – Orthophosphate | PH – pH |SALIN – Salinity| TEMP – Temperature | TURB – Turbidity | TKN – Total Kjeldahl Nitrogen | TN – Total Nitrogen | TP – Total Phosphorus | TSS – Total Suspended Solids | X7DayRain – 7-Day rolling antecedent precipitation | X30DayRain – 30-Day rolling antecedent precipitation
X=correlation is not significant, red=negative correlation, blue=positive correlation

## 11B – East Lake

### Oct 2020 – Sept 2021



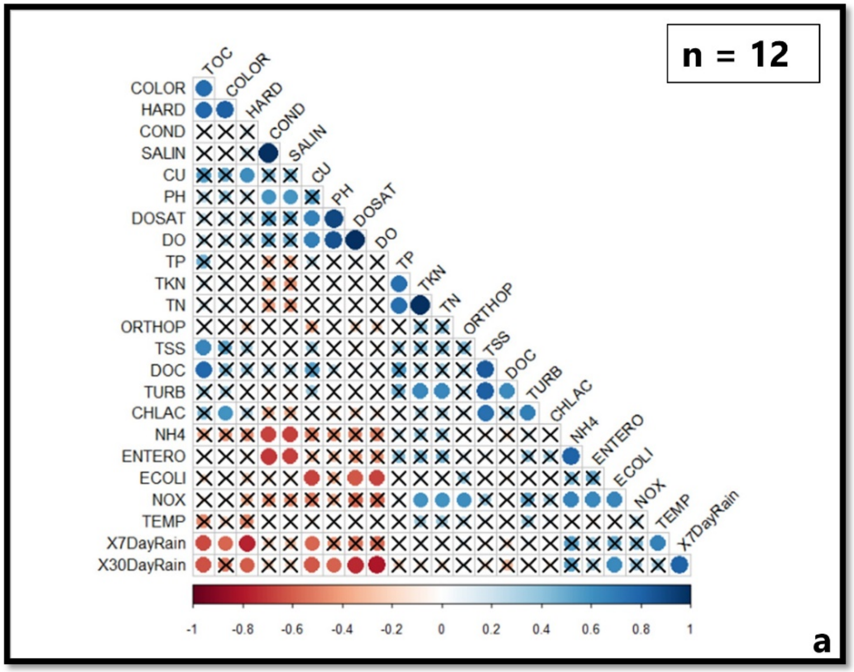

### POR




Note:
CHLAC – Corrected Chlorophyll-a | COND – Specific Conductance | CU – Copper| DOC – Dissolved Organic Carbon
DO – Dissolved Oxygen | ECOLI – E. coli | ENTERO – Enterococci | FCOLI = Fecal Coliform| HARD – Hardness| NOX – Nitrate+Nitrite | ORTHOP – Orthophosphate | PH – pH |SALIN – Salinity| TEMP – Temperature | TURB – Turbidity | TKN – Total Kjeldahl Nitrogen | TN – Total Nitrogen | TP – Total Phosphorus | TSS – Total Suspended Solids | X7DayRain – 7-Day rolling antecedent precipitation | X30DayRain – 30-Day rolling antecedent precipitation
X=correlation is not significant, red=negative correlation, blue=positive correlation

## 11C – Spring Lake

**Oct 2020 – Sept 2021**



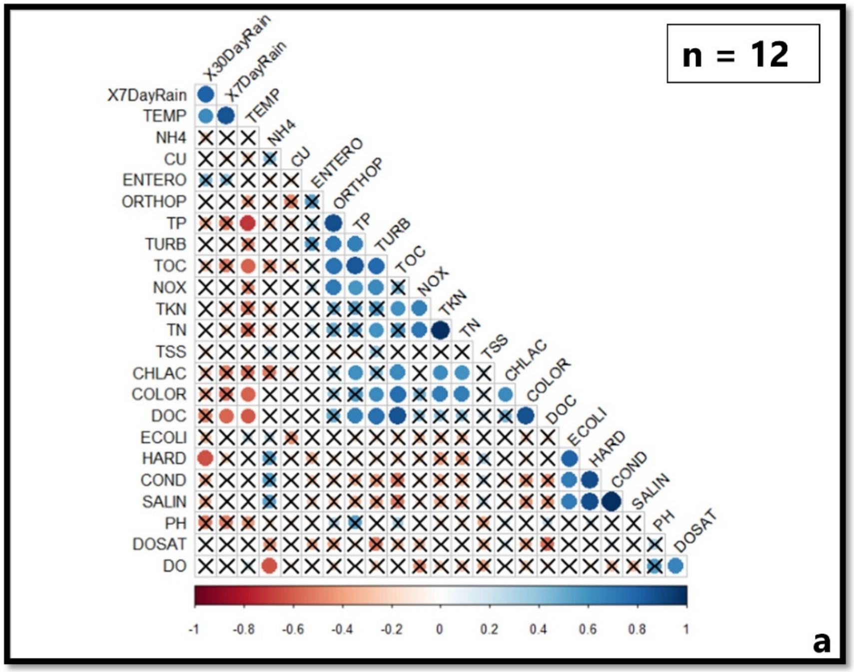

**POR**

**Data only available for Oct 2020 – Sept 2021**

Note:
CHLAC – Corrected Chlorophyll-a | COND – Specific Conductance | CU – Copper| DOC – Dissolved Organic Carbon
DO – Dissolved Oxygen | ECOLI – E. coli | ENTERO – Enterococci | FCOLI = Fecal Coliform| HARD – Hardness| NOX – Nitrate+Nitrite |
ORTHOP – Orthophosphate | PH – pH |SALIN – Salinity| TEMP – Temperature | TURB – Turbidity | TKN – Total Kjeldahl Nitrogen | TN – Total Nitrogen | TP – Total Phosphorus | TSS – Total Suspended Solids | X7DayRain – 7-Day rolling antecedent precipitation | X30DayRain – 30-Day rolling antecedent precipitation
X=correlation is not significant, red=negative correlation, blue=positive correlation

