Appendix K

Morris Bridge Sink Project H404 2023 Annual Report

JonesEdmunds 50 YEARS 1974-2024

MORRIS BRIDGE SINK PROJECT H404
2023 ANNUAL REPORT FOR
CONSUMPTIVE USE PERMIT No. 20020574.000

Southwest Florida Water Management District | March 2024

MORRIS BRIDGE SINK PROJECT H404
2023 ANNUAL REPORT FOR WATER USE
PERMIT NO. 20020574.000
(Task Work Assignment No. 23TW0004124)

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SWFWMD TWA#23TW0004124

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

APPENDICES

1 BACKGROUND

The Southwest Florida Water Management District (SWFWMD) adopted a minimum flows and level (MFL) rule for the Lower Hillsborough River in 2007 with the goal of extending a zone of oligohaline water (<5 practical salinity unit [psu]) from the base of the Hillsborough River dam toward Sulphur Springs. To achieve the MFL, a recovery strategy was adopted that specified the following external water sources would be used to supplement flows to the Lower Hillsborough River: Sulphur Springs (up to 18 cubic feet per second [cfs]), Blue Sink (up to 2 million gallons per day [MGD] or 3 cfs), Tampa Bypass Canal (up to 11 cfs), and Morris Bridge Sink (MBS) (up to 6 cfs).

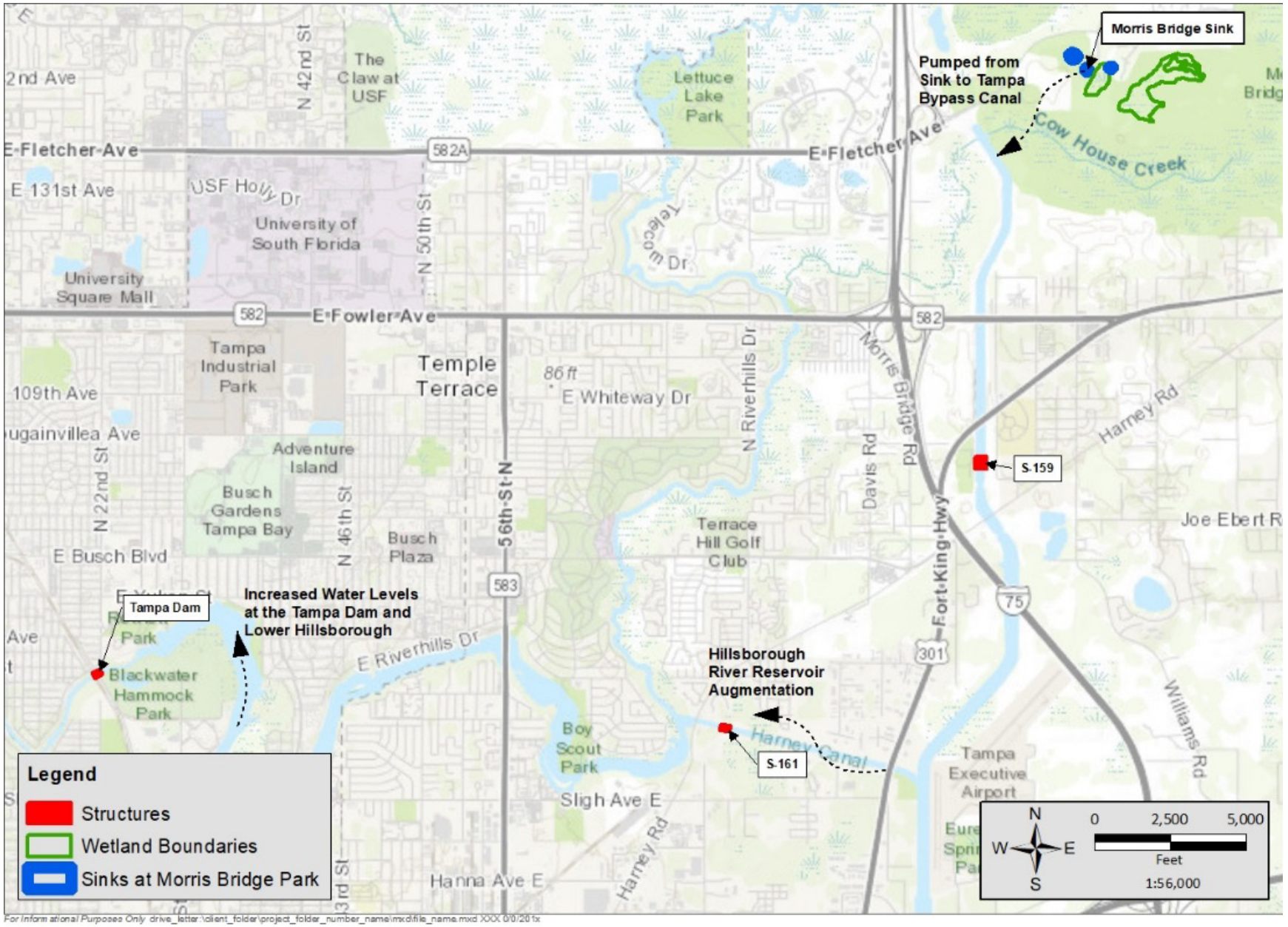
SWFWMD was issued Consumptive Water Use Permit (CUP) No. 20020574.000 on January 15, 2016, by the Florida Department of Environmental Protection (FDEP) to install a pump (MBS/1) at MBS and pump water from the sink to the upper pool of the Tampa Bypass Canal (Figure 1-1). A condition of this permit states that SWFWMD must *implement and maintain data collection programs as outlined in the Environmental Monitoring Plan dated June 10, 2013…throughout the term of the permit* and submit annual monitoring reports. The Environmental Monitoring Plan (EMP) outlines groundwater and surface water levels, wetland bathymetry and inundation analyses, annual vegetative health assessments, organic soil characterization, soil loss/subsidence monitoring, and wildlife monitoring and reporting requirements for MBS and numerous sites within Morris Bridge Park (Figure 1-1). This monitoring must occur before and during pumping from MBS. To date, no pumping from MBS has occurred for minimum flow purposes, and SWFWMD has not constructed a permanent pump station.

The first monitoring event occurred on October 15, 2016, and the first annual report was submitted in April 2017. Since pumping has yet to occur, this 2023 Annual Report represents the seventh year of background/baseline data that can be used for future comparison if pumping begins. As required by the permit, this report summarizes the following data collected in accordance with the MBS EMP:

- Water Use.
- Water Levels (Wetland, MBS, and Groundwater).
- Wetland Soils.
- Vegetation.
- Wetland Health Assessment.
- Wildlife.

In addition to the wetland and hydrologic data collected above in accordance with the EMP, SWFWMD continued to collect field data on zooplankton, benthic macroinvertebrates, fish, and water quality in 2023. These data are not required by the MBS EMP but are being collected to characterize baseline conditions at MBS before pumping. These data are also summarized in this 2023 Annual Report.

Figure 1-1 Study Area Overview Map



2 EMP SITE DESCRIPTIONS

Figure 2-1 shows that MBS is within Morris Bridge Park on property owned by SWFWMD. Morris Bridge Park is approximately 0.75 mile northeast of the Tampa Bypass Canal and approximately 0.6 mile southeast of the Hillsborough River. With its many plant and animal species, bike trails, and wetland areas, Morris Bridge Park is a local favorite that visitors enjoy year-round. Access to the monitoring sites is via Morris Bridge Road (County Road [CR] 579) and Idlewood Drive, which provides access to the north end of the park near Morris Bridge and Nursery Sink (Figure 2-1).

Figure 2-1 shows the three sinks and two wetlands within the park that are monitored in accordance with the EMP: Morris Bridge Nursery Marsh (Nursery Marsh) and Morris Bridge Nursery Sink Cypress Wetland (Cypress Wetland). Cypress Wetland contains an unforested area that is also monitored and is referred to as Morris Bridge Nursery Sink Cypress Marsh (Cypress Marsh).

Table 2-1 shows the full and abbreviated names of the sinks and wetlands.

Table 2-1 Sinks and Wetlands in Morris Bridge Park

Full Name of Wetland or Sink	Abbreviated Name
Morris Bridge Sink	—
Morris Bridge Nursery Sink	Nursery Sink
Morris Bridge Powerline Sink	Powerline Sink
Morris Bridge Nursery Sink Cypress Wetland	Cypress Wetland
Morris Bridge Nursery Sink Cypress Marsh	Cypress Marsh
Morris Bridge Nursery Marsh	Nursery Marsh

3 WATER USE

No pumping for MFL implementation has occurred since issuance of the SWFWMD CUP in January 2016. Therefore, no water use data are available to report for the 2023 reporting period.

Figure 2-1 Morris Bridge Park Feature and Hydrologic Monitoring Location Map

4 HYDROGEOLOGY AND HYDROLOGIC MONITORING

Three major hydrogeologic units make up the groundwater system in the MBS area. The units from top to bottom are 1) the surficial aquifer – up to 20 feet of unconsolidated sands and sandy clays; 2) semi-confining beds of the intermediate confining unit (ICU) – consisting of silt, sandy clay, and Hawthorn Group clay; and 3) the upper Floridan aquifer (UFA) – made up of limestone and dolomite beds with a 1,000-foot average thickness (Legette, Brashears, and Graham, Inc.; 2001). Groundwater seepage is hindered overall by the low permeability of these units; however, the presence of multiple sinkholes strongly suggests karst conditions and variability of the ICU.

4.1 WATER LEVELS

4.1.1 METHODS

The EMP requires monitoring daily water levels at 16 stations. These stations are wells within Morris Bridge Park that monitor water levels in the UFA, three sinkholes, the surficial aquifer, and three wetlands (Figure 2-1 and Table 4-1). The casing depths of the surficial wells range from 1 to 4 feet, and the casing depths for the UFA wells range from 19 to 100 feet (SWFWMD, 2010). Appendix A, *Hydrologic Monitoring Summary*, Table 3 provides detailed well information.

Table 4-1 Hydrologic Monitoring Stations by Feature Type (Period of Record January 2016 – December 2023)

Station ID	DID	Station Name
Sinkholes:		
709108	5	Morris Bridge Powerline Sink
709107	2	Morris Bridge Nursery Sink
709106	4	Morris Bridge Sink
Wells:		
705598	17	Morris Bridge Nursery Sink Cypress Wetland Surf
705596	16	Morris Bridge Nursery Sink Cypress Upland Surf
705595	10	Morris Bridge Nursery Sink Marsh Wetland Surf
705594	11	Morris Bridge Nursery Sink Marsh Upland Surf
705593	8	Morris Bridge Powerline Sink Upland Surf
637851	12	Morris Bridge 5-16-S-Surf
637850	9	Morris Bridge 516-D-Fldn
433083	14	FL-MB-750-Fldn (at Eloian)
433087	15	FL-MB-550 Fldn (at Idlewood)
433088	13	FL-MB-2200 Fldn (at Rockglen)
Wetlands:		
792841	7	Morris Bridge Nursery Sink Cypress Marsh
709110	6	Morris Bridge Nursery Sink Cypress Wetland
709109	3	Morris Bridge Nursery Marsh

Data for the January 1 to December 31, 2023, reporting period were downloaded in North American Vertical Datum of 1988 (NAVD88) from SWFWMD's Environmental Data Portal (EDP). Surface-water level daily data are estimated for Cypress Wetland (SID 709110; DID 6) from the surficial aquifer gauge SID 705598. Surface-water level daily data are estimated for Nursery Marsh (709109; DID 3) from the surficial aquifer gauge SID 705595.

Daily maximum water-level data for Nursery Sink aquifer gauge (SID 637850) and Nursery Sink surficial groundwater gauge (SID 637851) were provided by the SWFWMD for January 1, 2016, to December 31, 2023, in National Geodetic Vertical Datum of 1929 (NGVD29). A datum conversion of -0.84 foot was used to convert to NAVD88. All water-level elevation data are presented in feet NAVD88.

4.1.2 Results and Discussion

Figure 4-1 provides the wetlands water levels based on surficial groundwater level data in the two main wetlands. Plotting water levels using surficial groundwater allows water levels in the dry season to be observed since the wetlands often lack surface water. Water-level trends at these stations track each other closely, with Nursery Marsh being lower than Cypress Wetland. Bathymetric and topographic data discussed later in this report indicate that ground elevation differences account for Nursery Marsh's greater water depth.

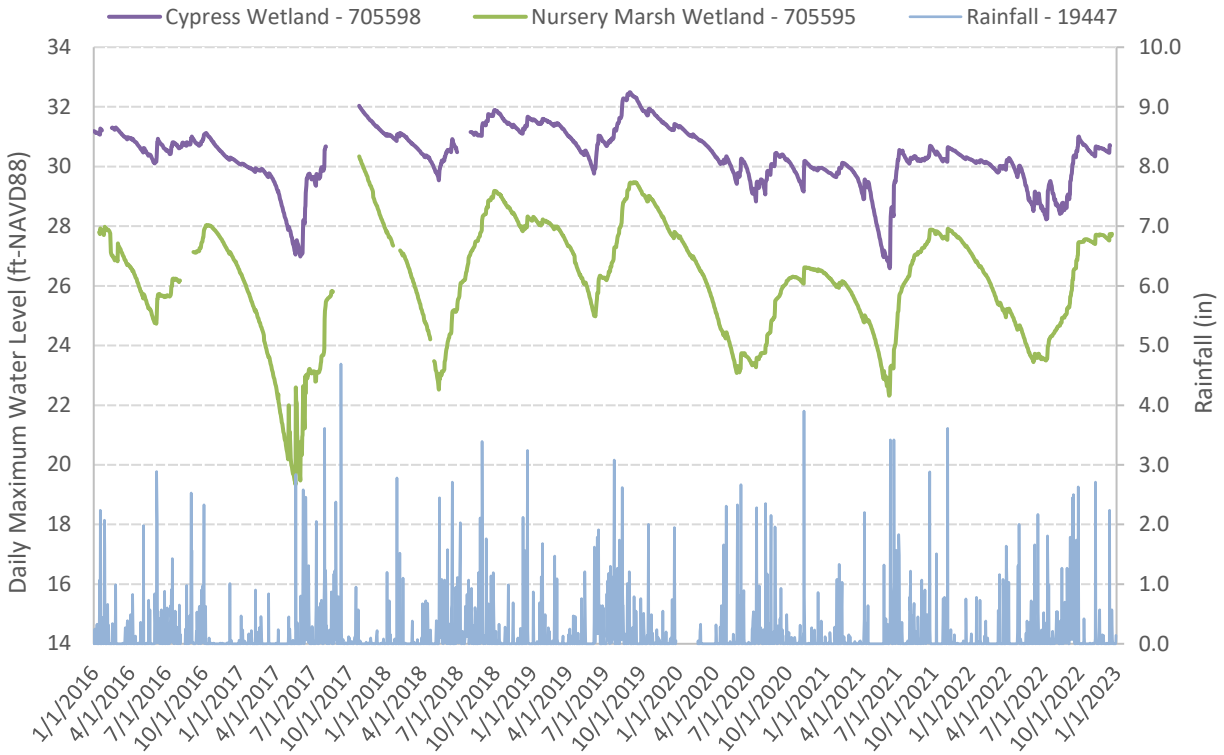
Annual water levels drop to their lowest in late May and early June due to the end of the dry season and peak in mid-August or September during the wet season. In addition, water levels in Nursery Marsh are much more flashy (higher amplitude) than Cypress Wetland (Figure 4-1). Recorded water levels in and near Cypress Wetland are generally higher than those in and near Nursery Marsh (Figure 4-1).

Figure 4-2 illustrates all data collected for the UFA. Although all three UFA locations are similar, a slight decrease in water levels exists from east to west. Station FL-MB-2200 (blue line) is situated farthest east, and Stations FL-MB-750 (orange line) and FL-MB-550 (red line) are just east of Nursery Marsh and farthest west, respectively. UFA water levels also follow distinct wet- and dry-season trends similar to the wetlands, and relatively small variations in the UFA levels occur throughout the study area.

Figure 4-3 shows that sinkhole water levels also follow a general decreasing east-to-west trend, with Nursery Sink to the east and Powerline Sink farther west and north. However, Powerline Sink shows slightly higher water levels in dry times and lower water levels at the peak of the wet season. Appendix A, *Hydrologic Monitoring Summary*, Figures 5-7 present water-level graphs at each individual station.

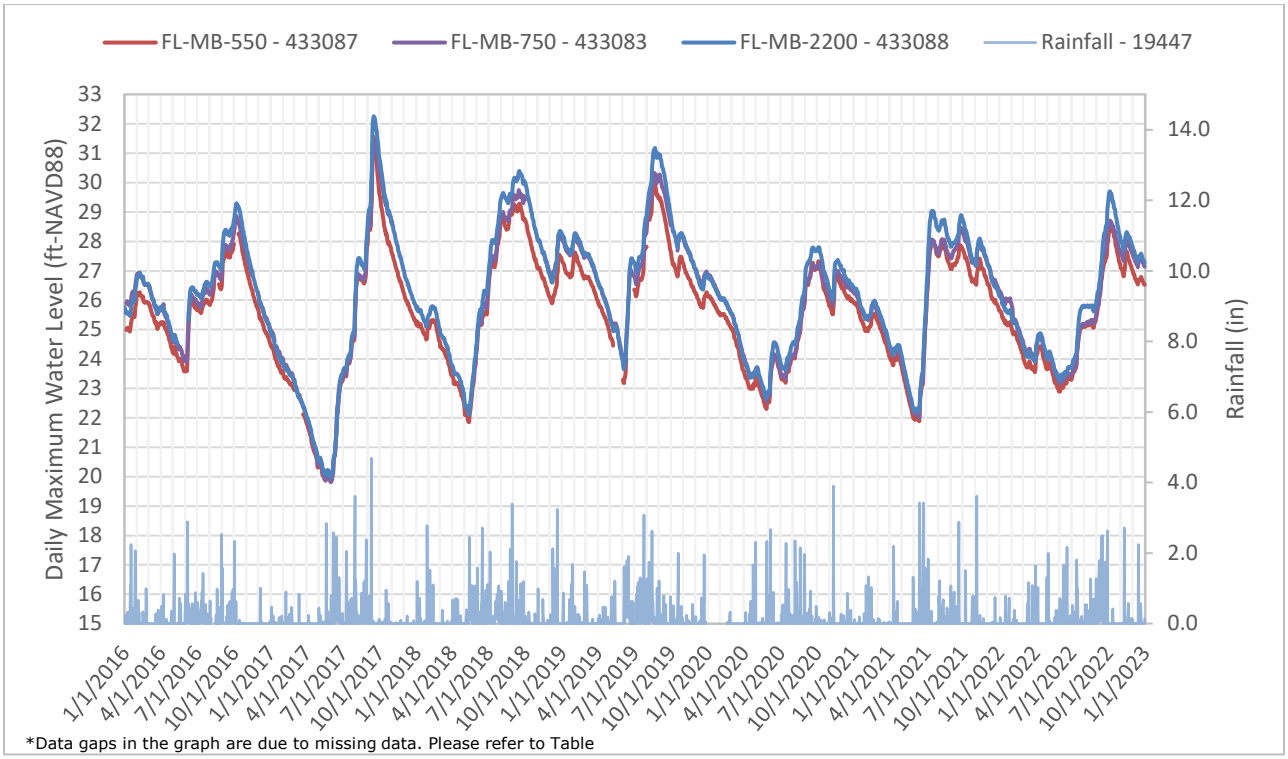
The surface water and surficial aquifer levels fluctuate similarly for each wetland, which indicates that the surficial aquifer feeds both wetlands. However, considering the relationship between the surface water and the levels recorded at the nearest UFA monitoring stations, the UFA levels align more closely with the surface water in Nursery Marsh than with the surface water in Cypress Wetland. This is likely due to Nursery Marsh's location in an area where the ICU may be more susceptible to seepage and collapse, allowing for interactions with the UFA and the formation of multiple nearby sinkholes. In contrast, the data in the Cypress Wetland and its surrounding area indicate a more solid presence of the ICU separating the surficial aquifer and the UFA.

Figure 4-1 Water Levels in Cypress Wetland and Nursery Marsh



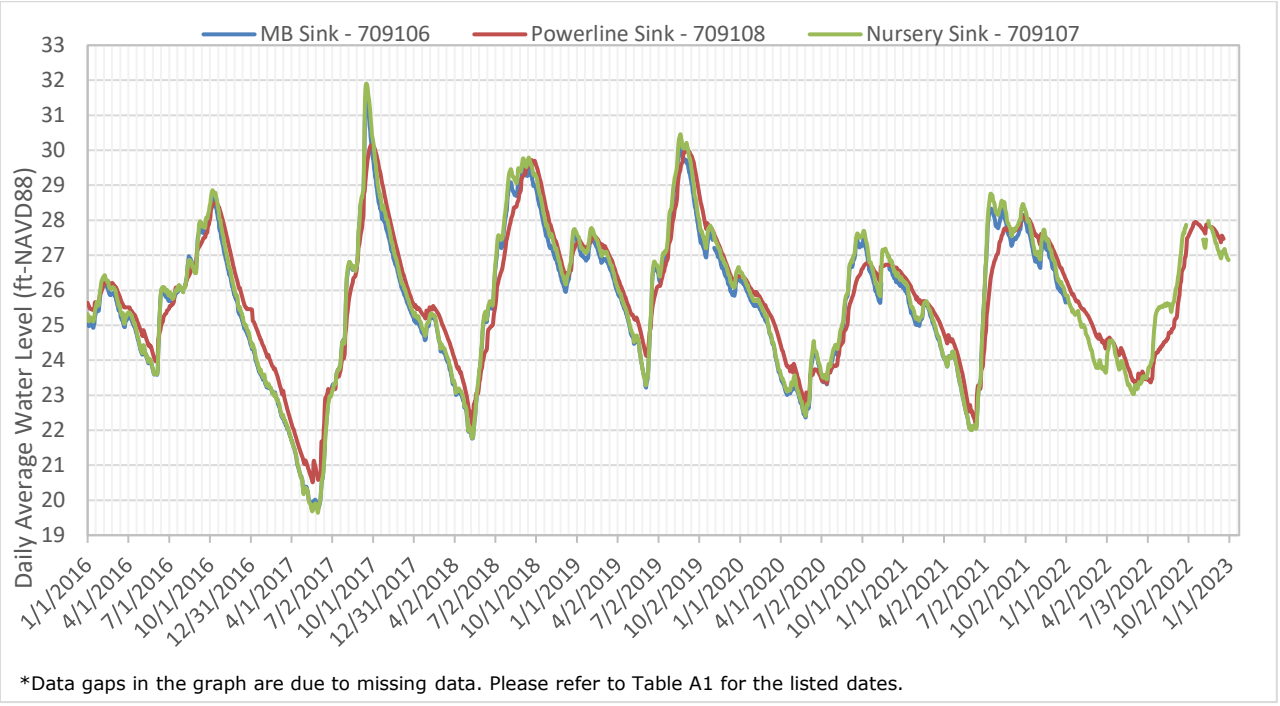
*Data gaps in the graph are due to missing data. Please refer to Table 4 for the listed dates.