**13B – Lake 13**

**Oct 2020 – Sept 2021**



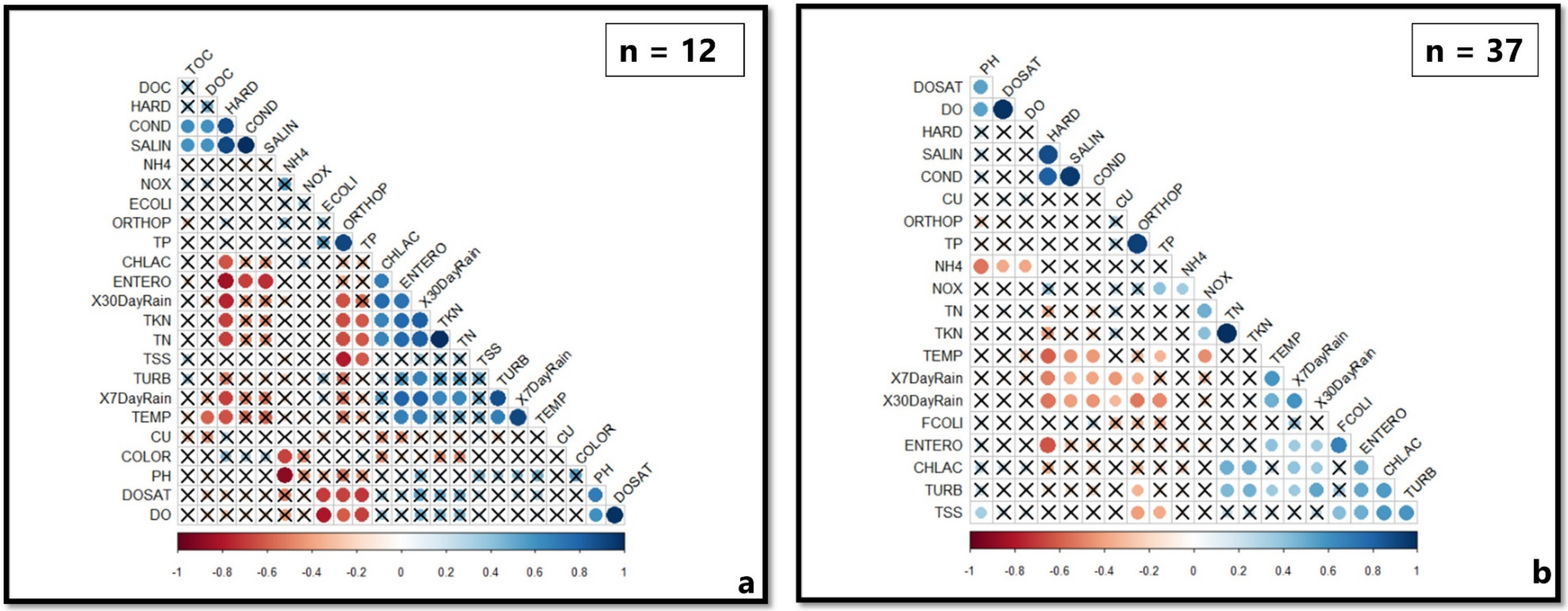

**POR**

**Data only available for Oct 2020 – Sept 2021**

Note:
CHLAC – Corrected Chlorophyll-a | COND – Specific Conductance | CU – Copper| DOC – Dissolved Organic Carbon DO – Dissolved Oxygen | ECOLI – E. coli | ENTERO – Enterococci | FCOLI = Fecal Coliform| HARD – Hardness| NOX – Nitrate+Nitrite | ORTHOP – Orthophosphate | PH – pH |SALIN – Salinity| TEMP – Temperature | TURB – Turbidity | TKN – Total Kjeldahl Nitrogen | TN – Total Nitrogen | TP – Total Phosphorus | TSS – Total Suspended Solids | X7DayRain – 7-Day rolling antecedent precipitation | X30DayRain – 30-Day rolling antecedent precipitation
X=correlation is not significant, red=negative correlation, blue=positive correlation