Figure 4-2 Water Levels in UFA Well Sites



*Data gaps in the graph are due to missing data. Please refer to Table

Figure 4-3 Sinkhole Water Levels



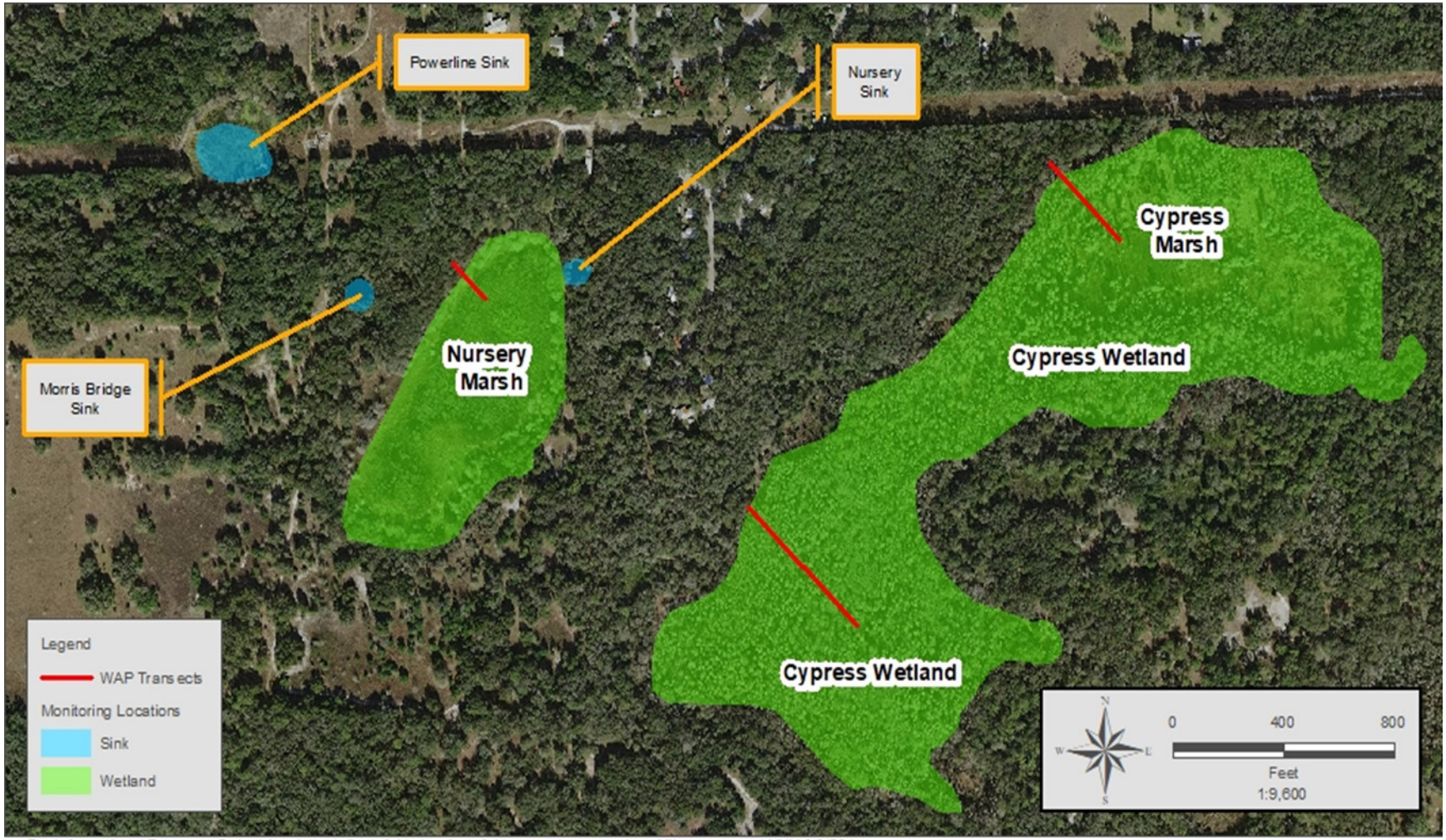
*Data gaps in the graph are due to missing data. Please refer to Table A1 for the listed dates.

To verify these conclusions, the *Results of Morris Bridge Sink Pumping Test, Hillsborough County, Florida* (SWFWMD, 2010) was reviewed in detail. In April and May 2009, a 30-day pumping test at MBS was performed while monitoring water levels in Nursery Marsh and Cypress Marsh, Nursery Sink, and other UFA monitoring sites. With an average pumping rate of approximately 4 MGD, the resulting drawdown in MBS was approximately 2.2 feet. Although approximately 0.3 foot of drawdown occurred at nearby Nursery Sink, water levels in the Nursery Marsh went dry 13 days into the pump test, which is explained by a prolonged drought period. Therefore, the pumping test did not conclusively determine the level of connectivity between the UFA and Nursery Marsh. However, water levels at a nearby nested well set, TBW 516-S and TBW 516-D, showed similar reactions to the pumping test; water levels in the surficial aquifer decreased by 0.78 foot and in the UFA by 0.83 foot. This may indicate at least some connectivity between the UFA and the surficial aquifer in this area.

5 WETLAND MONITORING

A monitoring program has been implemented to monitor potential impacts to three isolated wetlands resulting from surface-water withdrawal from MBS. The wetlands within the monitoring network consist of Nursery Marsh (also known as Morris Bridge Nursery Marsh in the Water Management Information System [WMIS], SID 709109), Cypress Wetland (the south sub-basin of Cypress Wetland also known as Morris Bridge Nursery Sink Cypress in WMIS, SID 709110), and Cypress Marsh (the north sub-basin of Cypress Wetland also known as Morris Bridge Nursery Sink Cypress Marsh in WMIS, SID 792841). Figure 5-1 shows the wetlands locations and the monitoring transects established in each wetland.

Figure 5-1 WAP Transect Location Map



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The purpose of the annual monitoring within the three isolated wetland sites is to collect data pertaining to wetland health along transects established in accordance with Specific Condition Nos. 12 and 13 of the CUP No. 2002574.000. The annual monitoring includes:

- Soil Subsidence and Hydric Soils Analysis.
- Wetland Assessment Procedures (WAPs).
- Wetland Evaluations (WE).
- Feral Pig Disturbance.

5.1 Soil Subsidence and Hydric Soils Monitoring

In accordance with the FDEP CUP, an EMP was adopted that requires annual monitoring of the soils to evaluate the potential impacts to the neighboring wetlands from any significant drawdown of the UFA and surficial aquifer resulting from withdrawals from MBS. Soil monitoring consists of characterizing and analyzing hydric soils and monitoring for soil subsidence at fixed monitoring stations along WAP transects. To date, no surface-water withdrawals from MBS for minimum flows implementation have occurred.

Soil subsidence was not evaluated in 2023. As a result, the 2020 soil subsidence monitoring event as well as previous annual soils reports document the baseline soil conditions within the monitored wetlands before pumping. This and the previous years' data are used to quantify the horizontal or vertical variability in hydric soil characteristics in the three WAP transects before pumping. Appendix B of the *2021 Annual Report* provides the Jones Edmunds *2021 Morris Bridge Sink Third Annual Soils Report*. To date, no evidence of soil subsidence has been observed.

5.2 Wetland Assessment Procedure (WAP)

The approved EMP requires that Nursery Marsh, Cypress Wetland, and Cypress Marsh be monitored using the SWFWMD WAP method. The WAP is to collect information on vegetation, hydrology, soils, and other pertinent variables in monitored isolated wetlands to accurately characterize the biological condition and health of each wetland. This information is used for a variety of water management purposes, including wellfield management considerations and the assessment of recovery in areas that have experienced historical hydrologic and biologic impacts due to groundwater withdrawals.

5.2.1 Methodology

Three WAP transects within two wetlands comprise the monitoring network – Nursery Marsh, Cypress Wetland, and Cypress Marsh (Figure 6-1). Nursery Marsh and Cypress Wetland have been in SWFWMD's vegetation monitoring network since 2009. Cypress Marsh was added in 2013. The WAP health assessment methodologies are performed annually on all three wetlands. WAP scores range from 1 to 5 and are assigned to the groundcover, shrub, and canopy strata observed along the WAP transect. A score of 1 indicates that upland plant species have moved into the Deep Zone (lowest elevation of the WAP transect), and a score of 5 indicates that all identified species are in their appropriate zones.

Ecological data were collected and entered on standardized WAP field forms in June 2023. The data collected included recording plant species, plant percent cover, plant health per stratum, weedy plant composition per stratum, staff gauge water levels, photographic

documentation, and incidental wildlife observations in accordance with the *WAP Instructional Manual for Isolated Wetlands* (SWFWMD, 2005). The *Morris Bridge EMP Report* by SWFWMD (2005) provides detailed WAP methodologies employed for this monitoring activity. Appendix B includes copies of the WAP field forms, and Appendix C provides WAP transect photos.

5.2.2 Results and Discussion

5.2.2.1 Nursery Marsh

The Nursery Marsh is a 12-acre kidney-shaped wetland. Limited areas of buttonbush *(Cephalanthus occidentalis),* with swamp smartweed *(Perisicaria hydropiperoides),* common duckweed *(Lemna minor),* peppervine *(Ampelopsis arborea),* St. Andrew's cross *(Hypericum hypericoides),* and royal fern *(Osmunda regalis)* are toward the wetland edge. A thick stand of Carolina willow *(Salix caroliniana)* dominates throughout most of the wetland. This marsh contains a few trees.

Table 5-1 shows the WAP scores for the groundcover, shrub/small tree, and tree strata all remained the same with the exception of groundcover in 2016 and 2019.

Table 5-1 Nursery Marsh (SID 776658) WAP Zonation Scores

Sampling Year	2016	2017	2018	2019	2020	2021	2022	2023
Groundcover	4	3	3	4	3	3	3	3
Shrub/Small Trees	3	3	3	3	3	3	3	3
Trees	3	3	3	3	3	3	3	3

Wildlife species documented during the monitoring event include pig frog (*Lithobates grylio*) and boat tailed grackle (*Quiscalus major*).

5.2.2.2 Cypress Wetland

The Cypress Wetland is a flat, 54-acre forested wetland that has two sub-basins. The south sub-basin has a dominate canopy of pond cypress *(Taxodium ascendens),* bald cypress *(Taxodium distichum),* swamp tupelo *(Nyssa sylvatica var. biflora)* (some old growth), and dahoon holly *(Ilex cassine),* with an occasional red maple (Acer *rubrum).* Much of the wetland has no shrubs; however, a few wax myrtles *(Myrica cerifera),* small sweetbay *(Magnolia virginiana),* and water oak *(Quercus nigra)* are near the wetland edge. Fetterbush *(Lyonia lucida)* are commonly found into the edge. Buttonbush is rarely found in the cypress wetland center where light gaps in the otherwise heavy canopy can be found. The sparse groundcover includes Virginia chain fern *(Woodwardia virginica)* and swamp fern *(Blechnum serrulatum).*

Table 5-2 shows that during the 2023 monitoring event, the groundcover WAP score remained at 4 as in 2022, and the shrub/small tree stratum increased from 3 to 4 as a result of a one-zone shift in enough numbers into the Deep Zone. The tree stratum WAP score remained at 3.

Table 5-2 Cypress Wetland (SID 709110) WAP Zonation Scores

Sampling Year	2016	2017	2018	2019	2020	2021	2022	2023
Groundcover	N/A; not enough WAP	5	4	4	4	3	4	4
Shrub/Small Trees	4	3	4	4	5	4	3	4
Trees	3	3	5	5	5	5	3	3

Wildlife species observed during the monitoring event include white tailed deer (*Odocoileus virginianus*) and great blue heron (*Ardea herodias*).

5.2.2.3 Cypress Marsh

Cypress Marsh is the north sub-basin of the Cypress Wetland. The center of Cypress Marsh has slightly deeper water levels than the Cypress Wetland and supports a mixture of herbaceous and forested vegetation. A thin canopy of pond cypress rings the outermost portion of the wetland. Red maple separates the area between the outer cypress trees from the herbaceous marsh at the center. The sparse groundcover in the forested edge of the marsh includes swamp fern and Virginia chain fern. The marsh in the center is dominated by maidencane *(Panicum hemitomon)* with waterhorehound *(Lycopus rubellus),* buttonbush, Virginia marsh, St. John's Wort *(Triadenum virginicum),* barnyardgrass *(Echinochloa* sp*.),* soft rush *(Juncus effusus),* pockets of pickerelweed *(Pontederia cordata),* and American white waterlily *(Nymphaea odorata).*

Table 5-3 shows that during the 2023 monitoring event groundcover and tree WAP scores remained the same as 2022 scores but shrub/small tree WAP score decreased from 5 to 4 due to a one-zone shift into the Deep Zone by enough counts.

Table 5-3 Cypress Marsh (SID 792841) WAP Zonation Scores

Sampling Year	2016	2017	2018	2019	2020	2021	2022	2023
Groundcover	5	5	4	4	5	3	3	3
Shrub/Small Trees	4	2	3	3	5	5	5	4
Trees	3	3	3	3	3	3	3	3

Wildlife species observed or documented within Cypress Marsh during the monitoring event include white tailed deer and great egret (*Ardea alba*).

5.3 Wetland Evaluation (WE)

The WE was completed for the three wetlands in May and June 2023. The WE is a qualitative wetland health assessment method performed by SWFWMD since the 1970s. The WE consists of recording qualitative field observations on tree canopy cover, tree stand maturity, dominant tree canopy species, tree health, cover by exotics, hydrology, organic soil observations, wildlife, and fire and evaluating the overall health and appearance. These data can be used as a tool to assist in evaluating the shift in wetland community structure and quality over time. Appendix D provides the 2023 WE field data forms.

5.4 Feral Pig Disturbance

Feral pigs can significantly disturb and alter the native plant and animal communities and act as a vector for diseases that affect wildlife, livestock, and humans. The US Department of Agriculture (USDA) created the *Wildlife Services Division Feral Pig Disturbance Ranking* (2009), a ranking system for evaluating feral pig damage to wetlands. The wetland damage ranking is based on severity, which includes depth and extent of damage and the age of damage or time since disturbance first occurred. The scoring guidance and methodology can be found in the USDA 2009 ranking.

5.4.1 Methodology

The spatial area considered when conducting the USDA *Wildlife Services Division Feral Pig Disturbance Ranking* (2009) is not specified in the USDA methodology. For this assessment and future assessments, the spatial area assessed consists of a 10-meter-wide belt along the WAP transect with the length of the assessment being the existing WAP transect, which is consistent with the spatial area considered for the WAP.

In May and June 2023, SWFWMD staff assessed the WAP transects to document evidence of feral pig (hog rooting) disturbance. If hog rooting was observed, photographic documentation was taken of the damaged area and the damage score was recorded. Each site was then scored using the USDA 2009 methodology.

5.4.2 Results and Discussion

Minor to moderate feral pig damage was observed along all three WAP transects. Table 5-4 summarizes the damage ranking for each wetland. In 2023, feral hog activity increased in Cypress Marsh and decreased in Cypress Wetland and Nursery Marsh compared to 2022. Appendix E provides the 2023 *Feral Hog Damage Assessment*, which provides additional details and photographs of the observed feral pig damage.

Table 5-4 Feral Pig Disturbance Rankings

Wetland Name	2016	2017	2018	2019	2020	2021	2022	2023
Cypress Marsh	2	1	1	4	1	1	2	4
Cypress Wetland	1	1	1	4	2	4	2	2
Nursery Marsh	1	2	3	2	2	3	4	2

Notes: 1 = Surficial Rooting; 2 = Moderate Rooting; 3 = Extensive Rooting; 4 = Wallow.

6 MBS BIOLOGICAL SAMPLING

To characterize the existing biological community of MBS before withdrawals, SWFWMD implemented the following annual biological sampling at MBS that is not required by the EMP:

- Zooplankton sampling.
- Benthic macroinvertebrate sampling.
- Fish sampling.
- Water quality sampling.

The following sections provide the methods and results of this baseline biological sampling.

6.1 Benthic Macroinvertebrate and Zooplankton Sampling

6.1.1 Methodology

6.1.1.1 Benthic Macroinvertebrates

Benthic macroinvertebrate samples were collected on April 25, 2023, by Frydenborg Ecologic, LLC, using a Modified BioRecon in accordance with FDEP's Standard Operating Procedure (SOP), *Biological Reconnaissance Field Method* (BRN 1000). The study area was visually scanned from the top of the bank to determine the best representative habitat and to verify that the shoreline was wadable. Due to the deep-water depths (>100 feet) in most areas of the sinkhole, sample collection was limited to the shoreline. Care was taken to ensure that BioRecon samples were collected at approximately the same depths across all sampling stations.

Four 0.5-meter sweeps were performed with a D-Frame dipnet (mesh size 600 micrometers [µm]) to collect invertebrates from available productive habitats. After each sweep, all contents from the D-Frame dipnet were carefully transferred to labeled sample jars, and the net was examined to ensure that all organisms had been transferred. Samples were preserved in the field with 10-percent buffered formalin. Material from each habitat was placed in separate sample containers. Taxa were identified in the field by FDEP BioRecon-certified biologists. Appendix F provides the Frydenborg 2023 *Morris Bridge Macroinvertebrate Monitoring* report, which further details field methods, analytical procedures, and results.

6.1.1.2 Zooplankton

Zooplankton sampling was conducted to identify major taxa and quantitative counts of crustacean zooplankton. Three zooplankton samples were collected by Frydenborg from a boat on April 25, 2023, by a vertical tow with a Wisconsin-style plankton sampling net (8-inch diameter and 80-µm mesh) at the following three locations:

1. Approximately 3 meters from shore.
2. Approximately 6 meters from shore.
3. Near the center of the sink approximately 12 meters from shore.

Samples were taken in three different zones of the sink – edge (approximately 3 meters from shore), mid (approximately 10 meters from shore), and center (approximately 25 meters from shore). The sample closest to the shore was sampled at a depth of 2 meters from the surface, and the mid- and center-zooplankton samples were intended to be sampled from a depth at which dissolved oxygen (DO) concentrations were above 3.0 milligrams per liter (mg/L). However, because the highest DO observed was 1.0 mg/L, the mid-and center-station zooplankton samples were sampled from 4.5 and 6 meters to the surface, respectively, to be consistent with the 2020 sampling event.

After each tow, the contents of the net were carefully transferred to labeled sample jars, and the net was examined to ensure that all material had been transferred. Samples were preserved in the field with 10-percent buffered formalin. Appendix G provides the

Frydenborg 2023 *Morris Bridge Zooplankton Monitoring* report, which describes additional methods, analytical procedures, and results.

6.1.2 Results and Discussion

6.1.2.1 Benthic Macroinvertebrates

Table 6-1 shows that 13 taxa were collected during the 2023 sampling event, a decrease of one taxa from 2022. The BioRecon scores are expressed on a scale of 0 to 10. Table 6-2 shows that the 2023 BioRecon results for all sampling sites received a very low BioRecon score of 0.08, the second lowest to date. Extensive periphyton smothering by *Cladophora* sp. of nearshore habitats is likely the reason.

Table 6-1 Taxa List for April 2023 MBS Benthic Macroinvertebrate Sampling Event

Order	Common Name	Family	Genus	Species	Count
Clitellata	Worm	Naididae	*Dero*	*digitata complex sp.*	1
Gastropoda	Snail	Amnicolidae	*Amnicola*	*dalli*	2
Gastropoda	Snail	Cochliopidae	*Pyrgophorus*	*platyrachis*	1
Gastropoda	Snail	Planorbidae	*Planorbella*	*trivolvis*	5
Amphipoda	Scud	Hyalellidae	*Hyalella*	*azteca* complex sp.	9
Heteroptera	True bug	Nepidae	*Ranatra*	*australis*	1
Coleoptera	Beetle	Haliplidae	*Peltodytes*	*dietrichi*	1
Coleoptera	Beetle	Haliplidae	*Peltodytes*	*oppositus*	2
Coleoptera	Beetle	Hydrophilidae	*Tropisternus*	*blatchleyi*	1
Diptera	Midge	Chironomidae	*Chironomus*	sp.	1
Diptera	Midge	Chironomidae	*Goeldichironomus*	*cf. natans*	3
Diptera	Midge	Chironomidae	*Kiefferulus*	sp.	1
Diptera	Midge	Chironomidae	*Polypedilum*	*beckae*	2

Table 6-2 MBS BioRecon Results Summary

Year	Total Taxa	BioRecon Score
2016	11	0.24
2017	9	0.0
2018	Not Sampled	
2019	18	0.8
2020	22	1.4
2021	12	0.33
2022	14	0.47
2023	13	0.08

The BioRecon sampling method is designed for flowing streams, and the SOP requires the presence of environmental conditions related to flowing systems (i.e., streams and rivers),

including a velocity greater than 0.05 meter per second (m/sec). MBS is a lentic system, for which BioRecon is not designed. Thus, the low BioRecon category is a result of MBS being a lentic system and is not necessarily an indication of poor health. The metric results associated with this EMP are useful only to assess relative trends at MBS over time and cannot be used to assess the health of MBS. Appendix F contains additional details and data.

6.1.2.2 Zooplankton

Three zooplankton taxa (*Calanoidea* sp., *Rotifer* sp., and *Chironomidae* sp.) were observed during the April 25, 2023, zooplankton sampling event, which was higher than the one taxa observed in 2022 and greater than 2017 and 2016 when no taxa were observed. Phytoplankton abundance was low in 2023 (chlorophyll was 4.4 micrograms per liter [µg/L]), which diminished the food supply for the zooplankton. However, DO was >3 mg/L at the surface at all three stations in 2023, and DO exceeded 3 mg/L to a depth of 4 meters at Stations 2 and 3, which should have assisted with zooplankton success. Table 6-3 shows the calculation of the mean abundance of zooplankton for the sampling period of record. Appendix G contains additional details and data.

Table 6-3 Summary of Zooplankton Sampling Results

Sampling Date	Number of Taxa	Mean Abundance	Dominant Taxa
2016	0	0	NA
2017	0	0	NA
2018	Not Sampled	Not Sampled	Not Sampled
2019	3	18,645 raw counts	*Cladocera sp., Calanoidea* sp., and *Rotifera* spp.
2020	1	249.4 individuals/m^3	*Calanoidea* sp.
2021	2	12,419 individuals/m^3	*Calanoidea* and *Rotifera* sp.
2022	1	1,412 individuals/m^3	*Calanoidea*
2023	3	2,000 individuals/m^3	*Calanoidea, Rotifera,* and *Chironomidae* sp.

Notes: NA = not applicable; m^3 = cubic meters.

6.2 Fish Sampling

6.2.1 Methodology

The fish sampling within MBS was conducted on April 25, 2023, by Frydenborg staff. Four minnow seine hauls were conducted along four locations of the sink's littoral shelf using a 12-foot seine with 0.125-inch mesh. All fish collected in each sample were identified, counted, and returned to MBS.

6.2.2 Results and Discussion

Table 6-4 shows that two species of fish were collected – mosquitofish (*Gambusia affinis*) and sailfin molly (*Poecilia latipinna*). Significantly more fish individuals were captured in 2023 than in 2022. This is likely because of the areas with lower periphyton abundance,

allowing for more effective seine net deployments. Additionally, the DO levels observed in 2023 were above 70-percent saturation in the top meter of the water column, favorable for fish success. Only two species of fish continue to be observed, which is likely due to the restricted fish recruitment potential from other waterbodies.

Appendix H provides the Frydenborg *2023 Fish Monitoring* report for the fish sampling event.

Table 6-4 Summary of Morris Bridge Sink Fish Sampling

Year	Total Taxa	Total Individuals	Taxa Present
2016	2	116	*Gambusia holbrooki, Poecilia latipinna*
2017	2	84	*Gambusia holbrooki, Poecilia latipinna*
2018	Not Sampled	Not Sampled	Not Sampled
2019	2	112	*Gambusia holbrooki, Poecilia latipinna*
2020	2	44	*Gambusia holbrooki, Poecilia latipinna*
2021	2	855	*Gambusia holbrooki, Poecilia latipinna*
2022	3	137	*Gambusia holbrooki, Poecilia latipinna, Ameirus nebulosus*
2023	2	489	*Gambusia holbrooki, Poecilia latipinna*

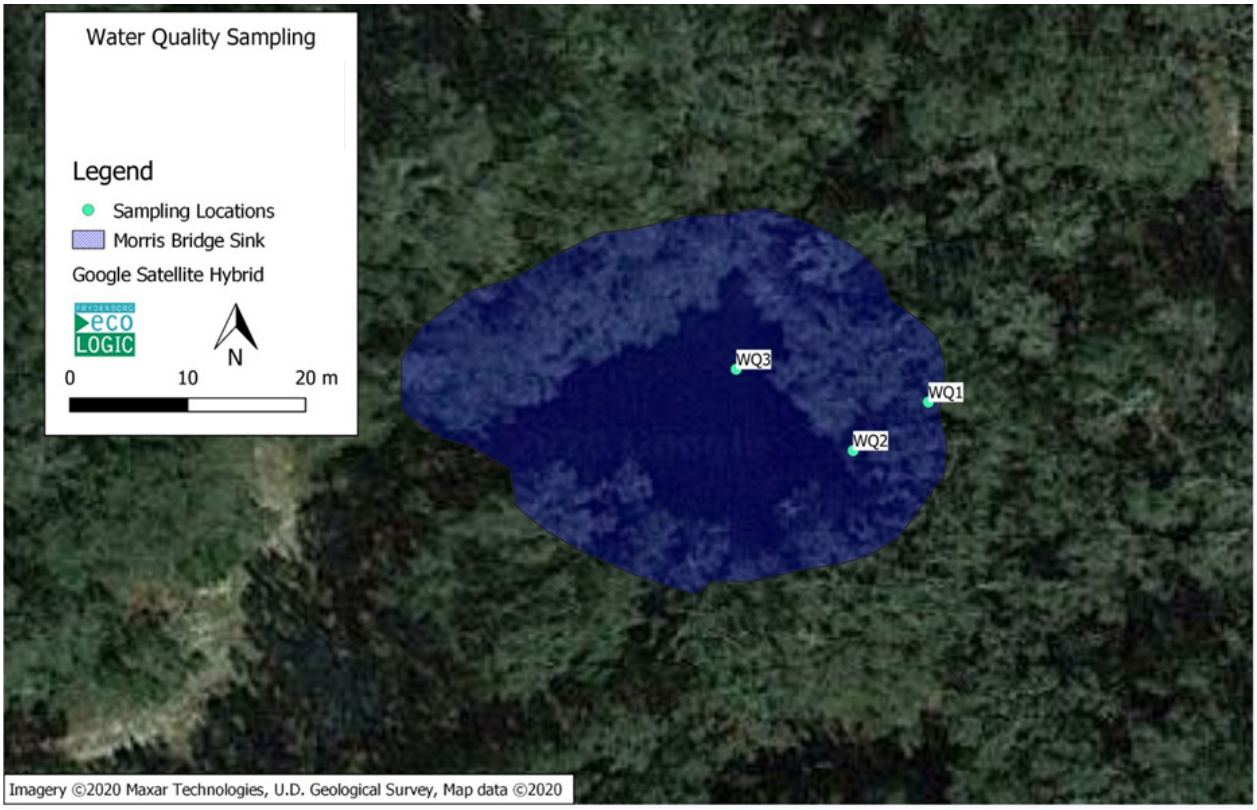
6.3 WATER QUALITY

6.3.1 METHODOLOGY

The water-quality monitoring was conducted at MBS on April 25, 2023, by Frydenborg. Figure 6-1 shows where the water-quality field parameters were collected, which consisted of conductivity, pH, DO (measured with a YSI 600XLM sonde equipped with a 100-foot cable), and water clarity (measured using a secchi disk at three locations in MBS). Vertical profile measurements were taken near the surface and at 0.5-meter intervals to a depth of 5 meters with an additional set of measurements recorded at 10 meters.

Water samples were collected from the center of MBS at 0.3- to 0.5-meter depths and analyzed for the following parameters: color, total chlorophyll, total suspended solids, total dissolved solids, alkalinity, major ions (chloride, calcium, fluoride, sulfate, and bromide), nitrate, nitrite, ortho-phosphorus, total phosphorus, and total nitrogen. All samples were collected in accordance with current FDEP SOPs (Florida Statutes [FS] 2000/2100). Unfiltered surface-water grab samples were collected directly into laboratory-supplied sterile containers. Following collection of the samples, the containers were preserved as necessary and stored in iced coolers. All samples were analyzed by Pace Analytical Services, LLC, in Tampa. Appendix I contains the Frydenborg 2023 *Water Quality Monitoring* report, which provides methods, analytical procedures, and data.

Figure 6-1 2023 Water-Quality Sampling Location Map



6.4 Results and Discussion

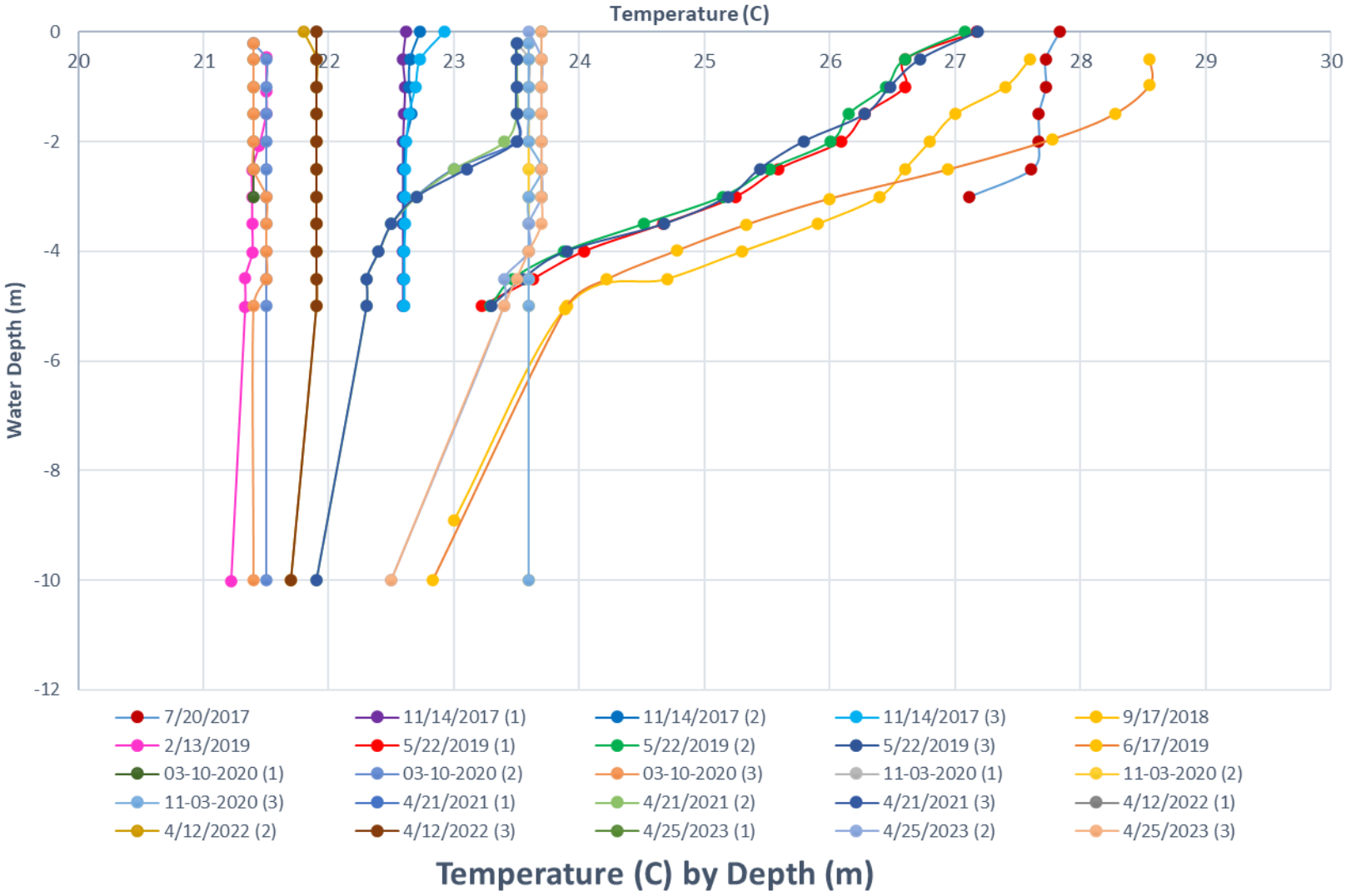
Table 6-5 and Figure 6-2 summarize the water-quality data from 2016 to 2023. Water-quality data were not collected in 2018. Overall, no statistically significant changes were noted in the field-measured parameters or chemical analytes over the years sampled. Appendix I provides additional details and data.

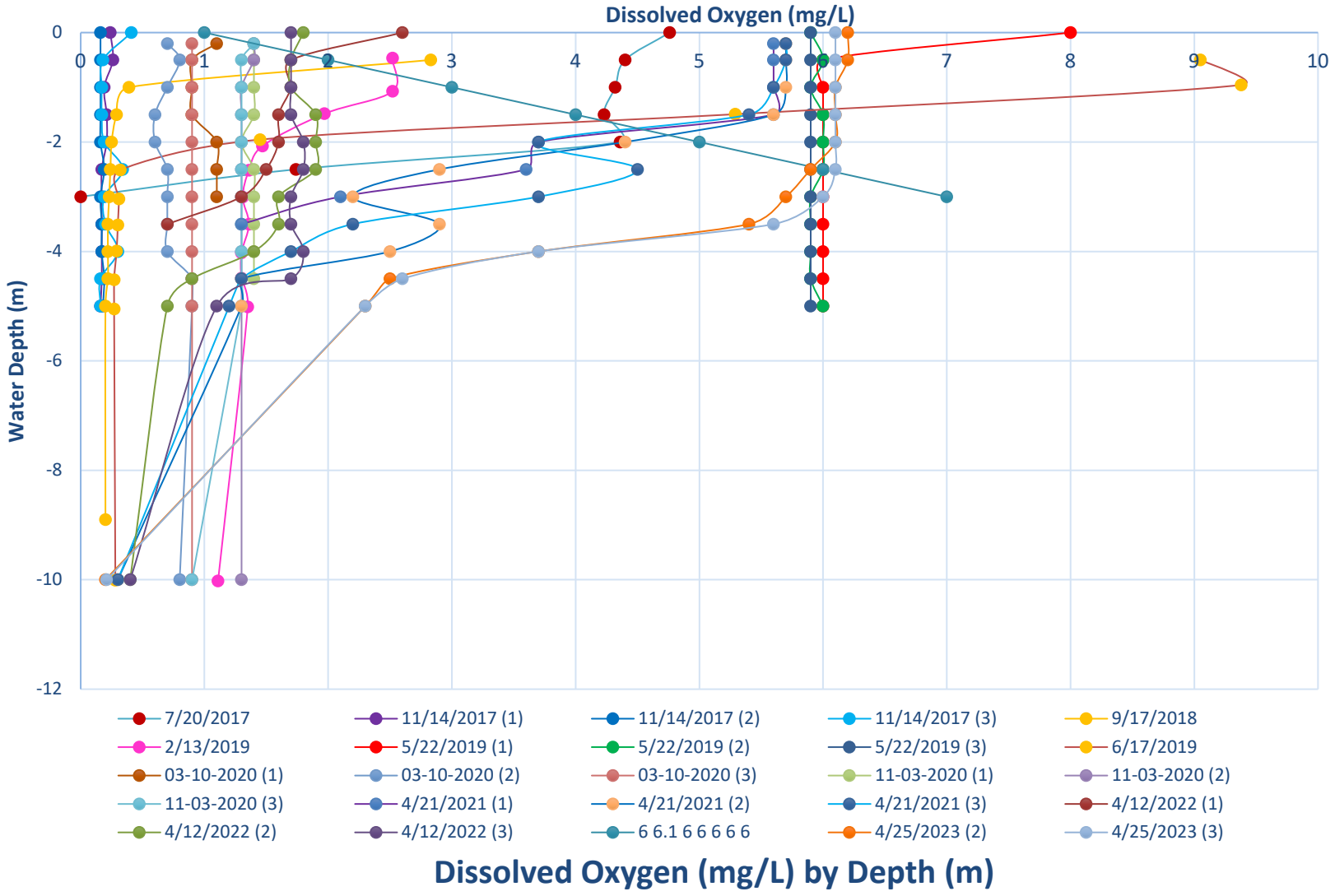
Table 6-5 Cumulative Water-Quality Results (Wet Chemistry) for MBS
(Past data: ADA and Earth Resources, 2016; ADA and Earth Resources, 2017; and ADA and Earth Resources, 2019.)

Parameter	2016	2017	2018	2019	Mar. 2020	Nov. 2020	2021	2022	2024
Alkalinity (mg/L)	—	—	—	—	170	120	160	130	150
Bromide (mg/L)	0.077	0.069	—	0.069	0.18*	0.2*	0.2*	0.2	0.2*
Calcium (mg/L)	—	—	—	67.6	74	53	74	75	72
Chloride (mg/L)	13	10.9	—	12.4	15	10	13	13	12
Chlorophyll a (µg/L)	2.2	2.2	—	8.3	2.5*	13	120	2.5	4.4
Color (platinum cobalt units [PCU])	—	—	—	20	13	24	4.3*	5	-
Fluoride (mg/L)	0.22	0.16	—	0.15	0.2*	0.4*	0.4*	0.4	0.4*
Nitrate (mg/L)	0.01	0.025	—	0.025	0.079*	0.28*	0.092*	0.092	0.09*
Nitrate-Nitrite (mg/L)	—	—	—	—	0.14*	0.28*	0.12*	0.12	0.24*
Nitrite (mg/L)	0.025	0.025	—	0.025	0.077*	0.081*	0.081*	0.081	0.09*
Ortho-Phosphorus (mg/L)	—	—	—	0.038	0.039	0.013*	0.013*	0.03	0.013*
Secchi (meters)	6.5	5.2	—	2.9	6.5	1.4	1.3	1.3	2.5
Sulfate (mg/L)	46.3	49	—	38.7	42	27	68	58	47
TKN (mg/L)	—	—	—	NA	0.075	0.21	0.115	0.087	0.097
Total Dissolved Solids (mg/L)	278	293	—	233	330	200	240	322	250
Total Nitrogen	0.28	0.34	—	0.58	0.18*	0.49	0.147	0.12	0.12*
Total Phosphorus (mg/L)	—	—	—	0.065	0.15	0.15*	0.15*	0.15	0.15*
Total Suspended Solids (mg/L)	5	5	—	5	2*	1.2*	1*	1.000	1*

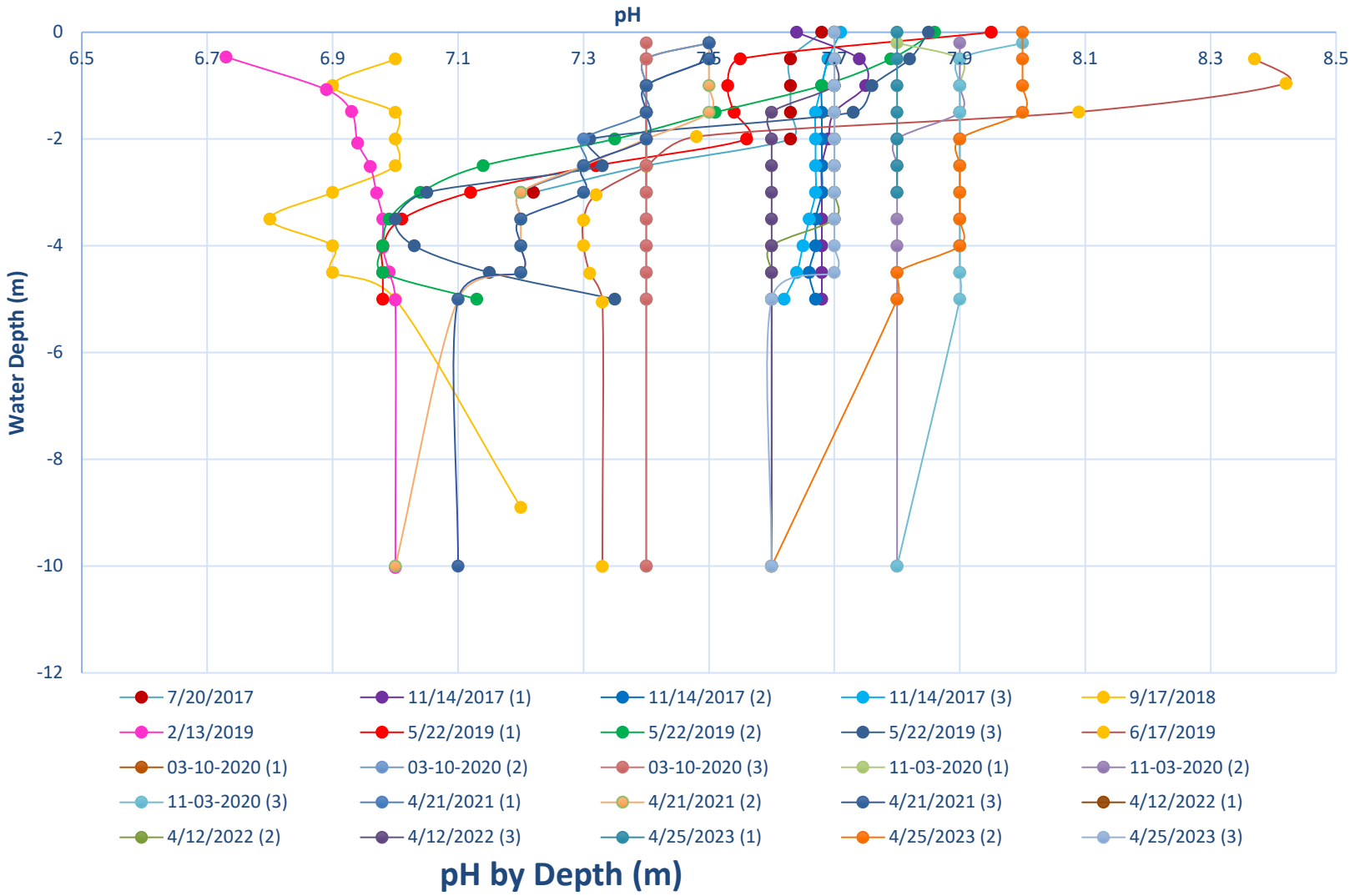
*Value reported is the laboratory method minimum detection limit.

Figure 6-2 Consolidated Water Quality Data Graphs (2017–2023)

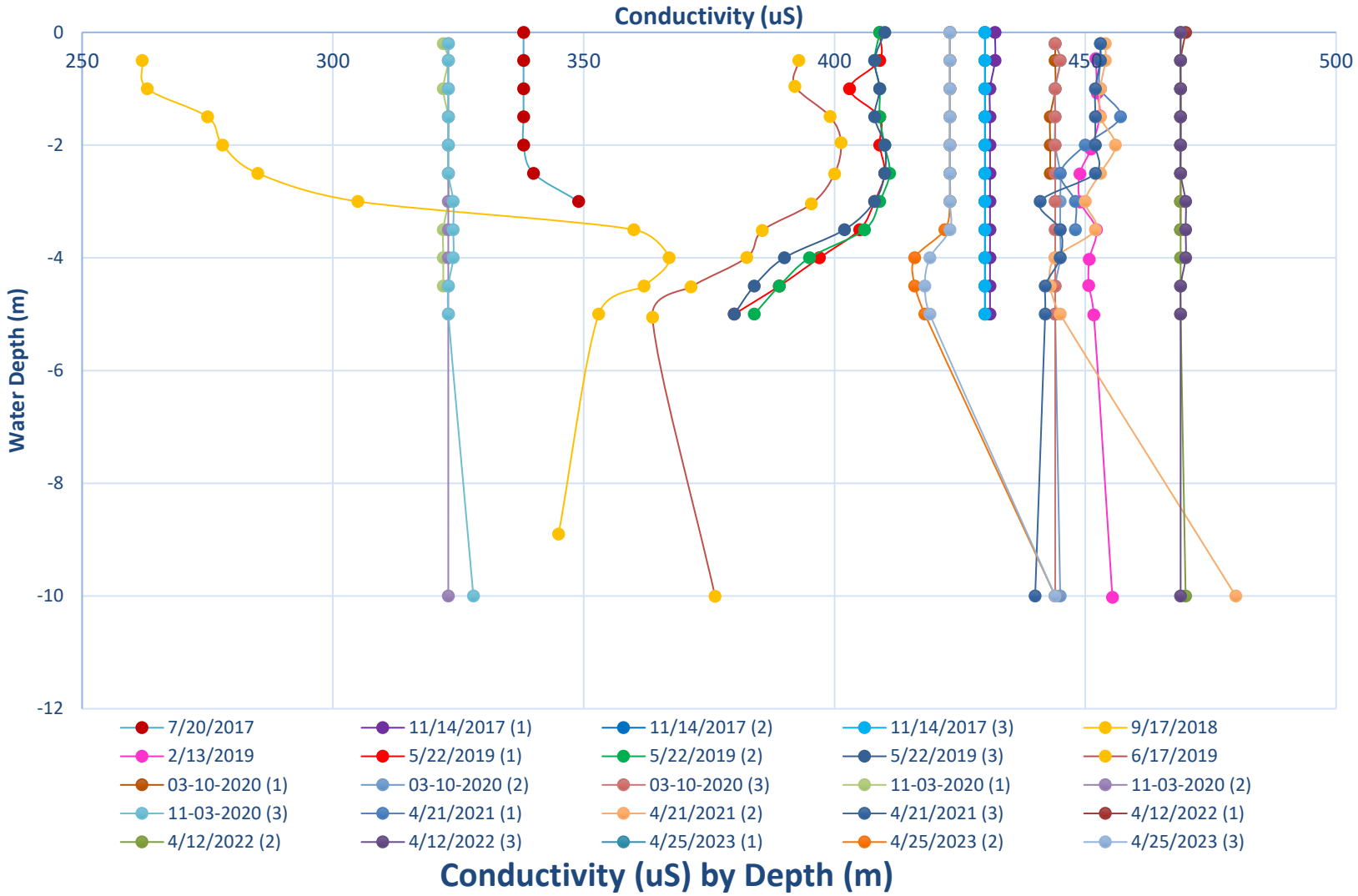




Dissolved Oxygen (mg/L) by Depth (m)


pH
0
-2
-4
-6
-8
-10
-12
6.5
6.7
6.9
7.1
7.3
7.5
7.7
7.9
8.1
8.3
8.5
Water Depth (m)
7/20/2017
11/14/2017 (1)
11/14/2017 (2)
11/14/2017 (3)
9/17/2018
2/13/2019
5/22/2019 (1)
5/22/2019 (2)
5/22/2019 (3)
6/17/2019
03-10-2020 (1)
03-10-2020 (2)
03-10-2020 (3)
11-03-2020 (1)
11-03-2020 (2)
11-03-2020 (3)
4/21/2021 (1)
4/21/2021 (2)
4/21/2021 (3)
4/12/2022 (1)
4/12/2022 (2)
4/12/2022 (3)
4/25/2023 (1)
4/25/2023 (2)
4/25/2023 (3)

pH by Depth (m)


Conductivity (uS)
0
-2
-4
-6
-8
-10
-12
250
300
350
400
450
500
Water Depth (m)
7/20/2017
11/14/2017 (1)
11/14/2017 (2)
11/14/2017 (3)
9/17/2018
2/13/2019
5/22/2019 (1)
5/22/2019 (2)
5/22/2019 (3)
6/17/2019
03-10-2020 (1)
03-10-2020 (2)
03-10-2020 (3)
11-03-2020 (1)
11-03-2020 (2)
11-03-2020 (3)
4/21/2021 (1)
4/21/2021 (2)
4/21/2021 (3)
4/12/2022 (1)
4/12/2022 (2)
4/12/2022 (3)
4/25/2023 (1)
4/25/2023 (2)
4/25/2023 (3)
Conductivity (uS) by Depth (m)

7 CONCLUSIONS

No pumping from MBS has occurred to date. This 2023 Annual Report documents hydrologic, soil, vegetative, and biological baseline conditions in MBS and the three adjacent wetlands that could be compared as baseline averages to data collected during or after pumping.

Water levels in the sinks, wetlands, and Floridan aquifer follow a wet- and dry-season pattern that coincides with regional rainfall patterns. Overall, the ecological and environmental data collected at Morris Bridge in 2023 signify a collection of healthy wetland environments. However, disturbance by feral pigs continues to be documented in the monitored wetlands.

If pumping commences, data collected to date will allow SWFWMD staff to more effectively assess whether withdrawals are negatively affecting wetland water levels, vegetation communities, and the biology of the monitored features.

8 REFERENCES

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Appendix A

2023 Hydrologic Monitoring Summary

JonesEdmunds 50 YEARS 1974-2024

MORRIS BRIDGE SINK

2023 HYDROLOGIC MONITORING SUMMARY

Southwest Florida Water Management District | February 2024

MORRIS BRIDGE SINK
2023 HYDROLOGIC MONITORING SUMMARY

Prepared for:

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SWFWMD TWA No.: 23TW0004124

February 2024

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1 METHODS

The Southwest Florida Water Management District (SWFWMD) provided daily water-level records for surface water and wetland gauges as well as surficial aquifer and upper Floridan aquifer (UFA) gauges for the 2016 through 2023 period of record. Figure 1 shows the locations of the monitoring stations. Surface-water-level daily data are estimated for Cypress Wetland (Site Identifier [SID] 709110) from the surficial aquifer gauge SID 705598 and for Nursery Marsh (SID 709109) from surficial aquifer gauge SID 705595.

SWFWMD provided daily maximum water-level data for the Nursery Sink aquifer gauge (SID 637850) and Nursery Sink surficial groundwater gauge (SID 637851) for January 1, 2016, to December 31, 2023, in feet National Geodetic Vertical Datum of 1929 (NGVD29). A datum conversion of -0.84 foot was used to convert to North American Vertical Datum of 1988 (NAVD88). All water-level elevation data are presented in feet NAVD88.

Figures 2 through 12 show the water levels at each station for the January 1, 2016, to December 31, 2023, reporting period. Unless otherwise stated, all graphs show daily records in a continuous line. SIDs 705598 and 705595 are shown with the estimated continuous water-level readings, and each manual reading for SIDs 709110 and 709109, respectively, are indicated by points along the line (Figures 3 and 4).

2 RESULTS

2.1 Surface-Water Monitoring – Water Levels

Tables 1 and 2 summarize the Environmental Management Plan (EMP) (wetland and sink, respectively) surface-water monitoring stations. Figures 2 through 7 provide trendlines of surface-water elevations at the EMP wetland and sink stations.

Table 1 EDP Station Identifications for Surface-Water Monitoring – Wetlands

SID	DID	Station Name	Abbreviated Name
792841	7	MorrisBridgeNurserySinkCypressMarsh	Cypress Marsh
709110	6	MorrisBridgeNurserySinkCypress	Cypress Wetland
709109	3	MorrisBridgeNurseryMarsh	Nursery Marsh

Note: EDP = Environmental Data Portal.

Table 2 EDP Station Identifications for Surface-Water Monitoring – Sinks

SID	DID	Station Name	Abbreviated Name
709108	5	MorrisBridgePowerlineSink	Powerline Sink
709106	2	MorrisBridgeSink	Morris Bridge Sink
709107	4	MorrisBridgeNurserySink	Nursery Sink

2.2 Groundwater Monitoring – Well Water Levels

Table 3 summarizes the surficial and Floridan aquifer monitoring stations. Water elevations are recorded hourly at all stations. Figures 8 through 12 provide daily maximum trendlines for these groundwater monitoring sites. Several stations have data gaps; Table 4 summarizes the data and gaps for all stations. The gaps represent periods when no water-level data are available from the EDP.