## 14B – Lantern Lake

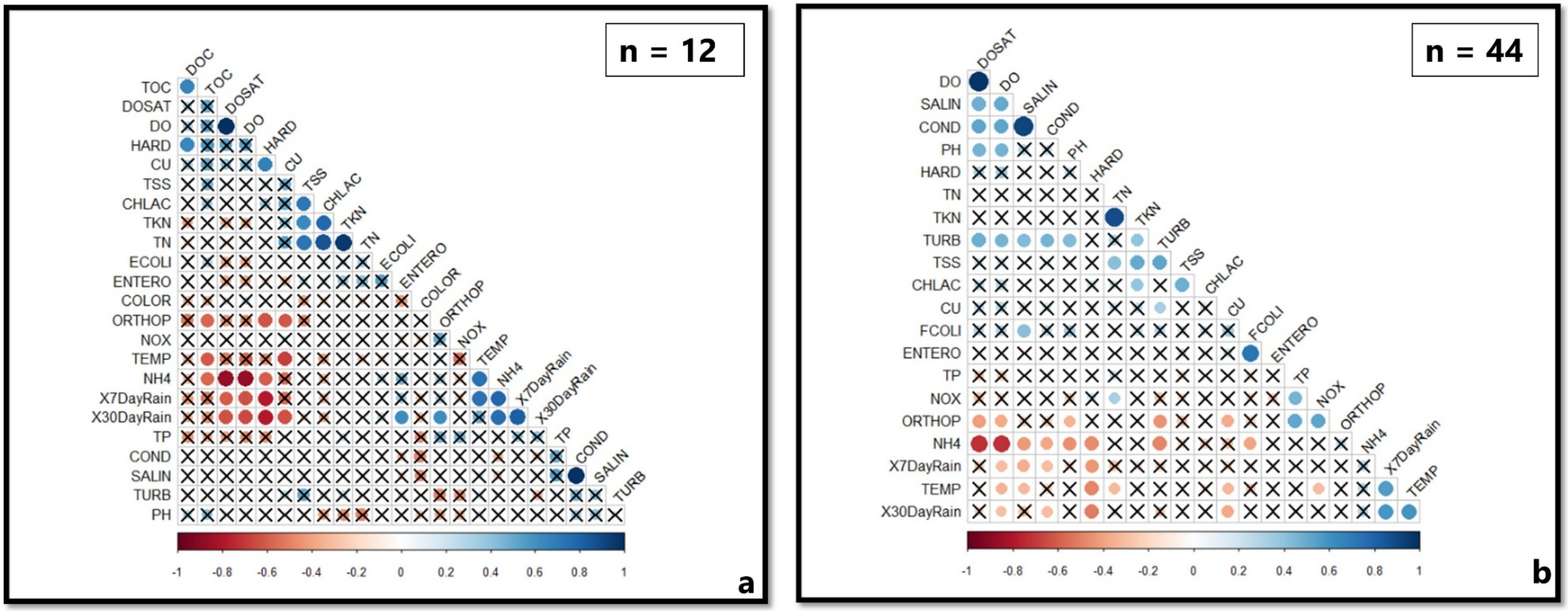
**Oct 2020 – Sept 2021** | **POR**




Note:
CHLAC – Corrected Chlorophyll-a | COND – Specific Conductance | CU – Copper| DOC – Dissolved Organic Carbon
DO – Dissolved Oxygen | ECOLI – E. coli | ENTERO – Enterococci | FCOLI = Fecal Coliform| HARD – Hardness| NOX – Nitrate+Nitrite |
ORTHOP – Orthophosphate | PH – pH |SALIN – Salinity| TEMP – Temperature | TURB – Turbidity | TKN – Total Kjeldahl Nitrogen | TN – Total Nitrogen | TP – Total Phosphorus | TSS – Total Suspended Solids | X7DayRain – 7-Day rolling antecedent precipitation | X30DayRain – 30-Day rolling antecedent precipitation
X=correlation is not significant, red=negative correlation, blue=positive correlation

## 15B – Sun Lake Terrace

**Oct 2020 – Sept 2021** | **POR**



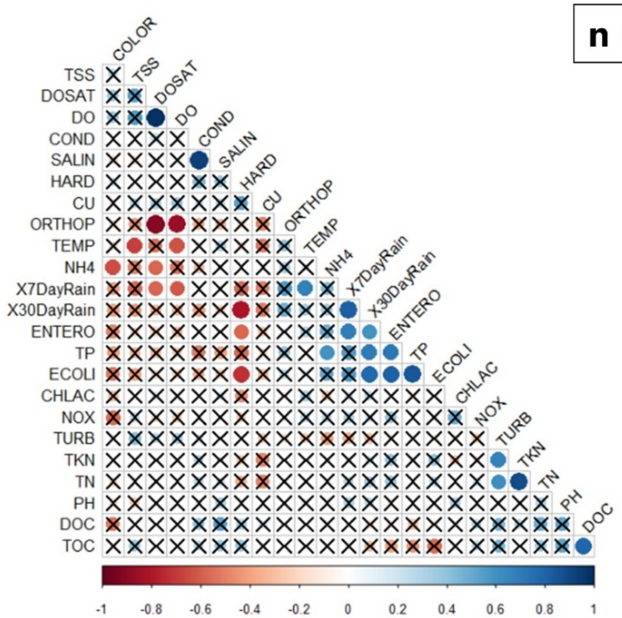

Note:
CHLAC – Corrected Chlorophyll-a | COND – Specific Conductance | CU – Copper| DOC – Dissolved Organic Carbon
DO – Dissolved Oxygen | ECOLI – E. coli | ENTERO – Enterococci | FCOLI = Fecal Coliform| HARD – Hardness| NOX – Nitrate+Nitrite | ORTHOP – Orthophosphate | PH – pH |SALIN – Salinity| TEMP – Temperature | TURB – Turbidity | TKN – Total Kjeldahl Nitrogen | TN – Total Nitrogen | TP – Total Phosphorus | TSS – Total Suspended Solids | X7DayRain – 7-Day rolling antecedent precipitation | X30DayRain – 30-Day rolling antecedent precipitation
X=correlation is not significant, red=negative correlation, blue=positive correlation