Table 3 EDP Station Summary for Groundwater Monitoring Sites

ID	DID	Station Name	Abbreviated Location	Aquifer Unit	Total Well Depth (feet)
705598	17	MorrisBridgeNurserySinkCypress WetlandSurf	Cypress Wetland	Surficial	9
705595	10	MorrisBridgeNurserySinkMarsh WetlandSurf	Nursery Marsh	Surficial	5
637851	12	MorrisBridge516-sSurf	Northwest of Nursery Sink	Surficial	18
705593	8	MorrisBridgePowerlineSink UplandSurf	Upland of Powerline Sink	Surficial	18
705596	16	MorrisBridgeNurserySinkCypress UplandSurf	Upland of Cypress Wetland	Surficial	6
705594	11	MorrisBridgeNurserySinkMarsh UplandSurf	Upland of Nursery Marsh	Surficial	10
433088	13	Fl-mb-2200Fldn(atRockglen)	North of Cypress Marsh	Floridan	48
433083	14	Fl-mb-750Fldn(atEloian)	East of Nursery Marsh	Floridan	70
433087	15	Fl-mb-550Fldn(atIdlewood)	Southwest of Morris Bridge Sink	Floridan	100
637850	9	MorrisBridge516-dFldn	Northwest of Nursery Sink	Floridan	140

Table 4 Hydrologic Monitoring Stations, Data Gaps, and Percent Data Capture Summary

Location	Station ID	Dates of Data Gaps	Total Days without Data	Data Capture (%)
Cypress Marsh	792841	1/1/2016 to 1/7/2016	7	99.8
	433088	5/14/2016 to 6/8/2016; 9/13/2023 to 10/10/2023; 12/6/2023 to 12/31/2023	80	97.3
Cypress Wetland	709110/ 705598	1/22/2016 to 2/14/2016; 8/4/2017 to 10/24/2017; 6/28/2018 to 7/30/2018, 12/17/2022 to 12/31/2022; 4/11/2023 to 5/15/2023; 12/6/2023 to 12/31/2023	215	92.6
	705596	5/4/2017 to 6/12/2017; 9/26/2018 to 9/30/2018; 12/22/2022 to 12/31/2022; 5/3/2023 to 5/5/2023; 5/9/2023 to 5/11/2023; 5/17/2023 to 6/4/2023	80	97.3
Nursery Marsh	709109/ 705595	1/1/2016 to 1/4/2016; 1/6/2016 to 1/13/2016; 8/4/2016 to 9/5/2016; 8/22/2017 to 9/4/2017; 9/6/2017 to 10/24/2017; 1/19/2018 to 2/4/2018; 4/22/2018 to 4/30/2018; 4/2/2019; 1/5/2021, 1/6/2021; 12/22/2022 to 12/31/2022	147	95.0
	705594	2/28/2017; 11/21/2017 to 12/5/2017; 12/7/2017 to 1/1/2018; 1/3/2018 to 2/4/2018; 2/6/2018 to 2/28/2018; 3/2/2018 to 4/1/2018; 4/3/2018 to 4/30/2018; 5/2/2018 to 5/7/2018; 12/22/2022 to 12/31/2022	173	94.1
	433083	1/1/2016 to 1/4/2016; 11/17/2016 to 11/29/2016; 1/12/2017 to 1/14/2017; 11/3/2017 to 12/5/2017; 12/7/2017 to 1/1/2018; 1/3/2018 to 2/4/2018; 2/6/2018 to 2/28/2018; 3/2/2018 to 4/1/2018; 4/3/2018 to 4/30/2018; 5/2/2018 to 5/7/2018; 10/2/2018 to 11/12/2018; 10/2/2019 to 10/16/2019; 2/4/2020 to 2/5/2020; 12/5/2023 to 12/31/2023	286	90.2
Powerline Sink	709108	11/19/2022 to 11/22/2022; 12/21/2022 to 12/31/2022	15	99.5
	705593	12/21/2022 to 12/31/2022	11	99.6
Nursery Sink	709107	9/25/2022; 9/28/2022 to 10/6/2022; 10/8/2022 to 10/23/2022; 10/25/2022; 10/27/2022 to 10/30/2022; 11/1/2022 to 11/3/2022; 11/12/2022 to 11/15/2022; 7/1/2023 to 7/18/2023	56	98.1
	637851	6/24/2017 to 6/26/2017; 2/17/2018 to 2/19/2018; 7/21/2018 to 7/24/2018; 9/11/2019; 8/26/2020	14	99.5
	637850	2/17/2018 to 2/19/2018; 7/21/2018 to 7/24/2018; 11/4/2018 to 11/27/2018; 1/9/2019 to 1/15/2019; 6/16/2020; 8/26/2020	42	98.6
Morris Bridge Sink	709106	8/20/2017 to 8/22/2017; 8/24/2017; 11/2/2019 to 11/4/2019; 11/14/2020 to 11/29/2020	23	99.2
	433087	1/1/2016 to 1/4/2016; 8/17/2016 to 8/23/2016; 10/2/2016 to 10/11/2016; 3/2/2017 to 3/22/2017; 5/10/2019 to 6/2/2019; 6/12/2019 to 6/30/2019; 8/2/2019 to 8/7/2019	91	96.9

Key:

Surface Water	Floridan Aquifer
Surficial GW Wetland/Sink	Surficial GW Upland

Figure 1 Monitoring Stations Location Map

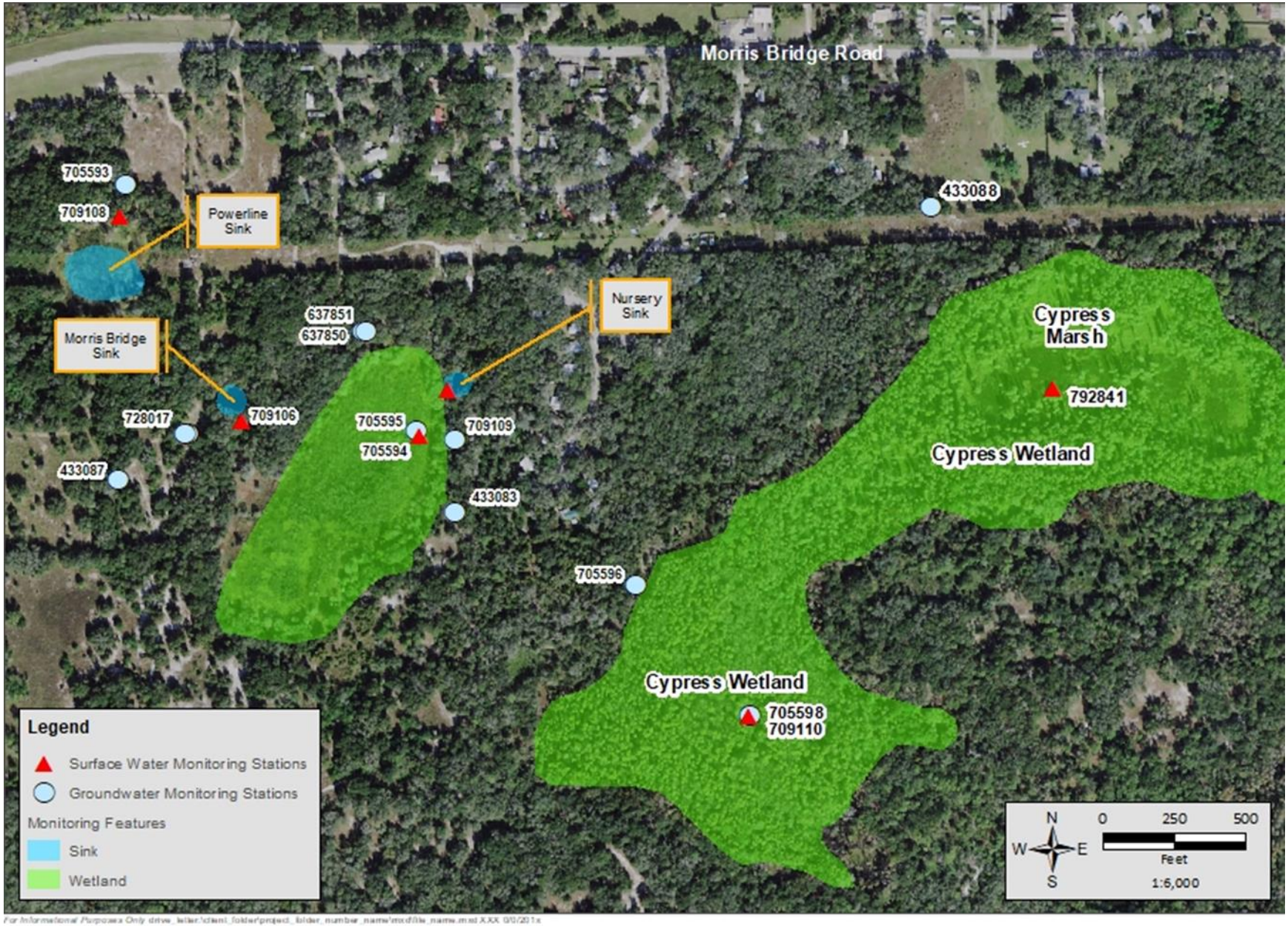
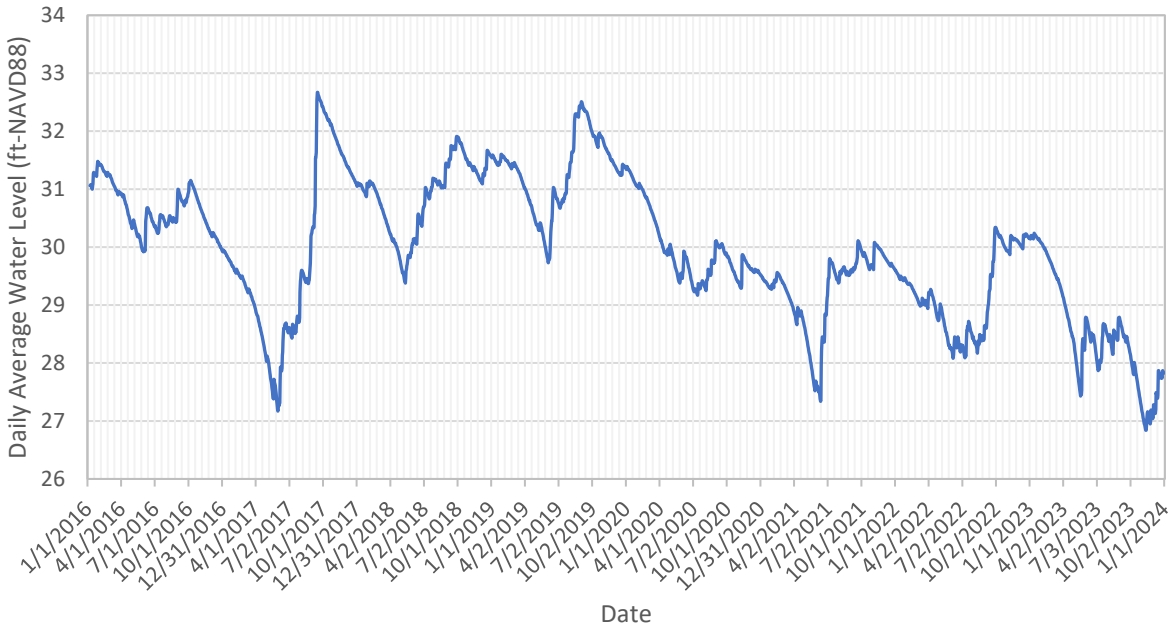
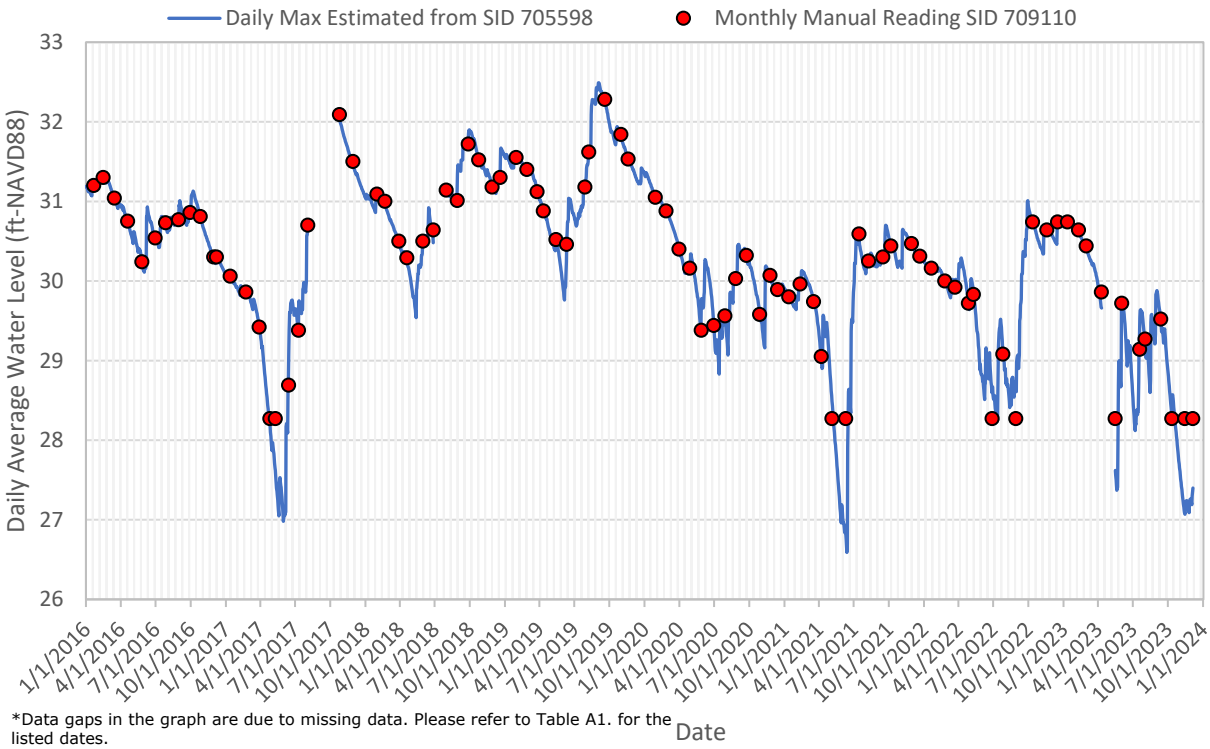


Figure 2 Surface-Water Levels at Cypress Marsh (SID 792841, DID 7)



*Data gaps in the graph are due to missing data. Please refer to Table A1. for the listed dates.

Figure 3 Surface-Water Levels at Cypress Wetland (SID 709110, DID 6)



*Data gaps in the graph are due to missing data. Please refer to Table A1. for the listed dates.

Figure 4 Surface-Water Levels at Nursery Marsh (SID 709109, DID 3)

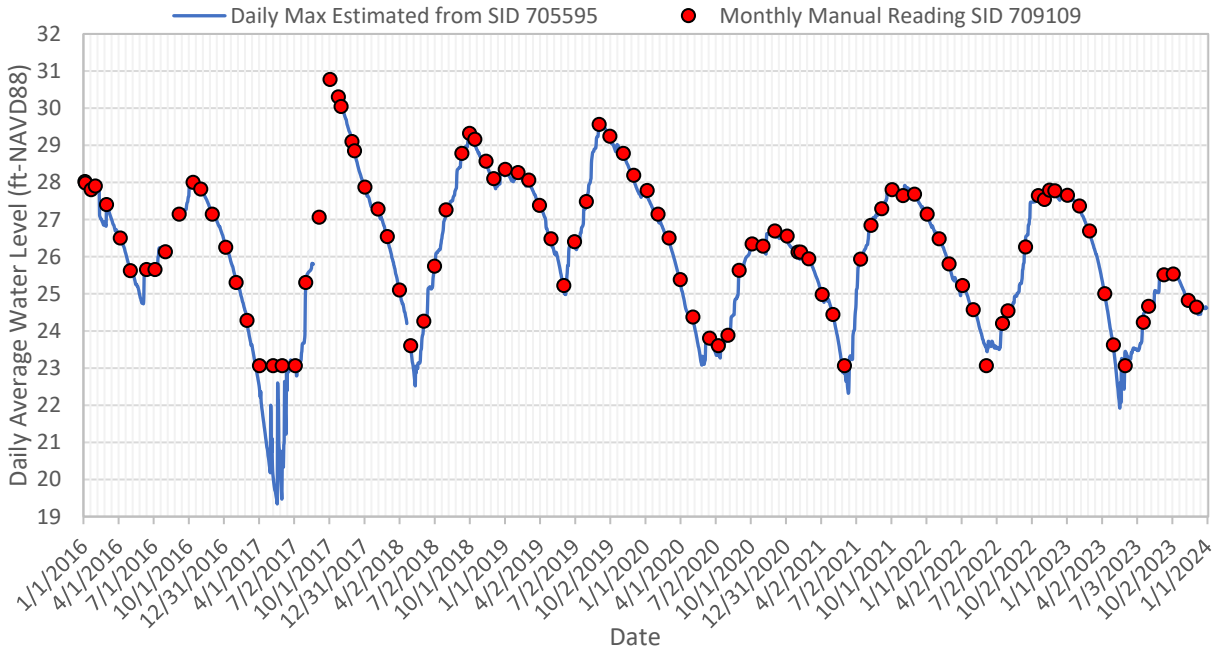
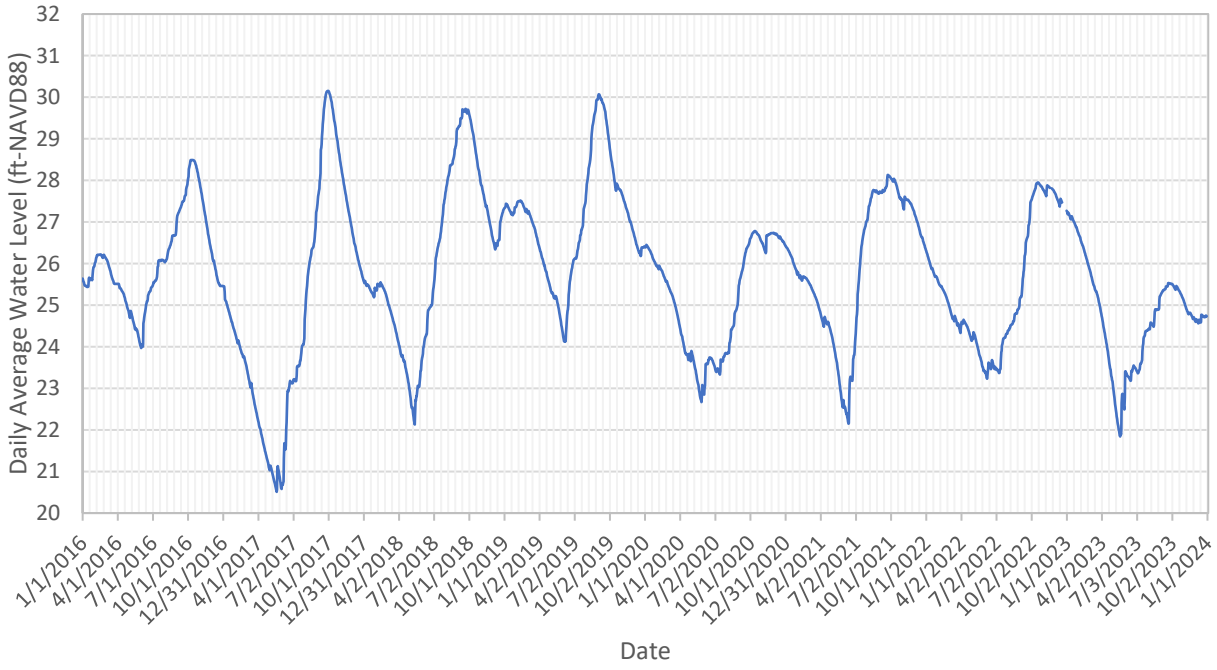
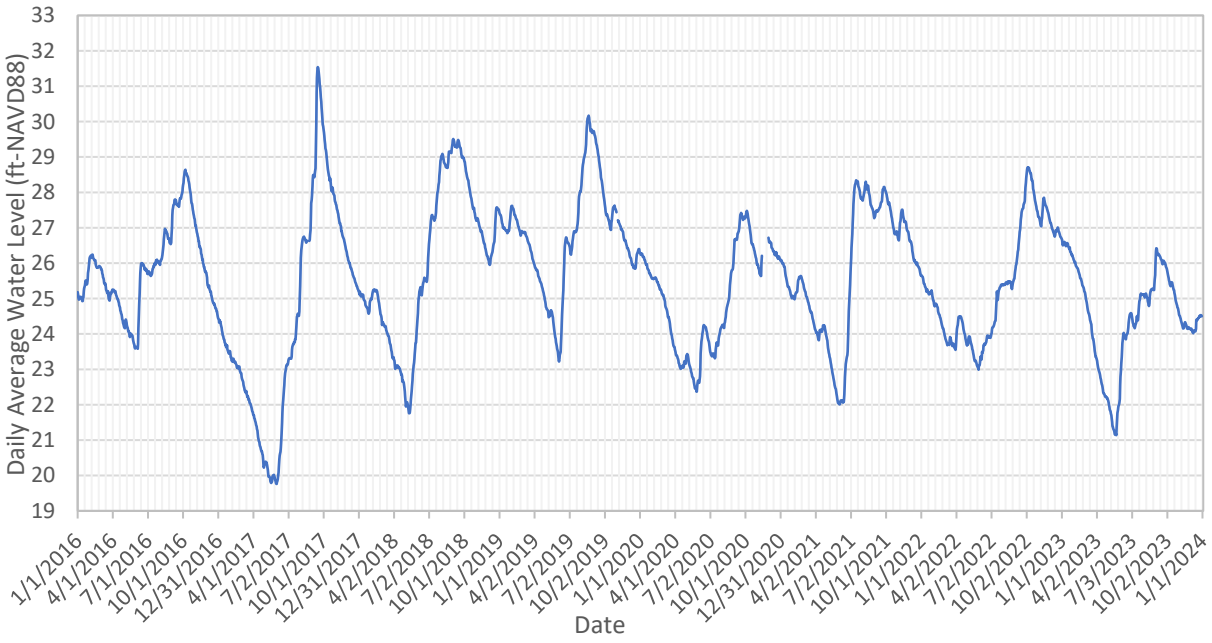


Figure 5 Surface-Water Levels at Powerline Sink (SID 709108, DID 5)



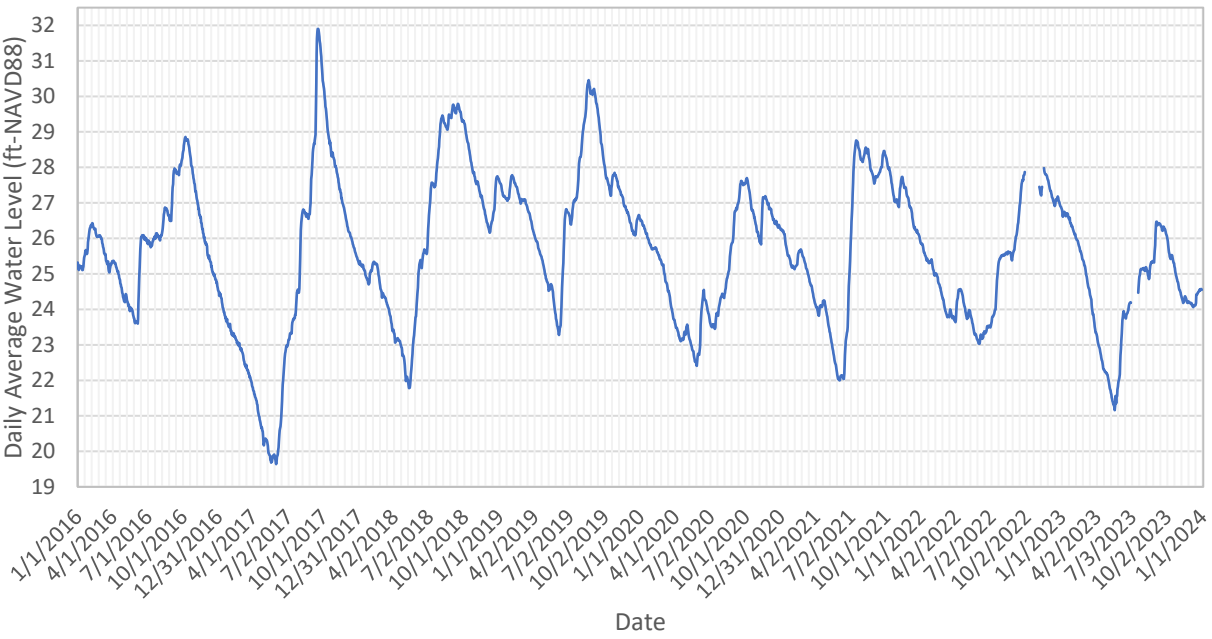
*Data gaps in the graph are due to missing data. Please refer to Table A1 for the listed dates.

Figure 6 Surface-Water Levels at Morris Bridge Sink (SID 709106, DID 2)



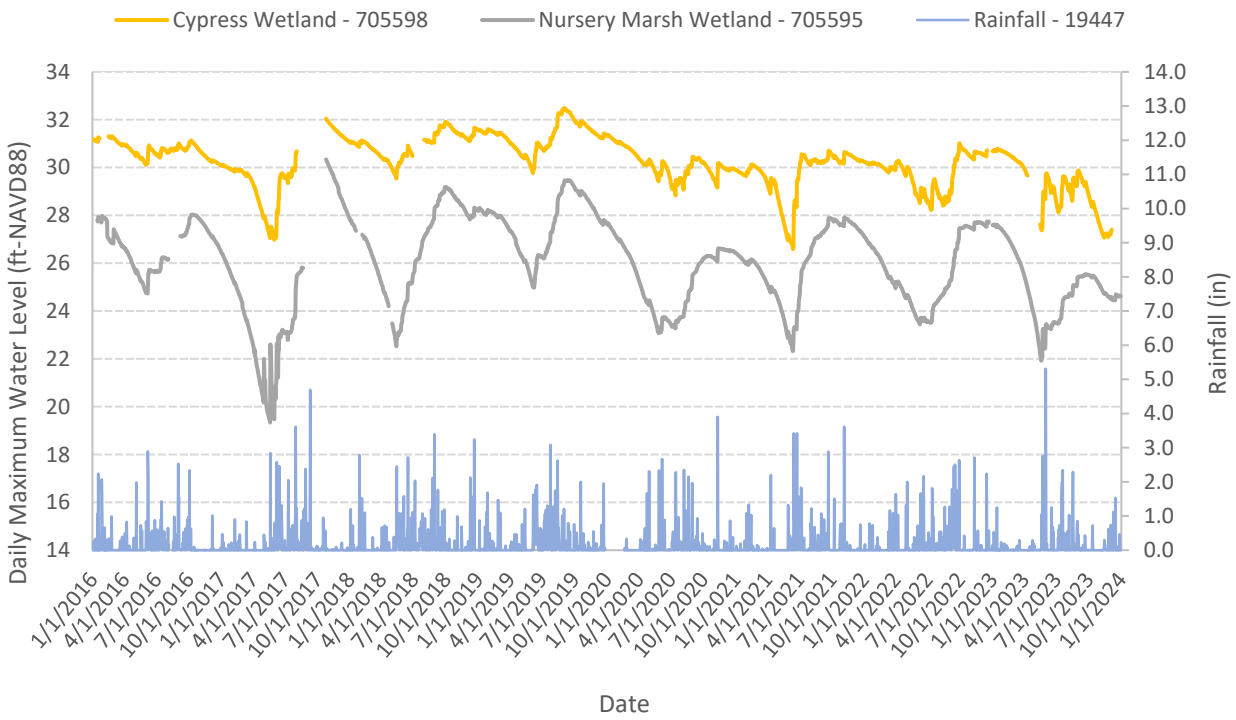
*Data gaps in the graph are due to missing data. Please refer to Table A1 for the listed dates.

Figure 7 Surface-Water Levels at Nursery Sink (SID 709107, DID 4)



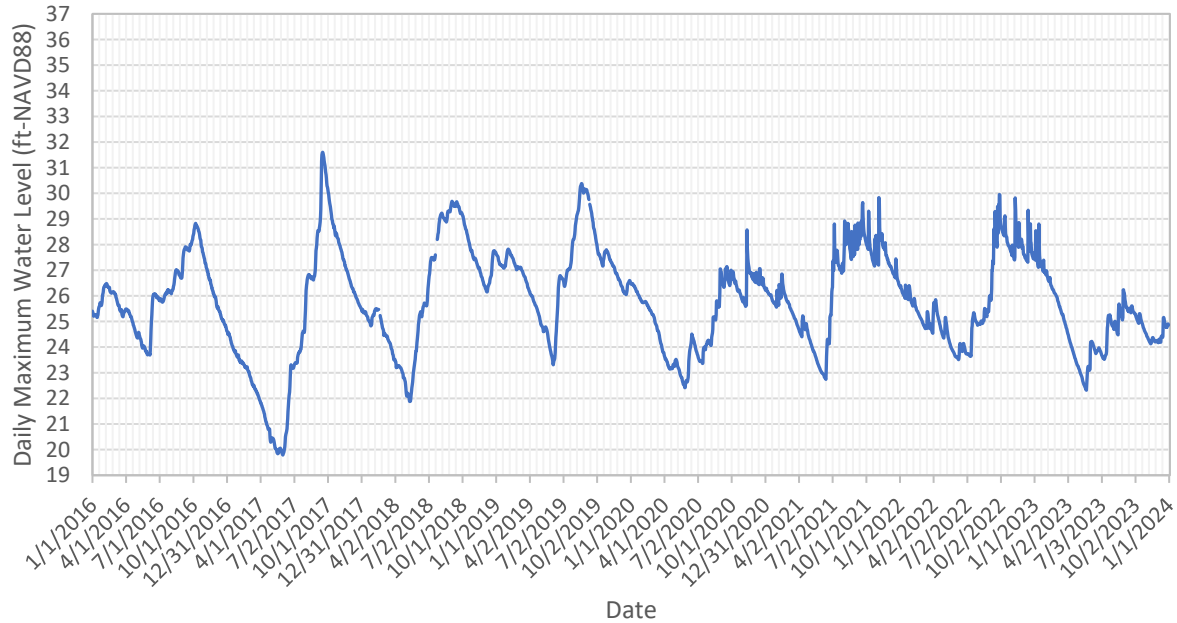
*Data gaps in the graph are due to missing data. Please refer to Table A1 for the listed dates.

Figure 8 Surficial Aquifer Levels at Nursery Marsh (SID 705595, DID 10) and Cypress Wetland (SID 705598, DID 17)



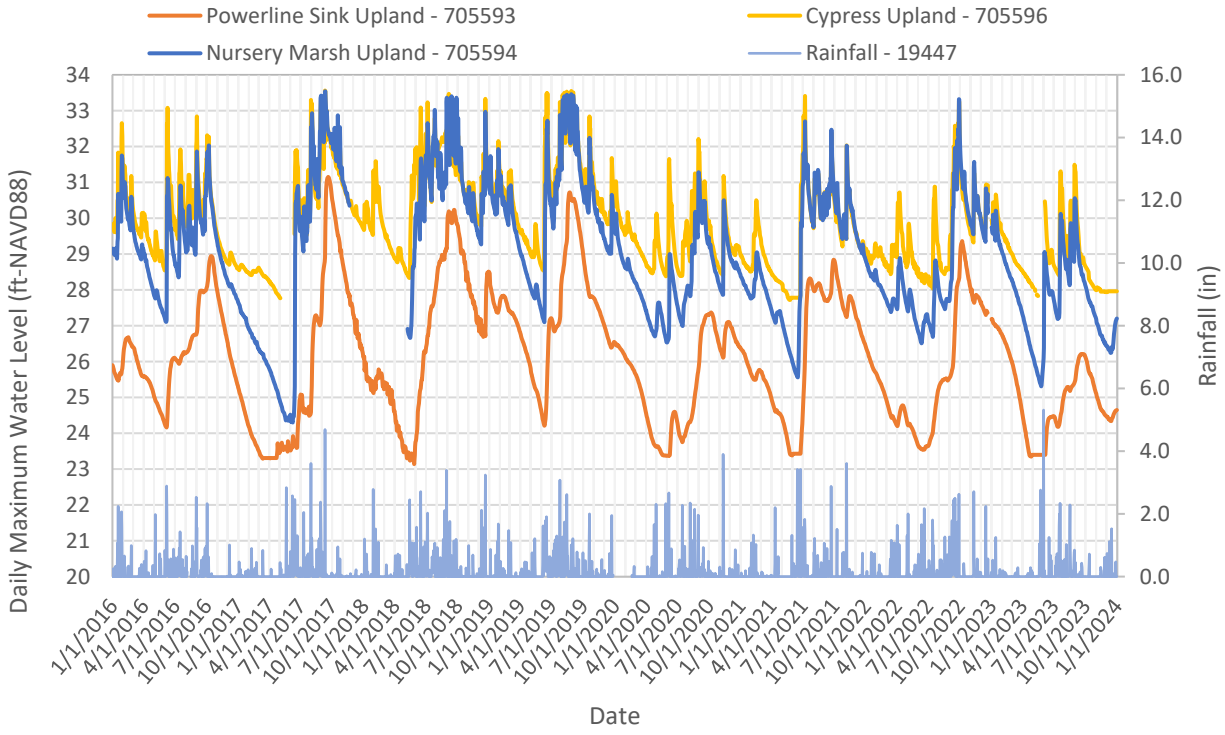
*Data gaps in the graph are due to missing data. Please refer to Table A1 for the listed dates.

Figure 9 Surficial Aquifer Levels Northwest of Nursery Sink (SID 637851, DID 12)



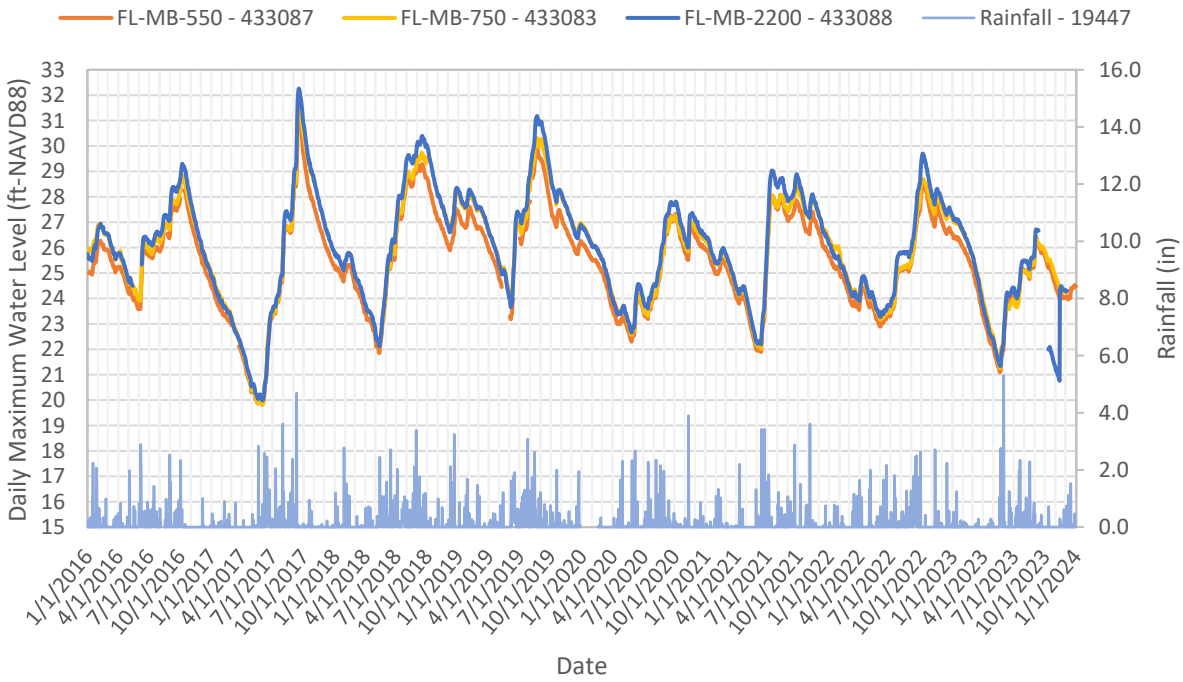
*Data gaps in the graph are due to missing data. Please refer to Table A1 for the listed dates.

Figure 10 Upland Surficial Aquifer Levels at Powerline Sink (SID 705593, DID 8), Cypress Wetland (SID 705596, DID 16), and Nursery Marsh Upland Wells (SID 705594, DID 11)



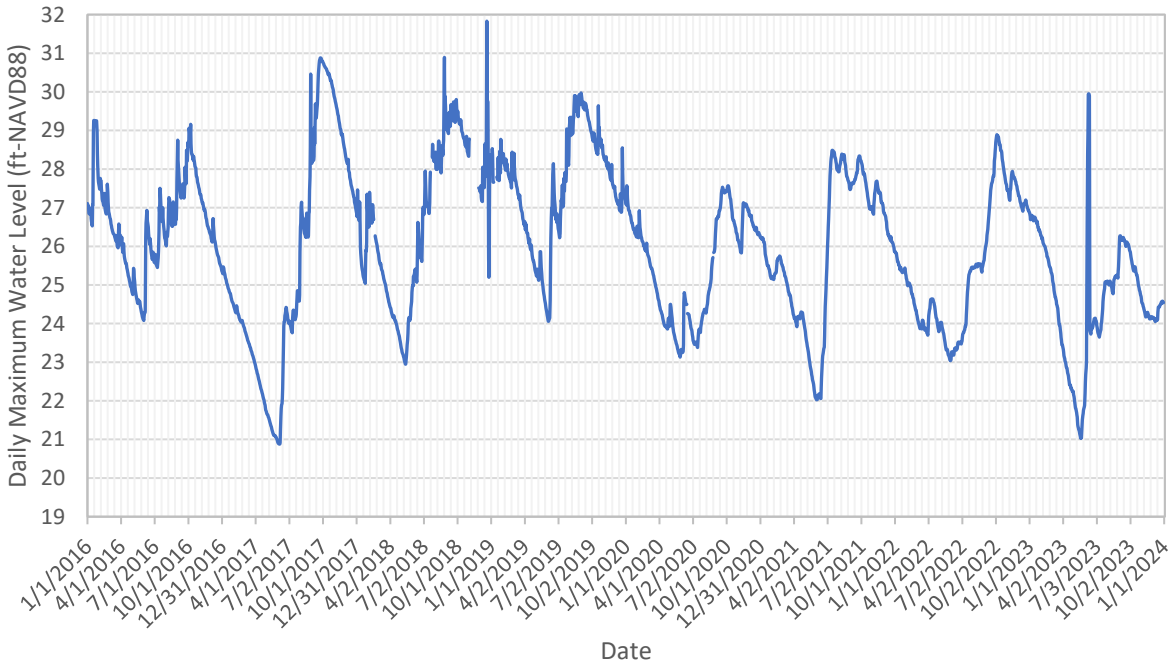
*Data gaps in the graph are due to missing data. Please refer to Table 4 for the listed dates.

Figure 11 UFA Levels near Cypress Marsh (SID 433088, DID 13), Nursery Marsh (SID 433083, DID 14), and Morris Bridge Sink (SID 433087, DID 15)



*Data gaps in the graph are due to missing data. Please refer to Table A1 for the listed dates.

Figure 12 UFA Levels NW of Nursery Sink (SID 637850, DID 9)



*Data gaps in the graph are due to missing data. Please refer to Table A1 for the listed dates.

Appendix B

2023 WAP Field Forms

Wetland Assessment Procedure P. 1

DID:	Wellfield/Property	Wetland Name	Wetland Type
	No Wellfield Association	Morris Bridge Nursery Marsh	Marsh Isolated

Wetland ID:	Site ID:	Data Owner:	Personnel's Employer:	Date:	Start Time:	End Time:	Transect
539	776658	SWFWMD	SWFWMD	June 29, 2023	12:35	14:05	Morris Bridge Nursery Marsh A

WAP Assessment Personnel:

TJ Venning	Brady Evans	

Water Level Information

Dry?	Yes	☐	No	☑

Elevation (ft):	Device Type:	Well/Gauge ID:
23.57	Staff Gauge	

Please enter Yes (Y), No (N), or Not Sure (NS) for the following questions and provide comments/explanations

Wetland Impacts			Wetland Drainage		
Wetland edges filled or disturbed?	☑ Yes	☐ No	Augmentation equipment in place?	☐ Yes	☑ No
Excessive dumping or trash in wetland?	☑ Yes	☐ No	Augmentation occurring at time of WAP?	☐ Yes	☑ No
Hog disturbance?	☑ Yes	☐ No	Clear evidence of direct stormwater inflow?	☐ Yes	☑ No
Significant impact from cattle (trampling)?	☐ Yes	☑ No	Clear evidence of direct drainage from wetland?	☐ Yes	☑ No
Vehicles through wetland (including bicycles)?	☐ Yes	☑ No	Other drainage activities in area?	☐ Yes	☑ No
Insect damage?	☐ Yes	☑ No	Borrow pit/retention pond in wetland vicinity?	☐ Yes	☑ No
Disease?	☐ Yes	☑ No			

Wetland Impact Comments	**Wetland Drainage Comments**
Significant hog rooting in transition zone and deep zone, a lot of trash observed along wetland edge	

Fire	**Lakes/Docks**
Signs of Fire? ☐ Yes ☑ No	N/A
	Is the littoral zone stranded?
Fire Comment (year, expanse, intensity)	**Lakes/Docks Comments:**

Soil Subsidence	**General Comments/Observations**
New signs of oxidation/subsidence: ☐ Yes ☑ No	
Soil Subsidence Comment:	
Future users of these data may not want to analyze/compare these data with other wetlands due to the extreme level of:	

Wildlife Species

Species Count	Common Name	Evidence Description	Comment
1	Pig frog	Call	
1	Boat tailed grackle	Observed	

Wetland ID:	Previous Year Assessment Width	Zone Assessment Notes	Transect
539	5M on each side of transect		Morris Bridge Nursery Marsh A

Groundcover

For each zone assessed, please document the following: species abbreviation, WAP zone (U, AD, T, OD, or D), percent cover (5% or 10% - 100% in increments of 10%), count (1-4), and distribution (E=edge, B=beyond a few feet, or T=throughout).

Transition Zone

☐ No groundcover

Species	Z	% or count	D
Ampelopsis arborea (PEPPERVINE)	AD	5	T
Amphicarpum muhlenbergianum (BLUE MAIDENCANE)	OD	5	T
Cephalanthus occidentalis (COMMON BUTTONBUSH)	D	5	T
Panicum hemitomon (MAIDENCANE)	NA	5	T
Hymenachne amplexicaulis (TROMPETILLA)	NA	5	T
Quercus laurifolia (LAUREL OAK; DIAMOND OAK)	T	5	T
Eupatorium capillifolium (DOGFENNEL)	AD	5	T
Eupatorium leptophyllum (FALSEFENNEL)	OD	5	T
Urena lobata (CAESARWEED)	U	20	T
Rhexia sp. ()	NA	5	T
Mikania scandens (CLIMBING HEMPVINE)	T	1	T
Dichanthelium sp. ()	NA	5	T
Carex longii (LONG'S SEDGE)	T	5	T

Outer Deep Zone

☐ No groundcover

Species	Z	% or count	D
Rhynchospora inundata (NARROWFRUIT HORNED BEAKSEDGE)	NA	10	T
Hypericum mutilum (DWARF ST.JOHN'S-WORT)	T	5	T
Cephalanthus occidentalis (COMMON BUTTONBUSH)	D	20	T
Panicum hemitomon (MAIDENCANE)	NA	10	T
Hymenachne amplexicaulis (TROMPETILLA)	NA	5	T
Ampelopsis arborea (PEPPERVINE)	AD	5	T
Rhexia sp. ()	NA	5	T
Setaria parviflora (YELLOW BRISTLEGRASS; KNOTROOT FOXTAIL)	AD	5	T
Juncus effusus subsp. solutus (SOFT RUSH)	NA	5	T
Andropogon glomeratus var. hirsutior (BUSHY BLUESTEM)	NA	1	T
Juncus marginatus (SHORE RUSH; GRASSLEAF RUSH)	NA	5	T
Leersia hexandra	OD	5	T

Deep Zone

☐ No groundcover

Species	Z	% or count	D
Salvinia minima (WATER SPANGLES)	NA	10	T
Lemna minor (COMMON DUCKWEED)	NA	5	T
Eichhornia crassipes (COMMON WATER-HYACINTH)	NA	10	T
Persicaria glabra (Denseflower knotweed)	NA	5	T
Cephalanthus occidentalis (COMMON BUTTONBUSH)	D	5	T
Panicum hemitomon (MAIDENCANE)	NA	5	T
Hymenachne amplexicaulis (TROMPETILLA)	NA	5	T
Mikania scandens (CLIMBING HEMPVINE)	T	3	T
Eupatorium capillifolium (DOGFENNEL)	AD	5	T
Hypericum mutilum (DWARF ST.JOHN'S-WORT)	T	5	T
Rhynchospora inundata (NARROWFRUIT HORNED BEAKSEDGE)	NA	5	T
Scleria baldwinii (BALDWIN'S NUTRUSH)	NA	5	T

Saccharum giganteum (SUGARCANE PLUMEGRASS)	OD	5	T
Leersia hexandra (SOUTHERN CUTGRASS)	OD	5	T
Juncus marginatus (SHORE RUSH; GRASSLEAF RUSH)	NA	5	T
Oldenlandia uniflora (CLUSTERED MILLE GRAINES)	T	5	T
Hypericum cistifolium (ROUNDPOD ST.JOHN'S-WORT)	NA	5	T
Parthenocissus quinquefolia (VIRGINIA CREEPER; WOODBINE)	NA	3	T
Smilax bona-nox (SAW GREENBRIER)	AD	2	T
Smilax auriculata (EARLEAF GREENBRIER)	NA	2	T
Erechtites hieraciifolius (AMERICAN BURNWEED; FIREWEED)	AD	5	T
Hypericum mutilum (DWARF ST.JOHN'S-WORT)	T	5	T
Drymaria cordata (DRYMARY; WEST INDIAN CHICKWEED)	AD	5	T
Andropogon glomeratus var. hirsutior (BUSHY BLUESTEM)	NA	5	T
Setaria parviflora (YELLOW BRISTLEGRASS; KNOTROOT FOXTAIL)	AD	5	T

(SOUTHERN CUTGRASS)			
Saccharum giganteum (SUGARCANE PLUMEGRASS)	OD	2	T

Rhynchospora inundata (NARROWFRUIT HORNED BEAKSEDGE)	NA	5	T
Rhynchospora filifolia (THREADLEAF BEAKSEDGE)	NA	5	T
Paspalum laeve (FIELD PASPALUM)	T	5	T
Paspalum setaceum (THIN PASPALUM)	AD	5	T
Callicarpa americana (AMERICAN BEAUTYBERRY)	U	3	T
Cyperus haspan (HASPAN FLATSEDGE)	NA	5	T
Coreopsis leavenworthii (LEAVENWORTH'S TICKSEED)	NA	5	T
Cyperus odoratus (FRAGRANT FLATSEDGE)	NA	5	T

Groundcover Comments

Zonation

Please assign a score of 1-5 or 0 (for NA) and provide an explanation

Zonation Score: 3

Zonation Score Explanation:

Two zone move in enough numbers into the deep zone

Wetland ID:	Previous Year Assessment Width	Zone Assessment Notes	Transect
539	5M on each side of transect		Morris Bridge Nursery Marsh A

Shrubs/Small Trees

For each zone assessed, please document the following: species abbreviation, WAP zone (U, AD, T, OD, or D), percent cover (5% or 10% - 100% in increments of 10%), count, and distribution (E=edge, B=beyond a few feet, or T=throughout).

Transition Zone

☐ No shrubs

Species	Z	%	#	D
Cephalanthus occidentalis (COMMON BUTTONBUSH)	D	10	4	T

Outer Deep Zone

☐ No shrubs

Species	Z	%	#	D
Cephalanthus occidentalis (COMMON BUTTONBUSH)	D	10	11	T

Deep Zone

☐ No shrubs

Species	Z	%	#	D
Salix caroliniana (CAROLINA WILLOW; COASTALPLAIN WILLOW)	O D	50	> 50	T
Cephalanthus occidentalis (COMMON BUTTONBUSH)	D	30	> 50	T

Shrubs/Small Trees Comments

Zonation

Please assign a score of 1-5 or 0 (for NA) and provide an explanation

Zonation Score: 3

Zonation Score Explanation:

One zone move in high numbers into the deep zone

Stress	
Signs of stress of appropriate shrubs and small trees (including dead species) ☑ Little or None ☐ Noticeable ☐ Significant ☐ Not Applicable	**Comment/Explanation**
Signs of stress of inappropriate shrubs and small trees (including dead species) ☑ Little or None ☐ Noticeable ☐ Significant ☐ Not Applicable	**Comment/Explanation**

Wetland ID:	Previous Year Assessment Width	Zone Assessment Notes	Transect
539	5M on each side of transect		Morris Bridge Nursery Marsh A

Trees

For each zone assessed, please document the following: species abbreviation, WAP zone (U, AD, T, OD, or D), percent cover (5% or 10% - 100% in increments of 10%), count, and distribution (E=edge, B=beyond a few feet, or T=throughout).