**Appendix C – Water Quality Correlations for Naples Stormwater Stations**

## 16B – Thurner

**Oct 2020 – Sept 2021**

**n = 12**




**a**

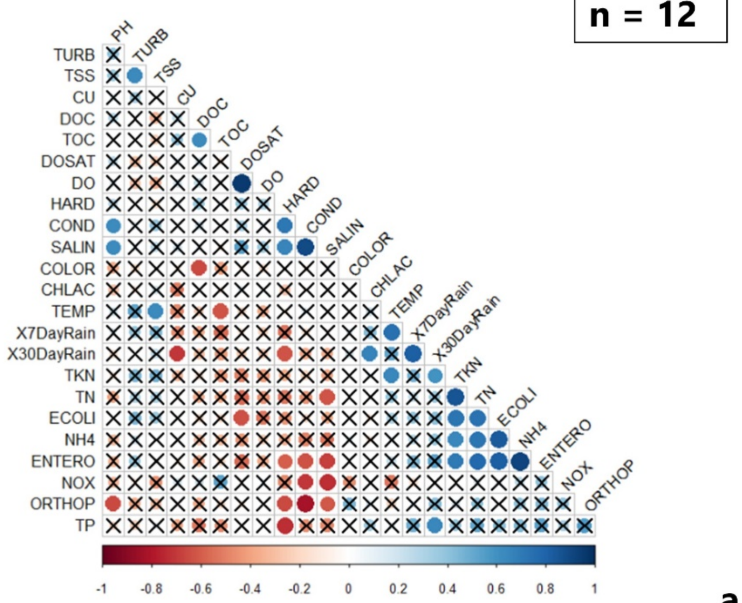
**POR**

**Data only available for Oct 2020 – Sept 2021**

Note:
CHLAC – Corrected Chlorophyll-a | COND – Specific Conductance | CU – Copper| DOC – Dissolved Organic Carbon
DO – Dissolved Oxygen | ECOLI – E. coli | ENTERO – Enterococci | FCOLI = Fecal Coliform| HARD – Hardness| NOX – Nitrate+Nitrite |
ORTHOP – Orthophosphate | PH – pH |SALIN – Salinity| TEMP – Temperature | TURB – Turbidity | TKN – Total Kjeldahl Nitrogen | TN – Total Nitrogen | TP – Total Phosphorus | TSS – Total Suspended Solids | X7DayRain – 7-Day rolling antecedent precipitation | X30DayRain – 30-Day rolling antecedent precipitation
X=correlation is not significant, red=negative correlation, blue=positive correlation