Transition Zone

☐ No trees

Species	Z	%	Count	D
Quercus virginiana (LIVE OAK)	U	30	3	T
Quercus laurifolia (LAUREL OAK; DIAMOND OAK)	T	20	1	T

Outer Deep Zone

☐ No trees

Species	Z	%	Count	D
Quercus laurifolia (LAUREL OAK; DIAMOND OAK)	T	20	1	T

Deep Zone

☐ No trees

Species	Z	%	Count	D
Salix caroliniana (CAROLINA WILLOW; COASTALPLAIN WILLOW)	O D	50	>50	T

Trees Comments

Zonation

Please assign a score of 1-5 or 0 (for NA) and provide an explanation

Zonation Score: 3

Zonation Score Explanation:

One zone move in high numbers into the deep zone

Stress	
Signs of stress of appropriate trees (do not include dead species) ☑ Little or None ☐ Noticeable ☐ Significant ☐ Not Applicable	**Comment/Explanation**
Signs of stress of inappropriate trees (include dead species) ☑ Little or None ☐ Noticeable ☐ Significant ☐ Not Applicable	**Comment/Explanation**
Dead/leaning trees (include standing dead trees and dead trees on ground that are appropriate) ☑ Little or None ☐ Noticeable ☐ Significant ☐ Not Applicable	**Comment/Explanation**
Recovery	
Signs of tree recovery ☐ Yes ☑ No ☐ Not Sure ☐ Not Applicable	**Comment/Explanation**
Inappropriate vine death suggesting recovery ☐ Yes ☑ No ☐ Not Sure ☐ Not Applicable	**Comment/Explanation**

Wetland Assessment Procedure P. 1

DID:	Wellfield/Property	Wetland Name	Wetland Type
	No Wellfield Association	Morris Bridge Nursery Cypress	Cypress Isolated

Wetland ID:	Site ID:	Data Owner:	Personnel's Employer:	Date:	Start Time:	End Time:	Transect
540		SWFWMD	SWFWMD	June 29, 2023	09:01	12:05	Morris Bridge Nursery Cypress A

WAP Assessment Personnel:

TJ Venning	Brady Evans	

Water Level Information

Dry?	Yes	☐	No	☑

Elevation (ft):	Device Type:	Well/Gauge ID:
28.75	Staff Gauge	

Please enter Yes (Y), No (N), or Not Sure (NS) for the following questions and provide comments/explanations

Wetland Impacts			Wetland Drainage		
Wetland edges filled or disturbed?	☑ Yes	☐ No	Augmentation equipment in place?	☐ Yes	☑ No
Excessive dumping or trash in wetland?	☐ Yes	☑ No	Augmentation occurring at time of WAP?	☐ Yes	☑ No
Hog disturbance?	☑ Yes	☐ No	Clear evidence of direct stormwater inflow?	☐ Yes	☑ No
Significant impact from cattle (trampling)?	☐ Yes	☑ No	Clear evidence of direct drainage from wetland?	☐ Yes	☑ No
Vehicles through wetland (including bicycles)?	☐ Yes	☑ No	Other drainage activities in area?	☐ Yes	☑ No
Insect damage?	☐ Yes	☑ No	Borrow pit/retention pond in wetland vicinity?	☐ Yes	☑ No
Disease?	☐ Yes	☑ No			

Wetland Impact Comments	**Wetland Drainage Comments**
Spoil piles on NW edge of wetland.Old hog rooting in TZ.	

Fire	**Lakes/Docks**
Signs of Fire? ☐ Yes ☑ No	N/A
	Is the littoral zone stranded?
Fire Comment (year, expanse, intensity)	**Lakes/Docks Comments:**

Soil Subsidence	**General Comments/Observations**
New signs of oxidation/subsidence: ☐ Yes ☑ No	
Soil Subsidence Comment: No signs of new subsidence but signs of old subsidence and root exposure near center of wetland.	
Future users of these data may not want to analyze/compare these data with other wetlands due to the extreme level of:	

Wildlife Species

Species Count	**Common Name**	**Evidence Description**	**Comment**
2	White tailed deer	Observed	
1	Great blue heron	Observed	

Wetland ID:	Previous Year Assessment Width	Zone Assessment Notes	Transect
540	5M on each side of transect		Morris Bridge Nursery Cypress A

Groundcover

For each zone assessed, please document the following: species abbreviation, WAP zone (U, AD, T, OD, or D), percent cover (5% or 10% - 100% in increments of 10%), count (1-4), and distribution (E=edge, B=beyond a few feet, or T=throughout).

Transition Zone

☐ No groundcover

Species	Z	% or count	D
Andropogon glomeratus var. glaucopsis (PURPLE BLUESTEM)	OD	10	T
Blechnum serrulatum (TOOTHED MIDSORUS FERN; SWAMP FERN)	NA	5	T
Eupatorium capillifolium (DOGFENNEL)	AD	10	T
Eupatorium leptophyllum (FALSEFENNEL)	OD	10	T
Woodwardia virginica (VIRGINIA CHAIN FERN)	NA	30	T
Rhexia sp. ()	NA	10	T
Dichanthelium sp. ()	NA	5	T
Quercus nigra (WATER OAK)	T	5	T
Urena lobata (CAESARWEED)	U	5	T
Eleocharis vivipara (VIVIPAROUS SPIKERUSH)	NA	5	T
Triadenum virginicum (VIRGINIA MARSH ST.JOHN'S-WORT)	NA	30	T
Amphicarpum muhlenbergianum (BLUE MAIDENCANE)	OD	5	T

Outer Deep Zone

☐ No groundcover

Species	Z	% or count	D
Blechnum serrulatum (TOOTHED MIDSORUS FERN; SWAMP FERN)	NA	20	T
Woodwardia virginica (VIRGINIA CHAIN FERN)	NA	10	T
Smilax auriculata (EARLEAF GREENBRIER)	NA	5	T
Eleocharis vivipara (VIVIPAROUS SPIKERUSH)	NA	5	T
Triadenum virginicum (VIRGINIA MARSH ST.JOHN'S-WORT)	NA	20	T
Amphicarpum muhlenbergianum (BLUE MAIDENCANE)	OD	5	T
Panicum hemitomon (MAIDENCANE)	NA	5	T
Rhexia sp. ()	NA	5	T
Andropogon glomeratus var. glaucopsis (PURPLE BLUESTEM)	OD	10	T
Andropogon glomeratus var. hirsutior (BUSHY BLUESTEM)	NA	1	T
Andropogon glomeratus (BUSHY BLUESTEM)	T	1	T

Deep Zone

☐ No groundcover

Species	Z	% or count	D
Blechnum serrulatum (TOOTHED MIDSORUS FERN; SWAMP FERN)	NA	10	T
Woodwardia virginica (VIRGINIA CHAIN FERN)	NA	5	T
Cephalanthus occidentalis (COMMON BUTTONBUSH)	D	5	T
Vitis rotundifolia (MUSCADINE)	AD	1	T
Andropogon glomeratus var. glaucopsis (PURPLE BLUESTEM)	OD	5	T
Triadenum virginicum (VIRGINIA MARSH ST.JOHN'S-WORT)	NA	5	T
Dichanthelium sp. ()	NA	5	T
Persea palustris (SWAMP BAY)	OD	1	T
Rhynchospora inundata (NARROWFRUIT HORNED BEAKSEDGE)	NA	5	T
Rhynchospora filifolia (THREADLEAF BEAKSEDGE)	NA	5	T
Eleocharis vivipara (VIVIPAROUS SPIKERUSH)	NA	5	T

Andropogon glomeratus var. hirsutior (BUSHY BLUESTEM)	NA	4	T
Cephalanthus occidentalis (COMMON BUTTONBUSH)	D	1	T
Smilax auriculata (EARLEAF GREENBRIER)	NA	3	T
Xyris jupicai (RICHARD'S YELLOWEYED GRASS)	NA	5	T
Hypericum cistifolium (ROUNDPOD ST.JOHN'S-WORT)	NA	5	T
Paspalum laeve (FIELD PASPALUM)	T	5	T
Paspalum setaceum (THIN PASPALUM)	AD	5	T
Rhynchospora filifolia (THREADLEAF BEAKSEDGE)	NA	5	T
Oldenlandia uniflora (CLUSTERED MILLE GRAINES)	T	5	T
Euthamia caroliniana (SLENDER FLATTOP GOLDENROD)	AD	1	T
Vitis rotundifolia (MUSCADINE)	AD	1	T
Lyonia lucida (FETTERBUSH)	T	1	T
Drymaria cordata (DRYMARY; WEST INDIAN CHICKWEED)	AD	5	T
Toxicodendron radicans (EASTERN POISON IVY)	AD	2	T

Xyris jupicai (RICHARD'S YELLOWEYED GRASS)	NA	4	T
Rhynchospora filifolia (THREADLEAF BEAKSEDGE)	NA	4	T
Dichanthelium sp. ()	NA	5	T
Lyonia lucida (FETTERBUSH)	T	2	T
Osmunda regalis var. spectabilis (ROYAL FERN)	NA	2	T
Juncus effusus subsp. solutus (SOFT RUSH)	NA	1	T
Toxicodendron radicans (EASTERN POISON IVY)	AD	3	T

Ludwigia repens (CREEPING PRIMROSEWILLOW)	NA	5	T
Toxicodendron radicans (EASTERN POISON IVY)	AD	2	T
Lemna minor (COMMON DUCKWEED)	NA	5	T
Paspalum repens (WATER PASPALUM)	NA	5	T
Xyris jupicai (RICHARD'S YELLOWEYED GRASS)	NA	5	T
Panicum hemitomon (MAIDENCANE)	NA	5	T

Carex longii (LONG'S SEDGE)	T	2	T
Agave decipiens (FALSE SISAL)	NA	1	T

Groundcover Comments

Groundcover mostly appropriate but some physical disturbance has contributed to some inappropriate species

Zonation

Please assign a score of 1-5 or 0 (for NA) and provide an explanation

Zonation Score: 4

Zonation Score Explanation:

One zone move in enough numbers into the deep however this is a large zone with these species near the beginning of the zone. A case could be made for a 5 possibly.

Wetland ID:	Previous Year Assessment Width	Zone Assessment Notes	Transect
540	5M on each side of transect		Morris Bridge Nursery Cypress A

Shrubs/Small Trees

For each zone assessed, please document the following: species abbreviation, WAP zone (U, AD, T, OD, or D), percent cover (5% or 10% - 100% in increments of 10%), count, and distribution (E=edge, B=beyond a few feet, or T=throughout).

Transition Zone

☐ No shrubs

Species	Z	%	#	D
Persea palustris (SWAMP BAY)	O D	5	1	T

Outer Deep Zone

☑ No shrubs

Species	Z	%	#	D

Deep Zone

☐ No shrubs

Species	Z	%	#	D
Cephalanthus occidentalis (COMMON BUTTONBUSH)	D	20	> 50	T
Ilex cassine (DAHOON)	O D	5	5	T

Shrubs/Small Trees Comments

Zonation

Please assign a score of 1-5 or 0 (for NA) and provide an explanation

Zonation Score: 4

Zonation Score Explanation:

One zone move into the deep zone in enough numbers

Stress	
Signs of stress of appropriate shrubs and small trees (including dead species) ☑ Little or None ☐ Noticeable ☐ Significant ☐ Not Applicable	**Comment/Explanation**
Signs of stress of inappropriate shrubs and small trees (including dead species) ☑ Little or None ☐ Noticeable ☐ Significant ☐ Not Applicable	**Comment/Explanation**

Wetland ID:	Previous Year Assessment Width	Zone Assessment Notes	Transect
540	5M on each side of transect		Morris Bridge Nursery Cypress A

Trees

For each zone assessed, please document the following: species abbreviation, WAP zone (U, AD, T, OD, or D), percent cover (5% or 10% - 100% in increments of 10%), count, and distribution (E=edge, B=beyond a few feet, or T=throughout).

Transition Zone

☐ No trees

Species	Z	%	Count	D
Taxodium ascendens (POND-CYPRESS)	D	10	3	T
Quercus nigra (WATER OAK)	T	5	1	T

Outer Deep Zone

☐ No trees

Species	Z	%	Count	D
Taxodium ascendens (POND-CYPRESS)	D	30	7	T
Nyssa sylvatica var. biflora (SWAMP TUPELO)	D	20	4	T
Ilex cassine (DAHOON)	O D	20	3	T

Deep Zone

☐ No trees

Species	Z	%	Count	D
Taxodium ascendens (POND-CYPRESS)	D	30	>50	T
Nyssa sylvatica var. biflora (SWAMP TUPELO)	D	30	>50	T
Ilex cassine (DAHOON)	O D	10	17	T

Trees Comments

Zonation

Please assign a score of 1-5 or 0 (for NA) and provide an explanation

Zonation Score: 3

Zonation Score Explanation:

One zone move in high numbers in the deep zone

Stress	
Signs of stress of appropriate trees (do not include dead species) ☑ Little or None ☐ Noticeable ☐ Significant ☐ Not Applicable	**Comment/Explanation**
Signs of stress of inappropriate trees (include dead species) ☑ Little or None ☐ Noticeable ☐ Significant ☐ Not Applicable	**Comment/Explanation**
Dead/leaning trees (include standing dead trees and dead trees on ground that are appropriate) ☑ Little or None ☐ Noticeable ☐ Significant ☐ Not Applicable	**Comment/Explanation**
Recovery	
Signs of tree recovery ☐ Yes ☑ No ☐ Not Sure ☐ Not Applicable	**Comment/Explanation**
Inappropriate vine death suggesting recovery ☐ Yes ☑ No ☐ Not Sure ☐ Not Applicable	**Comment/Explanation**

Wetland Assessment Procedure P. 1

DID:	Wellfield/Property	Wetland Name	Wetland Type
	No Wellfield Association	Morris Bridge Nursery Marsh	Marsh Isolated

Wetland ID:	Site ID:	Data Owner:	Personnel's Employer:	Date:	Start Time:	End Time:	Transect
543		SWFWMD	SWFWMD	June 14, 2023	09:23	12:29	Morris Bridge Nursery Marsh A

WAP Assessment Personnel:

TJ Venning	Jordan Miller	Brady Evans

Water Level Information

Dry?	Yes	☐	No	☑

Elevation (ft):	Device Type:	Well/Gauge ID:
28.5	Staff Gauge	

Please enter Yes (Y), No (N), or Not Sure (NS) for the following questions and provide comments/explanations

Wetland Impacts			**Wetland Drainage**		
Wetland edges filled or disturbed?	☐ Yes	☑ No	Augmentation equipment in place?	☐ Yes	☑ No
Excessive dumping or trash in wetland?	☐ Yes	☑ No	Augmentation occurring at time of WAP?	☐ Yes	☑ No
Hog disturbance?	☑ Yes	☐ No	Clear evidence of direct stormwater inflow?	☐ Yes	☑ No
Significant impact from cattle (trampling)?	☐ Yes	☑ No	Clear evidence of direct drainage from wetland?	☐ Yes	☑ No
Vehicles through wetland (including bicycles)?	☐ Yes	☑ No	Other drainage activities in area?	☐ Yes	☑ No
Insect damage?	☐ Yes	☑ No	Borrow pit/retention pond in wetland vicinity?	☐ Yes	☑ No
Disease?	☐ Yes	☑ No			

Wetland Impact Comments	**Wetland Drainage Comments**
Hog rooting in tz, ar's showed disease (cankers, bark lesions ,thin canopies) in previous years but look healthy this year	

Fire	**Lakes/Docks**
Signs of Fire? ☐ Yes ☑ No	N/A
	Is the littoral zone stranded?
Fire Comment (year, expanse, intensity)	**Lakes/Docks Comments:**

Soil Subsidence	**General Comments/Observations**
New signs of oxidation/subsidence: ☐ Yes ☑ No	
Soil Subsidence Comment: Subsidence likely historic however significant slumping observed throughout odz and dz	
Future users of these data may not want to analyze/compare these data with other wetlands due to the extreme level of:	

Wildlife Species

Species Count	**Common Name**	**Evidence Description**	**Comment**
2	White tailed deer	Observed	
1	Great egret	Observed	

Wetland ID:	Previous Year Assessment Width	Zone Assessment Notes	Transect
543	5M on each side of transect		Morris Bridge Nursery Marsh A

Groundcover

For each zone assessed, please document the following: species abbreviation, WAP zone (U, AD, T, OD, or D), percent cover (5% or 10% - 100% in increments of 10%), count (1-4), and distribution (E=edge, B=beyond a few feet, or T=throughout).

Transition Zone

☐ No groundcover

Species	Z	% or count	D
Smilax bona-nox (SAW GREENBRIER)	AD	5	T
Rhexia mariana (PALE MEADOWBEAUTY; MARYLAND MEADOWBEAUTY)	NA	5	T
Hypericum hypericoides (ST.ANDREW'S-CROSS)	NA	5	T
Andropogon glomeratus var. glaucopsis (PURPLE BLUESTEM)	OD	1	T
Andropogon virginicus (BROOMSEDGE BLUESTEM)	AD	1	T
Andropogon glomeratus (BUSHY BLUESTEM)	T	1	T
Andropogon glomeratus var. hirsutior (BUSHY BLUESTEM)	NA	5	T
Amphicarpum muhlenbergianum (BLUE MAIDENCANE)	OD	10	T
Oldenlandia uniflora (CLUSTERED MILLE GRAINES)	T	5	T
Dichanthelium sp. ()	NA	10	T
Urena lobata (CAESARWEED)	U	5	T

Outer Deep Zone

☐ No groundcover

Species	Z	% or count	D
Andropogon glomeratus (BUSHY BLUESTEM)	T	2	T
Andropogon glomeratus var. glaucopsis (PURPLE BLUESTEM)	OD	5	T
Andropogon glomeratus var. hirsutior (BUSHY BLUESTEM)	NA	10	T
Eupatorium capillifolium (DOGFENNEL)	AD	10	T
Eupatorium leptophyllum (FALSEFENNEL)	OD	10	T
Dichanthelium sp. ()	NA	5	T
Oldenlandia uniflora (CLUSTERED MILLE GRAINES)	T	5	T
Erechtites hieraciifolius (AMERICAN BURNWEED; FIREWEED)	AD	5	T
Rhexia mariana (PALE MEADOWBEAUTY; MARYLAND MEADOWBEAUTY)	NA	5	T
Paspalum setaceum (THIN PASPALUM)	AD	5	T
Eleocharis sp. ()	NA	5	T
Urena lobata (CAESARWEED)	U	5	T

Deep Zone

☐ No groundcover

Species	Z	% or count	D
Cephalanthus occidentalis (COMMON BUTTONBUSH)	D	5	T
Pontederia cordata (PICKERELWEED)	NA	20	T
Blechnum serrulatum (TOOTHED MIDSORUS FERN; SWAMP FERN)	NA	10	T
Utricularia sp. (BLADDERWORT)	NA	5	T
Habenaria repens (WATERSPIDER FALSE REINORCHID)	NA	5	T
Nymphaea odorata (AMERICAN WHITE WATERLILY)	NA	5	T
Taxodium ascendens (POND-CYPRESS)	D	5	T
Limnobium spongia (AMERICAN SPONGEPLANT; FROG'S-BIT)	NA	5	T
Ludwigia repens (CREEPING PRIMROSEWILLOW)	NA	5	T
Sagittaria lancifolia (BULLTONGUE ARROWHEAD)	NA	5	T

Quercus virginiana (LIVE OAK)	U	5	T
Quercus laurifolia (LAUREL OAK; DIAMOND OAK)	T	5	T
Panicum hemitomon (MAIDENCANE)	NA	5	T
Eupatorium capillifolium (DOGFENNEL)	AD	5	T
Eupatorium leptophyllum (FALSEFENNEL)	OD	5	T
Vitis rotundifolia (MUSCADINE)	AD	5	T
Erechtites hieraciifolius (AMERICAN BURNWEED; FIREWEED)	AD	5	T
Callicarpa americana (AMERICAN BEAUTYBERRY)	U	3	T
Sabal palmetto (CABBAGE PALM)	NA	2	T

Blechnum serrulatum (TOOTHED MIDSORUS FERN; SWAMP FERN)	NA	5	T
Lachnanthes caroliana (CAROLINA REDROOT)	NA	1	T
Acer rubrum (RED MAPLE)	OD	5	T

Panicum hemitomon (MAIDENCANE)	NA	40	T
Urena lobata (CAESARWEED)	U	5	T
Triadenum virginicum (VIRGINIA MARSH ST.JOHN'S-WORT)	NA	5	T
Woodwardia virginica (VIRGINIA CHAIN FERN)	NA	5	T
Lycopus rubellus (TAPERLEAF WATERHOREHOUND)	OD	5	T
Andropogon glomeratus var. glaucopsis (PURPLE BLUESTEM)	OD	5	T
Andropogon glomeratus var. hirsutior (BUSHY BLUESTEM)	NA	5	T
Eupatorium capillifolium (DOGFENNEL)	AD	5	T
Eupatorium leptophyllum (FALSEFENNEL)	OD	5	T
Eleocharis sp. ()	NA	5	T
Acer rubrum (RED MAPLE)	OD	5	T
Xyris jupicai (RICHARD'S YELLOWEYED GRASS)	NA	1	T
Lachnanthes caroliana (CAROLINA REDROOT)	NA	5	T
Erechtites hieraciifolius (AMERICAN BURNWEED; FIREWEED)	AD	5	T
Dichanthelium sp. ()	NA	5	T

Rhexia mariana (PALE MEADOWBEAUTY; MARYLAND MEADOWBEAUTY)	NA	5	T
Rhynchospora inundata (NARROWFRUIT HORNED BEAKSEDGE)	NA	5	T

Groundcover Comments

Zonation

Please assign a score of 1-5 or 0 (for NA) and provide an explanation

Zonation Score: 3

Zonation Score Explanation:

1 zone move into OD in high numbers and 2 zone move into D in enough numbers

Wetland ID:	Previous Year Assessment Width	Zone Assessment Notes	Transect
543	5M on each side of transect		Morris Bridge Nursery Marsh A

Shrubs/Small Trees

For each zone assessed, please document the following: species abbreviation, WAP zone (U, AD, T, OD, or D), percent cover (5% or 10% - 100% in increments of 10%), count, and distribution (E=edge, B=beyond a few feet, or T=throughout).

Transition Zone

☐ No shrubs

Species	Z	%	#	D
Quercus virginiana (LIVE OAK)	U	1	1	T
Quercus laurifolia (LAUREL OAK; DIAMOND OAK)	T	5	1	T
Sabal palmetto (CABBAGE PALM)	NA	5	1	T

Outer Deep Zone

☑ No shrubs

Species	Z	%	#	D

Deep Zone

☐ No shrubs

Species	Z	%	#	D
Cephalanthus occidentalis (COMMON BUTTONBUSH)	D	30	> 50	T
Taxodium ascendens (POND-CYPRESS)	D	1	1	T
Ilex cassine (DAHOON)	O D	5	2	T

Shrubs/Small Trees Comments

Zonation

Please assign a score of 1-5 or 0 (for NA) and provide an explanation

Zonation Score: 4

Zonation Score Explanation:

1 zone move into D in enough numbers

Stress	
Signs of stress of appropriate shrubs and small trees (including dead species) ☑ Little or None ☐ Noticeable ☐ Significant ☐ Not Applicable	**Comment/Explanation**
Signs of stress of inappropriate shrubs and small trees (including dead species) ☑ Little or None ☐ Noticeable ☐ Significant ☐ Not Applicable	**Comment/Explanation**

Wetland ID:	Previous Year Assessment Width	Zone Assessment Notes	Transect
543	5M on each side of transect		Morris Bridge Nursery Marsh A

Trees

For each zone assessed, please document the following: species abbreviation, WAP zone (U, AD, T, OD, or D), percent cover (5% or 10% - 100% in increments of 10%), count, and distribution (E=edge, B=beyond a few feet, or T=throughout).