# 17B – Lake Diana

## Oct 2020 – Sept 2021



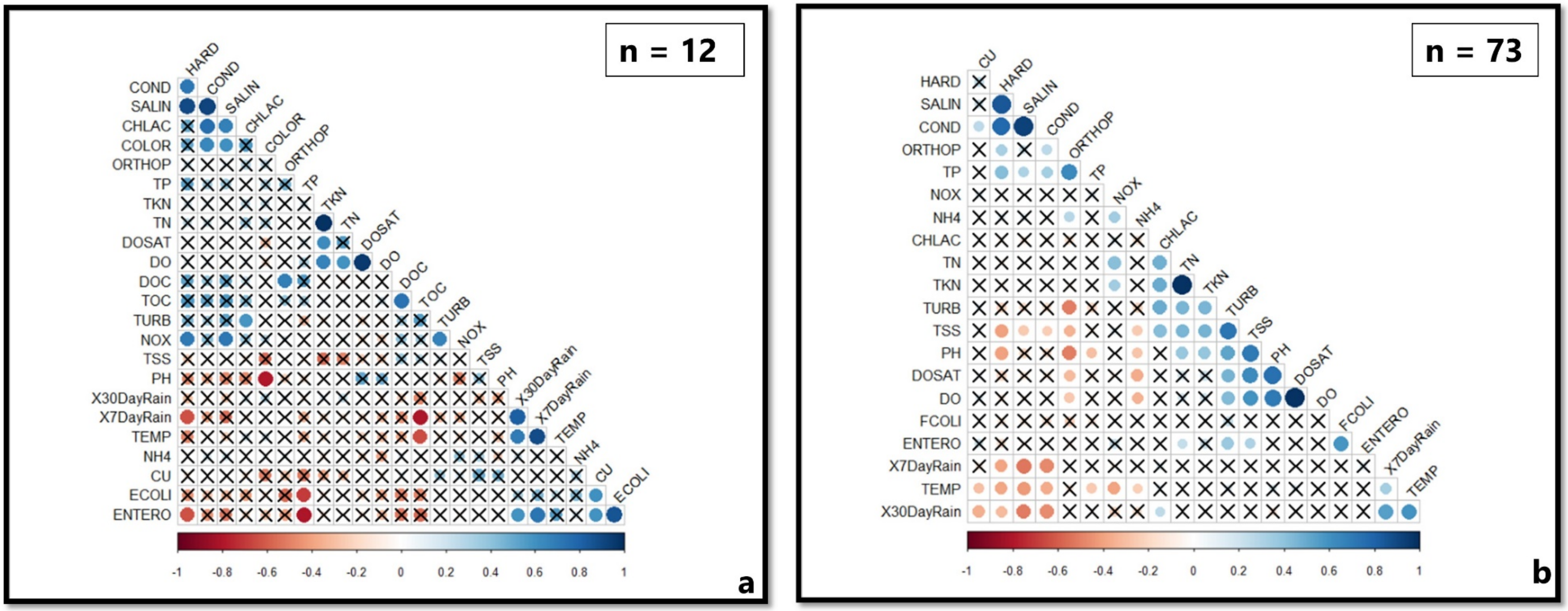

## POR

Data only available for Oct 2020 – Sept 2021

Note:
CHLAC – Corrected Chlorophyll-a | COND – Specific Conductance | CU – Copper| DOC – Dissolved Organic Carbon
DO – Dissolved Oxygen | ECOLI – E. coli | ENTERO – Enterococci | FCOLI = Fecal Coliform| HARD – Hardness| NOX – Nitrate+Nitrite |
ORTHOP – Orthophosphate | PH – pH |SALIN – Salinity| TEMP – Temperature | TURB – Turbidity | TKN – Total Kjeldahl Nitrogen | TN – Total Nitrogen | TP – Total Phosphorus | TSS – Total Suspended Solids | X7DayRain – 7-Day rolling antecedent precipitation | X30DayRain – 30-Day rolling antecedent precipitation
X=correlation is not significant, red=negative correlation, blue=positive correlation

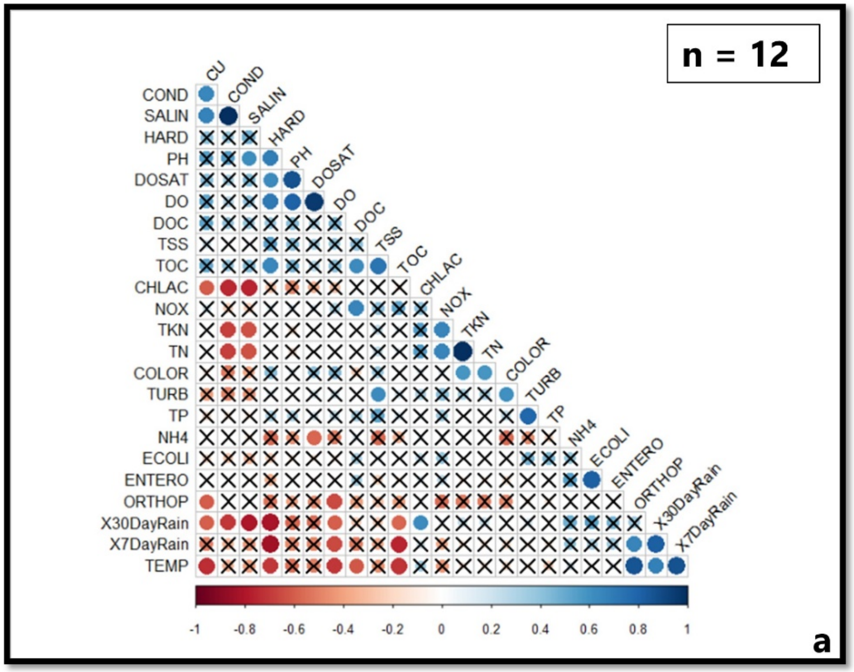
## 19B – Fleischmann Lake

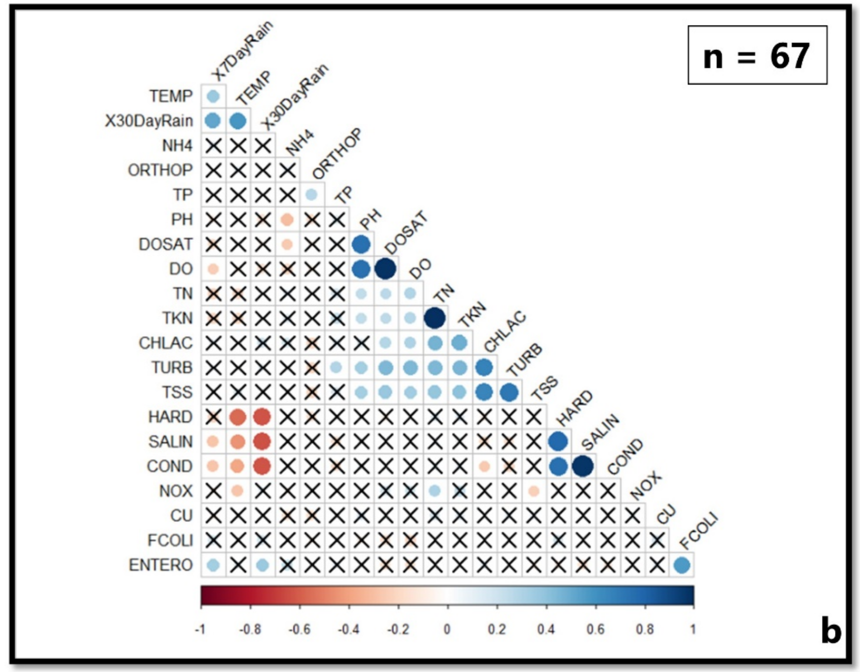
**Oct 2020 – Sept 2021** | **POR**




Note:
CHLAC – Corrected Chlorophyll-a | COND – Specific Conductance | CU – Copper| DOC – Dissolved Organic Carbon
DO – Dissolved Oxygen | ECOLI – E. coli | ENTERO – Enterococci | FCOLI = Fecal Coliform| HARD – Hardness| NOX – Nitrate+Nitrite |
ORTHOP – Orthophosphate | PH – pH |SALIN – Salinity| TEMP – Temperature | TURB – Turbidity | TKN – Total Kjeldahl Nitrogen | TN – Total Nitrogen | TP – Total Phosphorus | TSS – Total Suspended Solids | X7DayRain – 7-Day rolling antecedent precipitation | X30DayRain – 30-Day rolling antecedent precipitation
X=correlation is not significant, red=negative correlation, blue=positive correlation

# 20B – Forest Lake



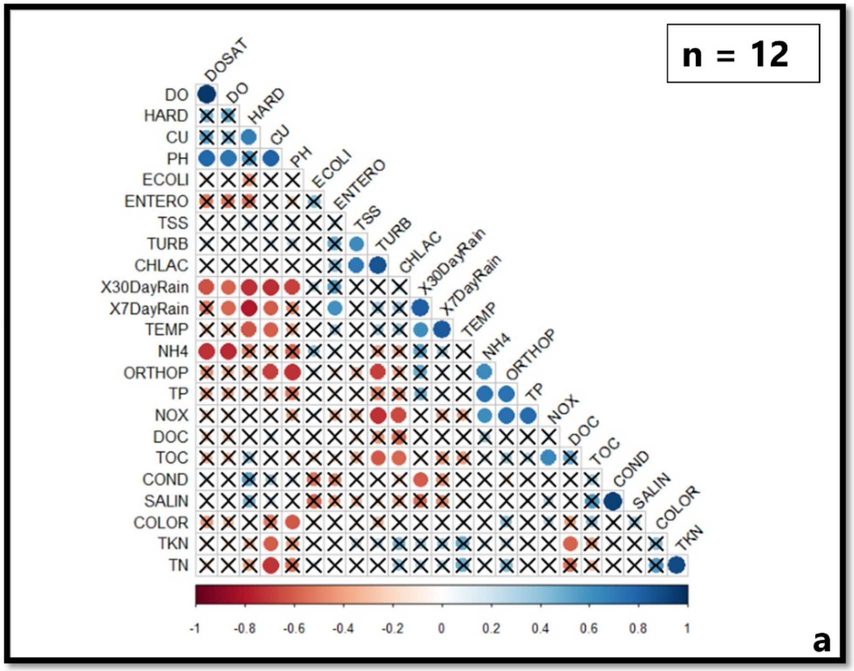

Note:
CHLAC – Corrected Chlorophyll-a | COND – Specific Conductance | CU – Copper| DOC – Dissolved Organic Carbon
DO – Dissolved Oxygen | ECOLI – E. coli | ENTERO – Enterococci | FCOLI = Fecal Coliform| HARD – Hardness| NOX – Nitrate+Nitrite | ORTHOP – Orthophosphate | PH – pH |SALIN – Salinity| TEMP – Temperature | TURB – Turbidity | TKN – Total Kjeldahl Nitrogen | TN – Total Nitrogen | TP – Total Phosphorus | TSS – Total Suspended Solids | X7DayRain – 7-Day rolling antecedent precipitation | X30DayRain – 30-Day rolling antecedent precipitation
X=correlation is not significant, red=negative correlation, blue=positive correlation