Transition Zone

☐ No trees

Species	Z	%	Count	D
Taxodium ascendens (POND-CYPRESS)	D	10	4	T
Quercus virginiana (LIVE OAK)	U	20	6	T
Quercus laurifolia (LAUREL OAK; DIAMOND OAK)	T	10	2	T

Outer Deep Zone

☐ No trees

Species	Z	%	Count	D
Acer rubrum (RED MAPLE)	O D	10	4	T
Taxodium ascendens (POND-CYPRESS)	D	10	4	T

Deep Zone

☐ No trees

Species	Z	%	Count	D
Ilex cassine (DAHOON)	O D	5	3	T
Acer rubrum (RED MAPLE)	O D	5	4	T
Taxodium ascendens (POND-CYPRESS)	D	30	33	T
Cephalanthus occidentalis (COMMON BUTTONBUSH)	D	2	1	T

Trees Comments

Zonation

Please assign a score of 1-5 or 0 (for NA) and provide an explanation

Zonation Score: 3

Zonation Score Explanation:

1 zone move into OD and D in high numbers

Stress	
Signs of stress of appropriate trees (do not include dead species) ☑ Little or None ☐ Noticeable ☐ Significant ☐ Not Applicable	**Comment/Explanation**
Signs of stress of inappropriate trees (include dead species) ☐ Little or None ☑ Noticeable ☐ Significant ☐ Not Applicable	**Comment/Explanation** Stressed and standing dead ar in dz, standing dead QV in tz
Dead/leaning trees (include standing dead trees and dead trees on ground that are appropriate) ☑ Little or None ☐ Noticeable ☐ Significant ☐ Not Applicable	**Comment/Explanation**
Recovery	
Signs of tree recovery ☐ Yes ☑ No ☐ Not Sure ☐ Not Applicable	**Comment/Explanation**
Inappropriate vine death suggesting recovery ☐ Yes ☑ No ☐ Not Sure ☐ Not Applicable	**Comment/Explanation**

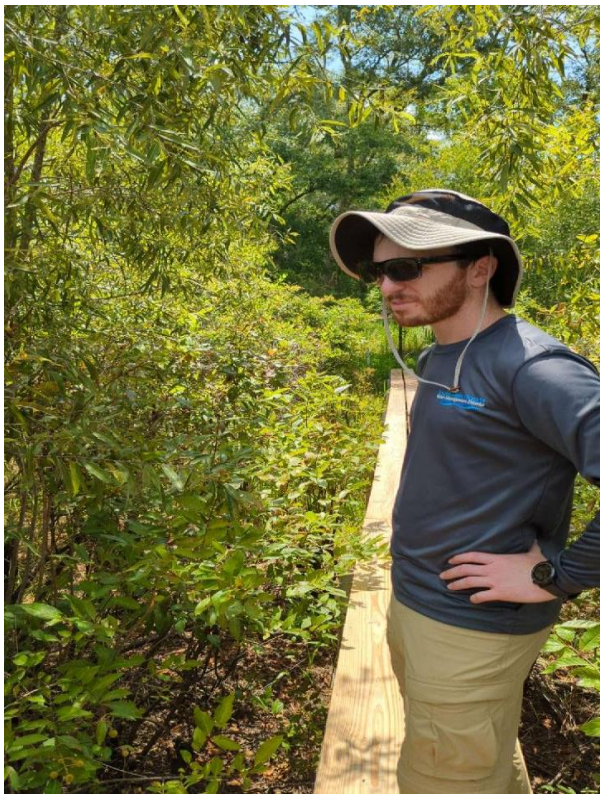
Appendix C

2023 WAP Field Photographs

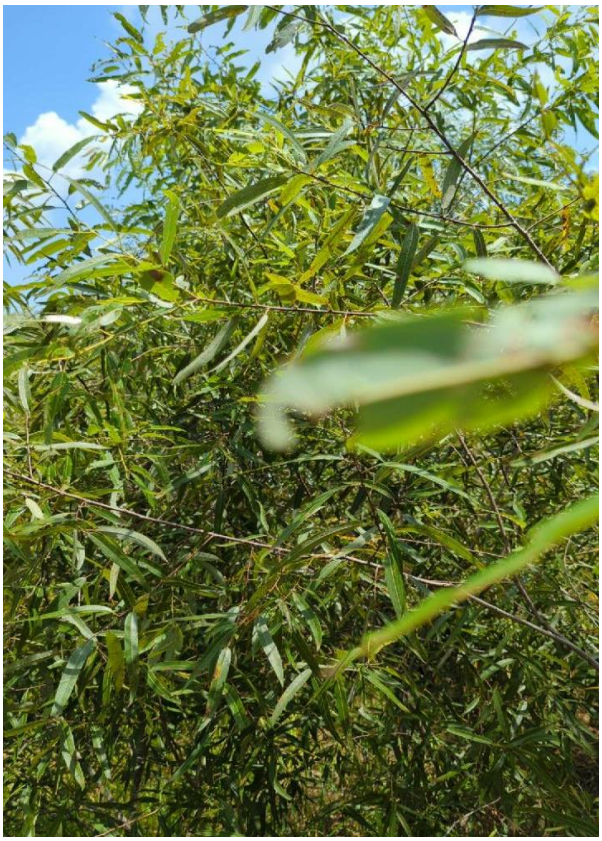
NURSERY MARSH WAP 539 TRANSECT PHOTOGRAPHS

JUNE 2023

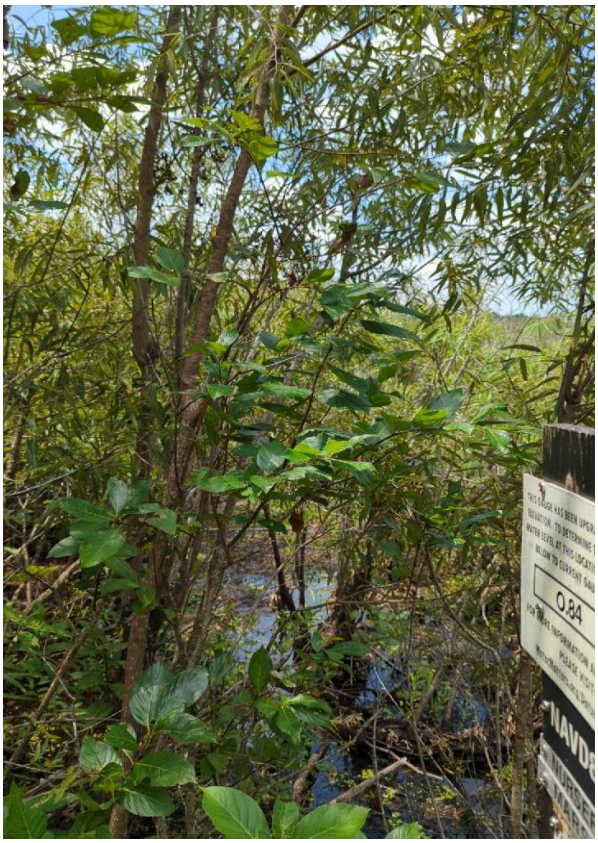
Edge Looking In



Gauge Facing East



Gauge Facing North



Gauge Facing South

NURSERY MARSH WAP 539 TRANSECT PHOTOGRAPHS

JUNE 2023

Gauge Facing West

NP-6 Looking In

NP-6 Looking Out

NP-12 Looking In

NURSERY MARSH WAP 539 TRANSECT PHOTOGRAPHS

JUNE 2023

NP-12 Looking Out

NURSERY CYPRESS WAP 540 TRANSECT PHOTOGRAPHS

JUNE 2023

Edge Looking in

Gauge Facing East

Gauge Facing North

Gauge Facing South

NURSERY CYPRESS WAP 540 TRANSECT PHOTOGRAPHS

JUNE 2023

Gauge Facing West

NP-6 Looking In

NP-6 Looking Out

NP-12 Looking In

NURSERY CYPRESS WAP 540 TRANSECT PHOTOGRAPHS

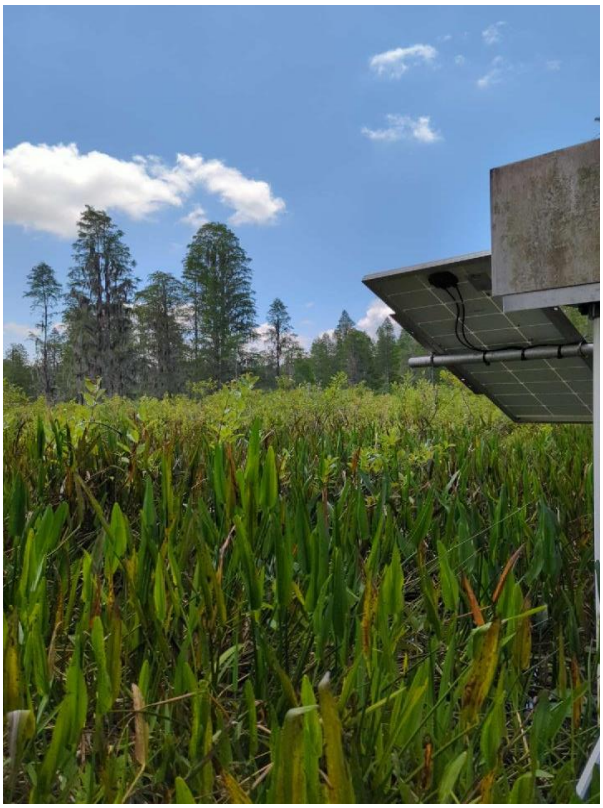
JUNE 2023

NP-12 Looking Out

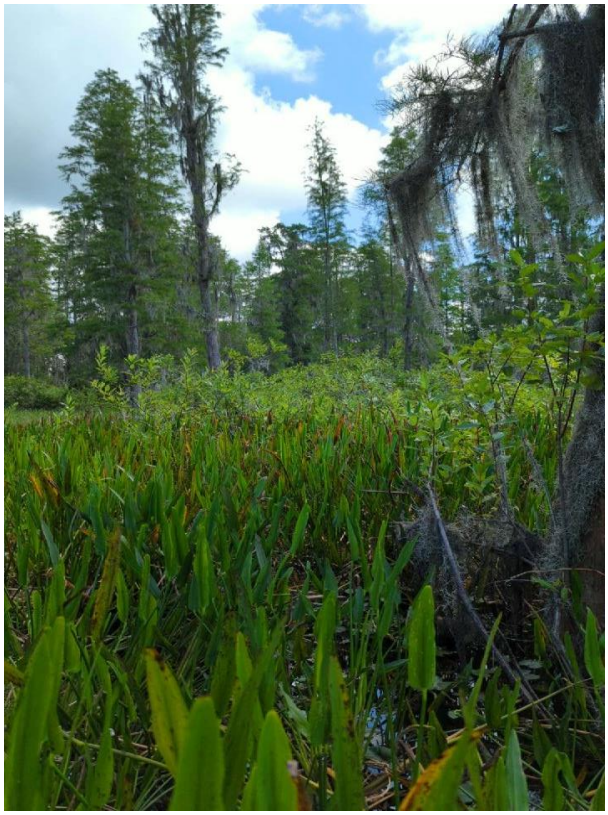
CYPRESS MARSH WAP 543 TRANSECT PHOTOGRAPHS

JUNE 2023

Edge Looking In



Gauge Facing East



Gauge Facing North

Gauge Facing South

CYPRESS MARSH WAP 543 TRANSECT PHOTOGRAPHS

JUNE 2023

Gauge Facing West

NP-6 Looking In

NP-6 Looking Out

NP-12 Looking In

CYPRESS MARSH WAP 543 TRANSECT PHOTOGRAPHS

JUNE 2023

NP-12 Looking Out

Appendix D

2023 Wetland Evaluation Field Forms

HERBACEOUS WETLAND ASSESSMENT

Herbaceous Type: Depressional	**Wetland ID#** 539 **Date** June 29, 2023	**Personnel:** TJ Venning, Brady Evans

e.g., Depressional marsh, Basin marsh, Floodplain marsh, Swale, Wet prairie

(a historical 1930's to early 50's start of an aerial analysis will be used to determine if the marsh has changed shape or type over time to be completed once and if necessary current conditions aerials could be included every 5 years)

Aerial Analysis: Describe changes in condition of the marsh

First date showing change: _____

Additional change date: _____

Ground Cover Zonation (judgment needed here to determine if the marsh has/had concentric ring zonation)	1. 2. 3. 4.	☐ Rapid loss of zonation ☑ Somewhat defined ☐ No zonation but typical ☐ Well defined or Typical	Describe: Zonation is somewhat defined, the transition zone has a lot of hog disturbance. The deep zone is dominated by mostly shrub and tree sized Salix.
Exotic Vegetation (be sure the wetland status is known)	1. 2. 3. 4.	☐ Exotics covering > 50% of the wetland ☑ Exotics covering 25% to 50% of the wetland ☐ Exotics covering <25% of the wetland ☐ No exotics or only a few specimens	List species: Hymenachne, Urena, Eichhornia
Have trees invaded the marsh? (≥10 cm (4") or greater calculate cover as a percent of marsh area be sure the wetland status is known)	1. 2. 3. 4.	☑ Many into center of marsh ☐ Some further into marsh and center ☐ More invading on the edge ☐ A few only at the edge	Calculate % and list species 40-50% of the wetland is mostly tree sized Salix caroliniana
Are shrubby FAC/UPL species that are inconsistent with marsh type invading? (< 4" , < 10cm dbh)	1. 2. 3. 4. 5.	☐ Many into center of marsh ☐ Some further into the marsh and center ☑ More invading on the edge ☐ A few only at the edge ☐ None	Calculate % and list species Many Urena lobata spread throughout the transition zone, approximately 10% of the wetland
***Aquatic vegetation, floating, emergents, submergents, sensitive plants** (i.e., Lemna, Utricularia, Nyphea, Pontederia, see list)	**Distribution (**check) ☐ None ☐ Near edge ☑ Near center ☐ Throughout		**Population Density (**check) ☐ None present ☐ Trace ☑ Moderate ☐ Heavy

Describe and list species: Salvinia, Lemna, and Eichhornia in the center of the wetland

*The presence of aquatic plants may be considered as a hydrological indicator in accordance with subsection 62-340.500(3),

SOIL	1. 2. 3. 4.	☐ > 6 in. soil oxidation ☐ 4 – 6 in. soil oxidation ☐ 1 – 3 in. soil oxidation ☑ No apparent soil subsidence	Describe:
	1. 2. 3. 4.	☐ > 6 in. Fissures ☐ 4 - 6 in. Fissures ☐ 1 – 3 in. Fissures ☐ No apparent soil fissures	Describe:
	1. 2. 3. 4.	☐ Many large sinkholes/subsidence features ☐ A few sinkholes/subsidence features ☐ Slumping, some subsidence ☑ No subsidence	Describe:

% and extent of water inundation: 60

% and extent of soil moisture (i.e., saturated, moist, dry): 70

HERBACEOUS WETLAND ASSESSMENT

Measure the distance from the edge to the mucky mineral or muck. Use a WAP marker to measure the distance waterward such as NP6, NP12, edge. If muck or mucky mineral is near the	☐ Organic soil dominated wetland ☑ Mineral soil dominated wetland	
	Distance from: 2 (feet)	Describe: muck a few feet before the NP12 marker

Evidence of recent inundation/flow (flow thru systems) Utilize 62-340 F.A.C. for evidence of hydrologic indicators or other.	☑ Yes ☐ No
Algal mat	☑ Algal mat
Water marks/line recent w/in a	☑ Water marks/line recent, within a year?
Drift line, rafted debris recent w/in a	☑ Drift line, rafted debris recent, within a year?
Saw Palmetto “Horses”	☐ Saw Palmetto “Horses”
Crayfish, Aquatic fauna	☐ Crayfish, Aquatic Fauna
Sediment deposition	☐ Sediment deposition
Aufwuchs	☐ Aufwuchs
Flow	☐ Flow Channels
	☑ Other

Describe the hydrologic conditions of the site: Center of wetland is inundated, muck starts at or near NP12, dry and sandy soils throughout transition zone, dry season was very dry

WHA Score: 3

Describe the overall appearance/health of the system using BPJ: non-wetland plants in transition zone such as Urena lobata are a result of much hog disturbance, soils become moist and mucky in the deep zone where the wetland becomes dominated by wetland shrubs and small trees (Conhalenthus and Salix)

The table below should be used as a guide to objectively score wetland health using
Best Professional Judgment (BPJ).

WHA Score	General Criteria for BPJ Wetland Health
1	No hydrology Severe non-wetland plant invasion into interior Severe tree fall and/or most cypress stressed Severe soil subsidence
2	Reduced hydrology Substantial non-wetland plant invasion into interior Some tree fall and/or stressed cypress Substantial soil subsidence
3	Depressed hydrology or was depressed but now recovering Non-wetland plant invasion of edge (may be in interior if inappropriate plants Dominated by wetland plants Cypress and other trees healthy or some stressed Moderate soil subsidence
4	Good hydrology or was depressed and now normal Few weedy plants (there may be some near the edge) Dominated by wetland plants (or most non-wetland plants dead) Most trees healthy Minor soil subsidence
5	Good hydrology Few non-wetland plants Most trees healthy No soil subsidence

Below are a few sections taken from the original WHA field form that explain two current factors

Biogeochemical

"Fuel accumulation: Wetlands experiencing normal water levels usually have low to moderate accumulations of dead vegetation since water is sufficiently high to retard abundant growth of understory vegetation. Wetland that are abnormally dry often support an abundance of weedy growth. During lengthy dry periods this high fuel accumulation can support destructive fires. Based upon experience with control wetlands a judgment is made wherever possible as to whether fuel accumulation is excessive for the type of wetland being evaluated."

Aquatics, floating, submerged

"List of Plants & Abundance
...An effort is made to list those species that provide the most ecological information on wetland condition to the professional conducting the wetland evaluation. For instance, listing maidencane under the "AQUATICS" category is not very informative since this species has a wide ecological tolerance. On the other hand, a listing of pickerelweed, pipewort, sphagnum and bladderwort is more informative since these species have narrow ecological tolerances especially with respect to the hydrologic condition of the wetland."

A list of aquatics, emergents, submergents and sensitive species is provided to assist in listing these species. This list does not contain all informative species and it can and should always be updated or increased.

FORESTED WETLAND ASSESSMENT

Wetland ID# 540 **Wetland Name:** Morris Bridge Nursery Cypress **Wetland Type:** Mixed Cypress

Date: June 29, 2023 **Personnel:** TJ Venning, Brady Evans **Gauge**

Bottomland Hardwood Forest, Bottomland Hardwood Swamp, Mixed Cypress, Cypress Depressional Dome, Cypress Strand, Cypress Basin Swamp, Baygall

	Degree of Impact (circle one)		Explanation
Canopy	1. 2. 3. 4. 5.	☐ >50% standing dead/thin canopy ☐ 26 -50% standing dead/thin canopy ☐ 10 – 25% standing dead/thin canopy ☑ <10% standing dead/thin canopy ☐ other	Describe: Mature Cypress and Nyssa dominate
Stand Maturity	1. 2. 3. 4.	☐ <10 cm (<4 in.) dbh, stunted, logged, cleared ☐ Early successional, logged <10cm (<4 in.) dbh ☑ Fully stocked mature avg. tree dbh > 10 cm (> 4 in.) ☐ other	Describe: Mostly mature trees, very few groundcover and shrub sized trees
Canopy Dominance (first species of each category is listed in order of dominance)	1. 2. 3. 4. 5. 6. 7. 8.	☐ Cypress Pine ☐ Cypress Hardwood ☑ Cypress Tupelo ☐ Cypress Bay ☐ Cypress ☐ Mixed Hardwood with Cypress ☐ Mixed Hardwood without Cypress ☐ other	Describe: Dominated by cypress with many Nyssa as well
Leaning Trees (Approximately 30 degrees)	1. 2. 3. 4.	☐ > 25% leaning ☐ 5 – 25% leaning ☑ < 5% leaning ☐ other	Describe:
Fallen Trees	1. 2. 3. 4.	☐ > 25% fallen ☐ 5 – 25% fallen ☑ < 5% fallen ☐ other	Root Rot? ☐ Yes ☑ No
Tree Succession	1. 2. 3. 4.	☑ None and/or saplings dead ☐ Some, low age classes represented ☐ Good, many age classes represented ☐ other	Describe: mostly mature trees
Exotic Vegetation (be sure to include wetland status of plants)	1. 2. 3. 4.	☐ Exotics covering > 50% of the wetland ☐ Exotics covering 25% to 50% of the wetland ☑ Exotics covering < 25% of the wetland ☐ No exotics or only a few specimens	List species: some Urena lobata along edge of wetland
Epiphytes **Population Density (**check one) ☐ None present ☐ Trace (< 5%) ☑ Moderate (6 – 10%) ☐ High (>10%) **Distribution (**check one) ☐ Within arm's length (< 6 ft. high) ☑ Mixed elevation ☐ High in trees (mostly > 6 ft. high)			Describe:

*__Aquatic vegetation, floating, emergents, submergents, and sensitive plants__ (i.e. Lemna, Utricularia, Nymphea, Pontederia, see list)

Distribution (check one) ☐ None ☐ Near edge ☑ Near center ☐ Throughout	**Population Density (**check one) ☐ None present ☑ Trace ☐ Moderate ☐ Heavy	Describe and list species: Lemna, Paspalum repens

*The presence of aquatic plants may be considered as a hydrological indicator in accordance with subsection 62-340.500(3),

FORESTED WETLAND ASSESSMENT

Soil	1. 2. 3. 4. 5.	☐ Root exposure > 6 in. ☐ Root exposure 4 – 6 in. ☑ Root exposure 1 – 3 in. ☐ No apparent root exposure ☐ other	Describe: some minor root exposure in deep zone and near center of wetland
	1. 2. 3. 4.	☐ Many large sinkholes, subsidence features ☐ A few sinkholes, subsidence features ☑ Slumping, some subsidence ☐ No subsidence	Describe: some minor slumping
% and extent of inundation: 5			
% and extent of soil moisture (i.e., saturated, moist, dry): 70			
Measure the distance from the edge to the mucky mineral or muck. Use a WAP marker to measure the distance waterward such as NP6, NP12, edge. If muck or mucky mineral is near the gauge measure from the gauge landward.	☑ Organic soil dominated wetland ☐ Mineral soil dominated wetland Distance from: 0 (feet)		Describe: muck presence at NP6
Biogeochemical (provide explanation of Fuel load)	1. 2. 3. 4.	☐ duff layer > 1 in. thick, no litter decomposition ☐ duff layer < 1 in. thick, some litter decomposition ☑ little to no duff	Describe:
[+]Slip fingers under the duff layer above the soil, grasp with your thumb and pick up the material. Hold firm without squeezing and measure thickness.			
Normal Pool indicators (mainly found in cypress depressional wetlands) Lower reach of moss collars, inflection point, Lyonia root crowns	1. 2. 3. 4. 5.	☐ None or at base of tree ☐ present, indistinct or abnormally low ☐ distinct at lower than normal ☑ distinct at appropriate level ☐ does not apply in this system	Describe: some inflections on cypress

Historic NP (list indicator type and briefly describe)	**inches**
Current NP (list type and briefly describe)	
Hurricane High (list the type & briefly describe)	
Explain if there is no lichen line or lichen is weak:	

FORESTED WETLAND ASSESSMENT

Evidence of recent inundation/flow (flow thru systems) Utilize 62-340 F.A.C. for evidence of hydrologic indicators or other.	☑ Yes ☐ No
Algal mat	☑ Algal mat

Water marks/line recent w/in a	☑ Water marks/line recent, within a year?
Drift line, rafted debris recent w/in a	☐ Drift line, rafted debris recent within a year?
Saw Palmetto “Horses”	☐ Saw Palmetto “Horses”
Crayfish, Aquatic fauna	☐ Crayfish, Aquatic fauna
Sediment deposition	☐ Sediment deposition
Aufwuchs	☐ Aufwuchs
Flow channels	☐ Flow channels
Other	☑ Other

FORESTED WETLAND ASSESSMENT
Describe the hydrologic conditions of the site: some standing water in center of wetland and saturated to moist all the way into transition zone

Describe extent of physical disturbance (fire break, truck/ATV impact into wetland, hog/cattle, etc.): For hog damage please provide size of area, estimated age of disturbance and depth of disturbance.
Some spoil piles along edge and some hog damage in the transition zone, a separate hog damage assessment was completed for this wetland

Describe the extent, reach, intensity of fire, and approximate year fire occurred:
no recent signs of fire observed

Describe the overall appearance/health of the system using BPJ. For instance, if shrubs are invading the center of a cypress dome that is an issue, but this is not necessarily an issue in a floodplain forest. See description for Wetland Health Score below - Rank (1-5).
WHA Score: 4

wetland has good zonation and is dominated by wetland plants and hydric soils, wetland trees are healthy

FORTESTED WETLAND ASSESSMENT

The table below should be used as a guide to objectively score wetland health using
Best Professional Judgment (BPJ).

WHA Score	General Criteria for BPJ Wetland Health
1	No hydrology Severe non-wetland plant invasion into interior Severe tree fall and/or most cypress stressed Severe soil subsidence
2	Reduced hydrology Substantial non-wetland plant invasion into interior Some tree fall and/or stressed cypress Substantial soil subsidence
3	Depressed hydrology or was depressed but now recovering Non-wetland plant invasion of edge (may be in interior if inappropriate plants Dominated by wetland plants Cypress and other trees healthy or some stressed Moderate soil subsidence
4	Good hydrology or was depressed and now normal Few weedy plants (there may be some near the edge) Dominated by wetland plants (or most non-wetland plants dead) Most trees healthy Minor soil subsidence
5	Good hydrology Few non-wetland plants Most trees healthy No soil subsidence

Below are a few sections taken from the original WHA field form that explain two current factors

Biogeochemical

"Fuel accumulation: Wetlands experiencing normal water levels usually have low to moderate accumulations of dead vegetation since water is sufficiently high to retard abundant growth of understory vegetation. Wetland that are abnormally dry often support an abundance of weedy growth. During lengthy dry periods this high fuel accumulation can support destructive fires. Based upon experience with control wetlands a judgment is made wherever possible as to whether fuel accumulation is excessive for the type of wetland being evaluated."