**Appendix C – Water Quality Correlations for Naples Stormwater Stations**

# 21B – Willow

**Oct 2020 – Sept 2021**

**POR**




**Data only available for Oct 2020 – Sept 2021**

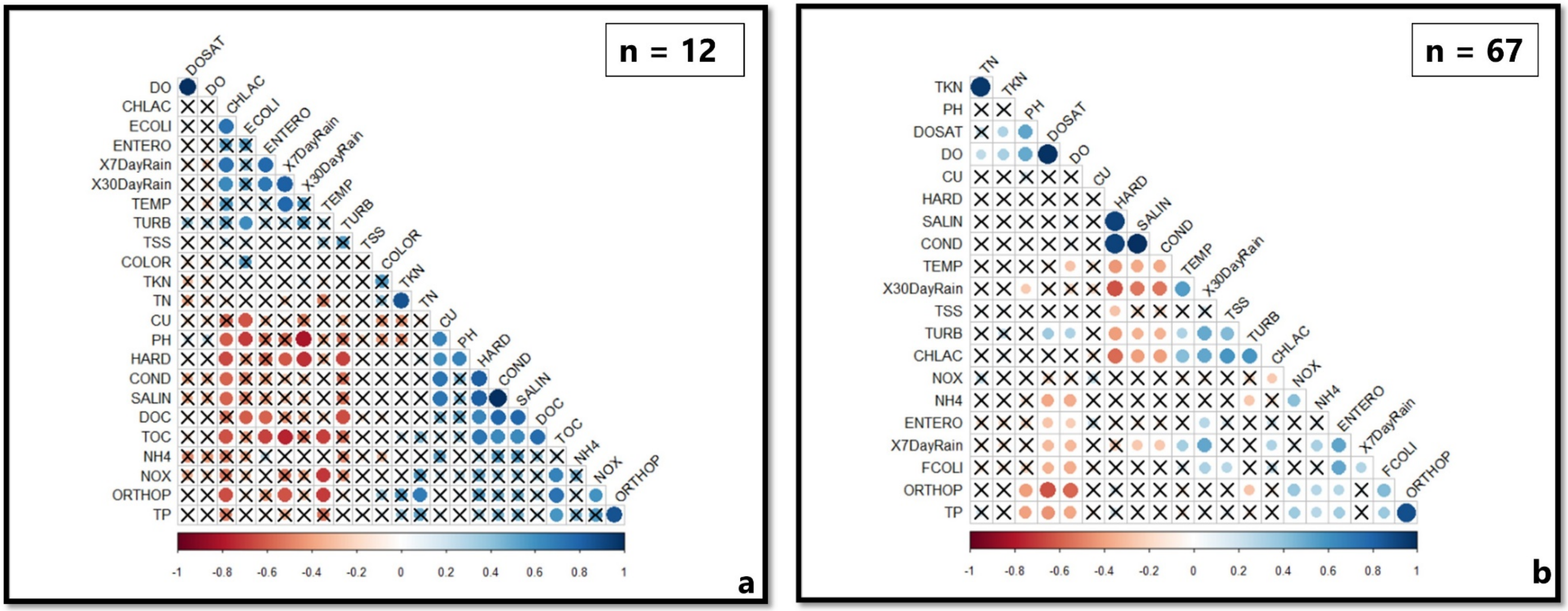
Note:

CHLAC – Corrected Chlorophyll-a | COND – Specific Conductance | CU – Copper| DOC – Dissolved Organic Carbon
DO – Dissolved Oxygen | ECOLI – E. coli | ENTERO – Enterococci | FCOLI = Fecal Coliform| HARD – Hardness| NOX – Nitrate+Nitrite |
ORTHOP – Orthophosphate | PH – pH |SALIN – Salinity| TEMP – Temperature | TURB – Turbidity | TKN – Total Kjeldahl Nitrogen | TN – Total Nitrogen | TP – Total Phosphorus | TSS – Total Suspended Solids | X7DayRain – 7-Day rolling antecedent precipitation | X30DayRain – 30-Day rolling antecedent precipitation

X=correlation is not significant, red=negative correlation, blue=positive correlation

## 22B – Lake Manor

**Oct 2020 – Sept 2021** | **POR**



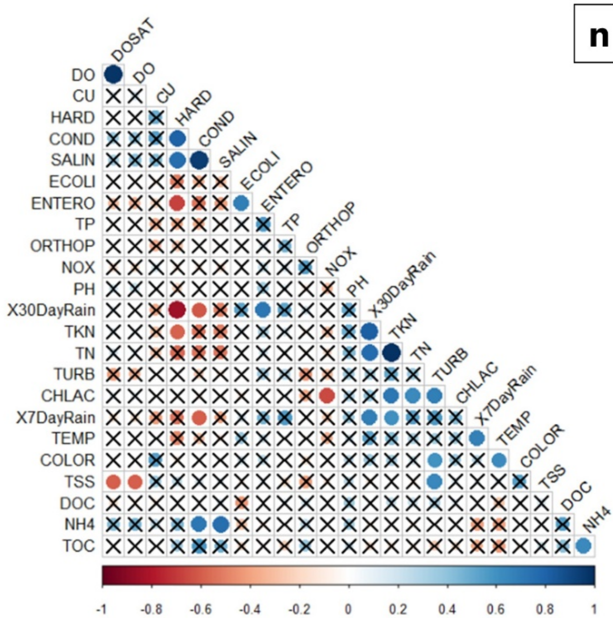

Note:
CHLAC – Corrected Chlorophyll-a | COND – Specific Conductance | CU – Copper| DOC – Dissolved Organic Carbon
DO – Dissolved Oxygen | ECOLI – E. coli | ENTERO – Enterococci | FCOLI = Fecal Coliform| HARD – Hardness| NOX – Nitrate+Nitrite |
ORTHOP – Orthophosphate | PH – pH |SALIN – Salinity| TEMP – Temperature | TURB – Turbidity | TKN – Total Kjeldahl Nitrogen | TN – Total Nitrogen | TP – Total Phosphorus | TSS – Total Suspended Solids | X7DayRain – 7-Day rolling antecedent precipitation | X30DayRain – 30-Day rolling antecedent precipitation
X=correlation is not significant, red=negative correlation, blue=positive correlation

**Appendix C – Water Quality Correlations for Naples Stormwater Stations**

## 23B – Lowdermilk

**Oct 2020 – Sept 2021**

**n = 12**




**a**

**POR**

**Data only available for Oct 2020 – Sept 2021**

Note:

CHLAC – Corrected Chlorophyll-a | COND – Specific Conductance | CU – Copper| DOC – Dissolved Organic Carbon
DO – Dissolved Oxygen | ECOLI – E. coli | ENTERO – Enterococci | FCOLI = Fecal Coliform| HARD – Hardness| NOX – Nitrate+Nitrite | ORTHOP – Orthophosphate | PH – pH |SALIN – Salinity| TEMP – Temperature | TURB – Turbidity | TKN – Total Kjeldahl Nitrogen | TN – Total Nitrogen | TP – Total Phosphorus | TSS – Total Suspended Solids | X7DayRain – 7-Day rolling antecedent precipitation | X30DayRain – 30-Day rolling antecedent precipitation

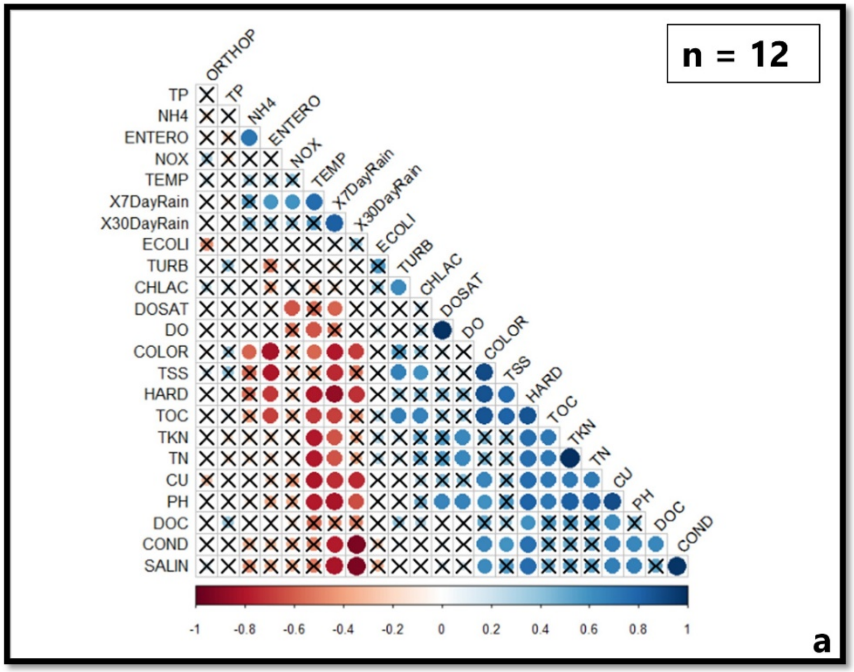
X=correlation is not significant, red=negative correlation, blue=positive correlation

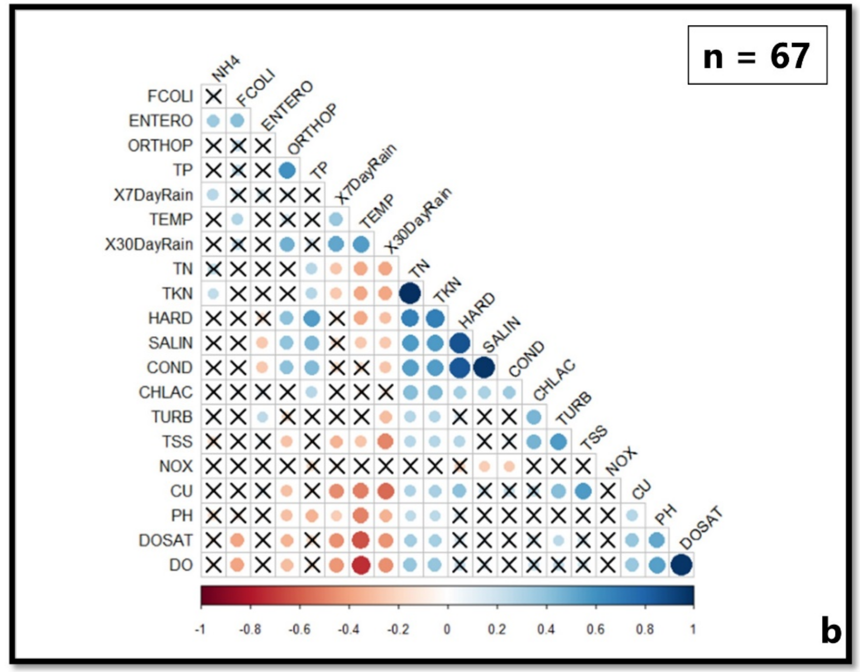
## Appendix C – Water Quality Correlations for Naples Stormwater Stations

# 26B – NCH Lake

**Oct 2020 – Sept 2021**

**POR**




Note:
CHLAC – Corrected Chlorophyll-a | COND – Specific Conductance | CU – Copper| DOC – Dissolved Organic Carbon
DO – Dissolved Oxygen | ECOLI – E. coli | ENTERO – Enterococci | FCOLI = Fecal Coliform| HARD – Hardness| NOX – Nitrate+Nitrite |
ORTHOP – Orthophosphate | PH – pH |SALIN – Salinity| TEMP – Temperature | TURB – Turbidity | TKN – Total Kjeldahl Nitrogen | TN – Total Nitrogen | TP – Total Phosphorus | TSS – Total Suspended Solids | X7DayRain – 7-Day rolling antecedent precipitation | X30DayRain – 30-Day rolling antecedent precipitation
X=correlation is not significant, red=negative correlation, blue=positive correlation