Aquatics, floating, submerged

"List of Plants & Abundance
...An effort is made to list those species that provide the most ecological information on wetland condition to the professional conducting the wetland evaluation. For instance, listing maidencane under the "AQUATICS" category is not very informative since this species has a wide ecological tolerance. On the other hand, a listing of pickerelweed, pipewort, sphagnum and bladderwort is more informative since these species

have narrow
ecological tolerances especially with respect to the hydrologic condition of the wetland."

A list of aquatics, emergents, submergents and sensitive species is provided to assist in listing these species. This list
does not contain all informative species and it can and should always be updated or increased.

FORESTED WETLAND ASSESSMENT

Wetland ID# 540 **Wetland Name:** Morris Bridge Nursery Cypress **Wetland Type:** Mixed Cypress

Date: June 29, 2023 **Personnel:** TJ Venning, Brady Evans **Gauge**

Bottomland Hardwood Forest, Bottomland Hardwood Swamp, Mixed Cypress, Cypress Depressional Dome, Cypress Strand, Cypress Basin Swamp, Baygall

	Degree of Impact (circle one)		Explanation
Canopy	1. 2. 3. 4. 5.	☐ >50% standing dead/thin canopy ☐ 26 -50% standing dead/thin canopy ☐ 10 – 25% standing dead/thin canopy ☑ <10% standing dead/thin canopy ☐ other	Describe: Mature Cypress and Nyssa dominate
Stand Maturity	1. 2. 3. 4.	☐ <10 cm (<4 in.) dbh, stunted, logged, cleared ☐ Early successional, logged <10cm (<4 in.) dbh ☑ Fully stocked mature avg. tree dbh > 10 cm (> 4 in.) ☐ other	Describe: Mostly mature trees, very few groundcover and shrub sized trees
Canopy Dominance (first species of each category is listed in order of dominance)	1. 2. 3. 4. 5. 6. 7. 8.	☐ Cypress Pine ☐ Cypress Hardwood ☑ Cypress Tupelo ☐ Cypress Bay ☐ Cypress ☐ Mixed Hardwood with Cypress ☐ Mixed Hardwood without Cypress ☐ other	Describe: Dominated by cypress with many Nyssa as well
Leaning Trees (Approximately 30 degrees)	1. 2. 3. 4.	☐ > 25% leaning ☐ 5 – 25% leaning ☑ < 5% leaning ☐ other	Describe:
Fallen Trees	1. 2. 3. 4.	☐ > 25% fallen ☐ 5 – 25% fallen ☑ < 5% fallen ☐ other	Root Rot? ☐ Yes ☑ No
Tree Succession	1. 2. 3. 4.	☑ None and/or saplings dead ☐ Some, low age classes represented ☐ Good, many age classes represented ☐ other	Describe: mostly mature trees
Exotic Vegetation (be sure to include wetland status of plants)	1. 2. 3. 4.	☐ Exotics covering > 50% of the wetland ☐ Exotics covering 25% to 50% of the wetland ☑ Exotics covering < 25% of the wetland ☐ No exotics or only a few specimens	List species: some Urena lobata along edge of wetland
Epiphytes **Population Density (**check one) ☐ None present ☐ Trace (< 5%) ☑ Moderate (6 – 10%) ☐ High (>10%) **Distribution (**check one) ☐ Within arm's length (< 6 ft. high) ☑ Mixed elevation ☐ High in trees (mostly > 6 ft. high)			Describe:

*__Aquatic vegetation, floating, emergents, submergents, and sensitive plants__ (i.e. Lemna, Utricularia, Nymphea, Pontederia, see list)

Distribution (check one) ☐ None ☐ Near edge ☑ Near center ☐ Throughout	**Population Density (**check one) ☐ None present ☑ Trace ☐ Moderate ☐ Heavy	Describe and list species: Lemna, Paspalum repens

*The presence of aquatic plants may be considered as a hydrological indicator in accordance with subsection 62-340.500(3),

FORESTED WETLAND ASSESSMENT

Soil	1. 2. 3. 4. 5.	☐ Root exposure > 6 in. ☐ Root exposure 4 – 6 in. ☑ Root exposure 1 – 3 in. ☐ No apparent root exposure ☐ other	Describe: some minor root exposure in deep zone and near center of wetland
	1. 2. 3. 4.	☐ Many large sinkholes, subsidence features ☐ A few sinkholes, subsidence features ☑ Slumping, some subsidence ☐ No subsidence	Describe: some minor slumping
% and extent of inundation: 5			
% and extent of soil moisture (i.e., saturated, moist, dry): 70			
Measure the distance from the edge to the mucky mineral or muck. Use a WAP marker to measure the distance waterward such as NP6, NP12, edge. If muck or mucky mineral is near the gauge measure from the gauge landward.	☑ Organic soil dominated wetland ☐ Mineral soil dominated wetland Distance from: 0 (feet)		Describe: muck presence at NP6
Biogeochemical (provide explanation of Fuel load)	1. 2. 3. 4.	☐ duff layer > 1 in. thick, no litter decomposition ☐ duff layer < 1 in. thick, some litter decomposition ☑ little to no duff	Describe:
[+]Slip fingers under the duff layer above the soil, grasp with your thumb and pick up the material. Hold firm without squeezing and measure thickness.			
Normal Pool indicators (mainly found in cypress depressional wetlands) Lower reach of moss collars, inflection point, Lyonia root crowns	1. 2. 3. 4. 5.	☐ None or at base of tree ☐ present, indistinct or abnormally low ☐ distinct at lower than normal ☑ distinct at appropriate level ☐ does not apply in this system	Describe: some inflections on cypress

Historic NP (list indicator type and briefly describe)	**inches**
Current NP (list type and briefly describe)	
Hurricane High (list the type & briefly describe)	
Explain if there is no lichen line or lichen is weak:	

FORESTED WETLAND ASSESSMENT

Evidence of recent inundation/flow (flow thru systems) Utilize 62-340 F.A.C. for evidence of hydrologic indicators or other.	☑ Yes ☐ No
Algal mat	☑ Algal mat

Water marks/line recent w/in a	☑ Water marks/line recent, within a year?
Drift line, rafted debris recent w/in a	☐ Drift line, rafted debris recent within a year?
Saw Palmetto “Horses”	☐ Saw Palmetto “Horses”
Crayfish, Aquatic fauna	☐ Crayfish, Aquatic fauna
Sediment deposition	☐ Sediment deposition
Aufwuchs	☐ Aufwuchs
Flow channels	☐ Flow channels
Other	☑ Other

FORESTED WETLAND ASSESSMENT
Describe the hydrologic conditions of the site: some standing water in center of wetland and saturated to moist all the way into transition zone

Describe extent of physical disturbance (fire break, truck/ATV impact into wetland, hog/cattle, etc.): For hog damage please provide size of area, estimated age of disturbance and depth of disturbance.
Some spoil piles along edge and some hog damage in the transition zone, a separate hog damage assessment was completed for this wetland

Describe the extent, reach, intensity of fire, and approximate year fire occurred:
no recent signs of fire observed

Describe the overall appearance/health of the system using BPJ. For instance, if shrubs are invading the center of a cypress dome that is an issue, but this is not necessarily an issue in a floodplain forest. See description for Wetland Health Score below - Rank (1-5).
WHA Score: 4

wetland has good zonation and is dominated by wetland plants and hydric soils, wetland trees are healthy

FORTESTED WETLAND ASSESSMENT

The table below should be used as a guide to objectively score wetland health using
Best Professional Judgment (BPJ).

WHA Score	General Criteria for BPJ Wetland Health
1	No hydrology Severe non-wetland plant invasion into interior Severe tree fall and/or most cypress stressed Severe soil subsidence
2	Reduced hydrology Substantial non-wetland plant invasion into interior Some tree fall and/or stressed cypress Substantial soil subsidence
3	Depressed hydrology or was depressed but now recovering Non-wetland plant invasion of edge (may be in interior if inappropriate plants Dominated by wetland plants Cypress and other trees healthy or some stressed Moderate soil subsidence
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Below are a few sections taken from the original WHA field form that explain two current factors

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"Fuel accumulation: Wetlands experiencing normal water levels usually have low to moderate accumulations of dead vegetation since water is sufficiently high to retard abundant growth of understory vegetation. Wetland that are abnormally dry often support an abundance of weedy growth. During lengthy dry periods this high fuel accumulation can support destructive fires. Based upon experience with control wetlands a judgment is made wherever possible as to whether fuel accumulation is excessive for the type of wetland being evaluated."

Aquatics, floating, submerged

"List of Plants & Abundance
...An effort is made to list those species that provide the most ecological information on wetland condition to the professional conducting the wetland evaluation. For instance, listing maidencane under the "AQUATICS" category is not very informative since this species has a wide ecological tolerance. On the other hand, a listing of pickerelweed, pipewort, sphagnum and bladderwort is more informative since these species

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ecological tolerances especially with respect to the hydrologic condition of the wetland."

A list of aquatics, emergents, submergents and sensitive species is provided to assist in listing these species. This list
does not contain all informative species and it can and should always be updated or increased.

Appendix E

2023 Feral Hog Damage Report

Technical Memorandum

July 21, 2023

TO: Danielle Rogers, PWS, PMP, Environmental Project Manager, Environmental Flows and Levels, Natural Systems and Restoration Bureau

THROUGH: Chris Zajac, Manager, Environmental Flows and Levels Section, Natural Systems and Restoration Bureau

FROM: T.J. Venning, PWS, Staff Environmental Scientist, Environmental Flows and Levels, Natural Systems and Restoration Bureau

Jordan Miller, Environmental Scientist, Environmental Flows and Levels, Natural Systems and Restoration Bureau

Brady Evans, Ph.D., Staff Hydrogeologist, Environmental Flows and Levels, Natural Systems and Restoration Bureau

Subject: Morris Bridge Sink Environmental Monitoring – Feral Pig Damage Assessment

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A. Introduction

Pursuant to Water Use Permit (WUP) No. 20020574.000 (Morris Bridge Sink) issued to the District in 2016, annual environmental assessment of three wetlands near Morris Bridge Sink in north-central Hillsborough County is required, including assessment of feral pig impacts to those wetlands. This assessment is part of the Environmental Monitoring Plan (EMP) required by Special Condition 12 of the WUP. Previous years' assessments (2016 – 2020) were conducted by others, but in 2021 the assessment was conducted by District staff in the Resource Projects Section, and in 2022 and 2023 by District staff in the Environmental Flows and Levels Section, concurrent with the Northern Tampa Bay Water Use Caution Area Wetland Assessment Procedure (WAP) assessments of the three Morris Bridge Sink wetlands.

B. Background and Setting

The Lower Hillsborough River Minimum Flows and Levels (MFL) Recovery Strategy includes Morris Bridge Sink as a potential water source to maintain minimum flows in the lower Hillsborough River. The District monitors three wetlands in the vicinity of Morris Bridge Sink annually through the District's WAP program. These three wetlands are Cypress Marsh (Wetland ID 543), Nursery Cypress (Wetland ID 540), and Nursery Marsh (Wetland ID 539) (Figure 1).

Figure 1. Morris Bridge Sink wetland's location (Southwest Florida Water Management District 2020 aerial photograph)

As feral pigs can adversely impact wetlands, primarily through substantial soil and groundcover vegetation disturbance during foraging and wallowing, the EMP includes a feral pig activity/impact assessment. The WAP is primarily a vegetation assessment procedure conducted annually in May and June, so in 2023 the feral pig assessment was conducted concurrent with the WAP assessment of the three wetlands.

C. Methods

The U.S. Department of Agriculture (USDA) has developed a ranking or scoring scale for feral pig disturbance (Attachment A) in order to make assessment of pig activities somewhat quantitative. This scoring methodology has been performed in previous assessments at these sites and was repeated for the 2023 assessment. The USDA ranking method does not specify the extent of the assessment area. The assessment conducted in 2020 by Frydenborg Ecologic, LLC and Jones Edmunds (Frydenborg, 2020), defined the USDA methodology somewhat by limiting the assessment area to the same area as the WAP transect. However, for the 2021 assessment District staff decided that limiting the extent of the pig assessment area to the WAP transect, although making it easier to quantify the areal extent of pig activities, did not necessarily provide an accurate assessment since much of the pig disturbance was

outside the transect area. Therefore, the 2021 assessment includes both the area of the WAP transect and areas in the vicinity of the transect. The decision was made for the 2022 and future assessments to assess areas only within the WAP transect to remain consistent with earlier years assessments for the purposes of ranking, making note that pig damage was present outside of these areas as well.

The USDA ranking method consists of two components: a severity and extent component, and a time component (See Appendix A). Both aspects of the method are scaled from 1 to 4. For severity and extent, a Category 1 score indicates the least amount of damage and Category 3 the greatest or most extensive damage. Category 4 of the severity component is specifically for observations of pig wallows, which can be deeper than rooting activities. The time component is also ranked Category 1 to 4, based on the estimated time since the activity occurred. Category 1 is the most recent, one week or less, and Category 4 being the oldest, 4 to 6 months. There is no category for any activity estimated to be older than 6 months.

Usually, feral pig activities of different severities and occurrence times can be observed in different parts of the same assessment area. In those instances, the rank assigned in the results table for each wetland (Table 1) is based on the most severe damage ranking, which usually coincided with a more recent time ranking, i.e., a lower time Category rating. However, all pig damage observed in the wetlands was included in Section D. of this report.

D. Results and Discussion

Consistent with previous reports, all assessment results for all assessment years are summarized in tabular form (Table 1). In addition, field photographs of the 2023 assessment are provided. The field assessments were conducted on June 14, 2023, by District staff from the Environmental Flows and Levels section of the Natural Systems and Restoration bureau.

Table 1. Results of Feral Pig Damage Assessments from 2016 to 2023

Assessment Year	Cypress Marsh (ID 543)	Nusery Cypress (ID 540)	Nursery Marsh (ID 539)
2016	2 - moderate rooting	1 - surficial rooting	1 - surficial rooting
2017	1 - surficial rooting	1 - surficial rooting	2 - moderate rooting
2018	1 - surficial rooting	1 - surficial rooting	3 - extensive rooting
2019	4 - wallow; <1 month	4 - wallow; <1 month	2 - moderate; 2-3 months
2020	1 - surficial rooting; past 2 weeks	2 - moderate rooting; past 2 weeks, <20% area	2 - moderate rooting; past month, ~30% area
2021	1 - surficial rooting; </= 1 month (Time Category 2)	4 - wallows; </= 1 week (Time Category 1)	3 - extensive rooting; </= 1 month (Time Category 2)
2022	2 - moderate rooting; 4-6 months (Time Category 4)	2 - moderate rooting; 4-6 months (Time Category 4)	4 - wallow; </= 1 week (Time Category 1)
2023	4 - wallow; </= 1 week (Time Category 1)	2 - moderate rooting; </= 1 week (Time Category 1)	2 - moderate rooting; </= 1 week (Time Category 1)

The final rankings for the 2023 assessment are listed in Table 1. The final ranking of each wetland for 2023 is based on the most severe damage observed within the WAP transect in each wetland this year. However, different levels of damage severity and different occurrence times were observed in each wetland within the WAP transect and/or beyond the transect. Note that for this assessment, pig damage observed outside the designated WAP transect is still described for comparison purposes.

For Cypress Marsh (ID 543), most of the damaged area observed occurred in the WAP Transition Zone which is a drier portion of the wetland and the zone closest to the wetland edge and upland. The damage was assessed as moderate rooting (Category 2) based on the amount of bare soil (33 – 66%), vegetation consumed (33 – 66%), and depth of some of the rooting (4 – 8”) (Figure 2). The damage was determined to be 4-6 months prior and was ranked a Time Category 4 due to the new growth of vegetation present.

Figure 1. Morris Bridge Cypress Marsh. Area of moderate rooting (Severity Category 2) within the WAP Transition Zone.

Morris Bridge Cypress Marsh also had similar damage observed in the WAP Outer Deep Zone, close to where the Transition Zone ends, and the Outer Deep Zone begins. The same level of damage was observed in areas outside of the WAP transect as well. Morris Bridge Cypress Marsh also had some recent wallows observed (Severity Category 4) in the WAP Deep Zone (Figure 2 and Figure 3). The damage from the wallows was determined to have occurred less than or equal to one week prior (Time Category 1).

Figure 2. Morris Bridge Cypress Marsh. Area of wallow (Severity Category 4) within the WAP Deep Zone.

Figure 3. Morris Bridge Cypress Marsh. Area of wallow (Severity Category 4) within the WAP Deep Zone.

In Nursery Cypress (ID 540), moderate rooting (Severity Category 2) was observed in the drier WAP Transition zone (Figure 4). The damage was determined to be Severity Category 2 based on the amount of bare soil and lack of vegetation. The damage appeared to have occurred 4-6 months prior (Time Category 4) and this was determined based on the vegetation present in the damaged area, size, and distinguishable to species.

Figure 4. Morris Bridge Nursery Cypress. Area of moderate rooting (Severity Category 2) within the WAP Transition Zone.

Observed within the WAP Outer Deep Zone of Nursery Cypress was more recent damage of less severity. Surficial rooting (Severity Category 1) was noted and was determined based on the depth of the rooting. The damage was determined to be less than or equal to one week based on the freshly overturned soil and little to no effect observed from wind or rain (Figure 5 and Figure 6).

Figure 5. Morris Bridge Nursery Cypress. Area of surficial rooting (Severity Category 1) within the WAP Outer Deep Zone.

Figure 6. Morris Bridge Nursery Cypress. Area of surficial rooting (Severity Category 1) within the WAP Outer Deep Zone.

In Nursery Marsh (ID 539) damage was observed in the driest area of the wetland (WAP Transition Zone) and in the WAP Outer Deep Zone (Figure 7 and Figure 8). Moderate rooting (Severity Category 2) was observed in both zones however, more recent rooting was observed in the Outer Deep Zone. The damage in the Outer Deep Zone was determined to be less than or equal to 1 week (Category 1) based on little to no effect of wind or rain to the damaged area. Damage in the Transition Zone was determined to be 4-6 months (Category 4). There was additional pig damage ranging from Severity Category 2-4 in areas of the wetland outside of the WAP transect.

Figure 7. Morris Bridge Nursery Marsh. Area moderate rooting (Severity Category 2) within the WAP Transition Zone.

Figure 8. Morris Bridge Nursery Marsh. Area of moderate rooting (Severity Category 2) within the WAP Outer Deep Zone.

E. Reference

Frydenborg Ecologic, L.L.C., and Jones Edmunds. 2020. Morris Bridge Sink Environmental Monitoring: Task Work Assignment 20TW0002825, Task 4.4, Wildlife (Feral Swine Damage) Assessment, Calendar Year 2020. Southwest Florida Water Management District.

Attachment A

Feral Pig Disturbance Ranking (excerpts from "Development, Implementation, and Evaluation of Management Tools to Reduce Feral Swine Damage at Avon Park AFR, Florida)

Feral Pig Disturbance Ranking Excerpts taken from:

Development, Implementation, and Evaluation of Management Tools to Reduce Feral Swine Damage at Avon Park AFR, Florida

Interim Report, Year 1
March 31, 2009

Prepared by the staff
United States Department of Agriculture
Wildlife Services/National Wildlife Research Center

Contact Info: Gary Killian
USDA-APHIS-WS/NWRC
7225 Las Vistas Drive
Las Cruces, NM

Severity and extent of pig damage

Category 1: Surficial rooting (see Figure 1A for examples)
Foraging at or just below the surface
Rooting depth less than 6 inches
Fewer than 33% of plants uprooted and/or consumed
Less than 33% bare soil

Category 2: Moderate rooting (see Figure 1B for examples)
Foraging below the surface
Rooting depth 4 to 8 inches
33% to 66% of plants uprooted and/or consumed
Up to 66% bare soil

Category 3: Extensive rooting (see Figure 1C for examples)
Foraging below the surface
Rooting depth 4 to 12+ inches
Greater than 66% of plants uprooted and/or consumed
Over 66% bare soil

Category 4: Wallow (see Figure 1D for examples)
Open depression created by "rolling" activity of hogs in sand and/or muck soils
Devoid of vegetation
Often retains water, creating new hydrologic feature

Time since pig damage occurred

Category 1: Less than or equal to 1 week
Freshly overturned soil, with little or no effect of wind or rain on the surface of the broken soil
Overturned vegetation is still green in color; may or may not be moderately wilted
Exposed roots are still intact and pliable
Disturbed vegetation has not resprouted
No new plants have sprouted up in areas of bare soil

Category 2: Less than or equal to 1 month
Overturned soil shows some signs of weathering
Overturned vegetation is yellowing and/or wilted
Exposed roots are intact but dry
Disturbed vegetation shows initial signs of regrowth (budding leaves and stems)
Seeds may have just sprouted in areas of bare soil

Category 3: 2 to 3 months
Overturned soil is weathered and beginning to settle or flatten
Overturned vegetation is mostly dead (depending on soil adherence to the roots)
Exposed roots are dry, brittle, and beginning to break off
Disturbed vegetation shows signs of regrowth (extended shoots and stems)
Plants sprouted in areas of bare soil becoming distinguishable (to genus, possibly species)

Category 4: 4 to 6 months
Overturned soil is weathered and partially settled
Overturned vegetation is dead and beginning to decompose
Exposed roots are dry and broken off, soil is falling away from root balls
Disturbed vegetation has moderately recovered
Plants sprouted in areas of bare soil are distinguishable (to species)

Figure 1 A. Examples of Category 1 Damage-Surficial rooting

Selective feeding-cutthroat grass

Surface soil pushed up in shallow mounds

Vegetation Uprooted

Figure 1B. Examples of Category 2 Damage-Moderate rooting

Cutthroat grass uprooted and soil turned over

Patchy removal and/or consumption of vegetation

Subsurface feeding in wet, mucky soils

Figure 1C. Examples of Category 3 damage Extensive/Severe rooting

Deep rooting down to mineral soil

Soil pushed up in tall mounds

Thorough destruction of plant community

Figure 1D. Examples of Category 4 Damage-Wallow

Shallow depression from pig rolling in mud

Wallow created after recent feeding

Deep wallow along a movement corridor, holding water

Appendix F

2023 Morris Bridge Sink Macroinvertebrate Report

Morris Bridge Sink Environmental Monitoring:
Task Work Assignment No. 23TW0004124
Task 5.3, Macroinvertebrate Monitoring, Calendar Year 2023

Prepared for:

Southwest Florida Water Management District

Prepared by:

Frydenborg EcoLogic, L.L.C. and Jones Edmunds

May 2023

CONTENTS

FIGURES

TABLES

1 EXECUTIVE SUMMARY

To comply with Minimum Flows and Levels (MFL) requirements, up to 6 cubic feet per second (cfs) of water from Morris Bridge Sink may be pumped to augment flow to the Hillsborough River. Consumptive Water Use Permit (WUP) No. 20020574.000 was issued to the Southwest Florida Water Management District (SWFWMD) to authorize this activity. This permit contains an Environmental Monitoring Plan (EMP) that includes measuring groundwater and surface water levels, wetland bathymetry and inundation analysis, annual vegetative health assessments, organic soil characterization, soil loss/subsidence monitoring, wildlife monitoring, and reporting requirements. In 2016, SWFWMD implemented a supplementary sampling program (to augment the EMP requirements) to characterize the existing biological community of Morris Bridge Sink before MFL water withdrawals. This annual supplementary monitoring includes the following:

- Zooplankton;
- Benthic macroinvertebrates;
- Fish; and
- Water quality.

No pumping from the sink has occurred to date for the MFL implementation. Baseline (pre-pumping) benthic macroinvertebrate data have been collected since 2016 (except no benthic sampling was conducted in 2018). The most recent annual benthic macroinvertebrate sampling event occurred on April 25, 2023. A total of 13 taxa were collected, with no individuals belonging to the *Ephemeroptera* (mayflies, a sensitive order of macroinvertebrates). The BioRecon score was calculated to be 0.08 (points were achieved for taxa richness only). The BioRecon score for 2023 was the second lowest score reported for Morris Bridge Sink, only exceeding the 2017 score of zero. Extensive periphyton smothering (by *Cladophora* sp., a filamentous green alga) of near-shore habitats continues to be present. Because the BioRecon interpretation system was developed for flowing streams, the metric results are useful only to assess relative trends at Morris Bridge Sink over time and cannot be used to assess the absolute health of the system.

2 INTRODUCTION

The SWFWMD contracted with Jones Edmunds and Frydenborg EcoLogic to conduct environmental monitoring associated with the consumptive WUP. Task 5.3 of this contract involves assessing the Morris Bridge Sink's benthic macroinvertebrate community. **Figure 1** provides a map of the areas sampled in the sink (dip net sweeps using the BioRecon method)**.**

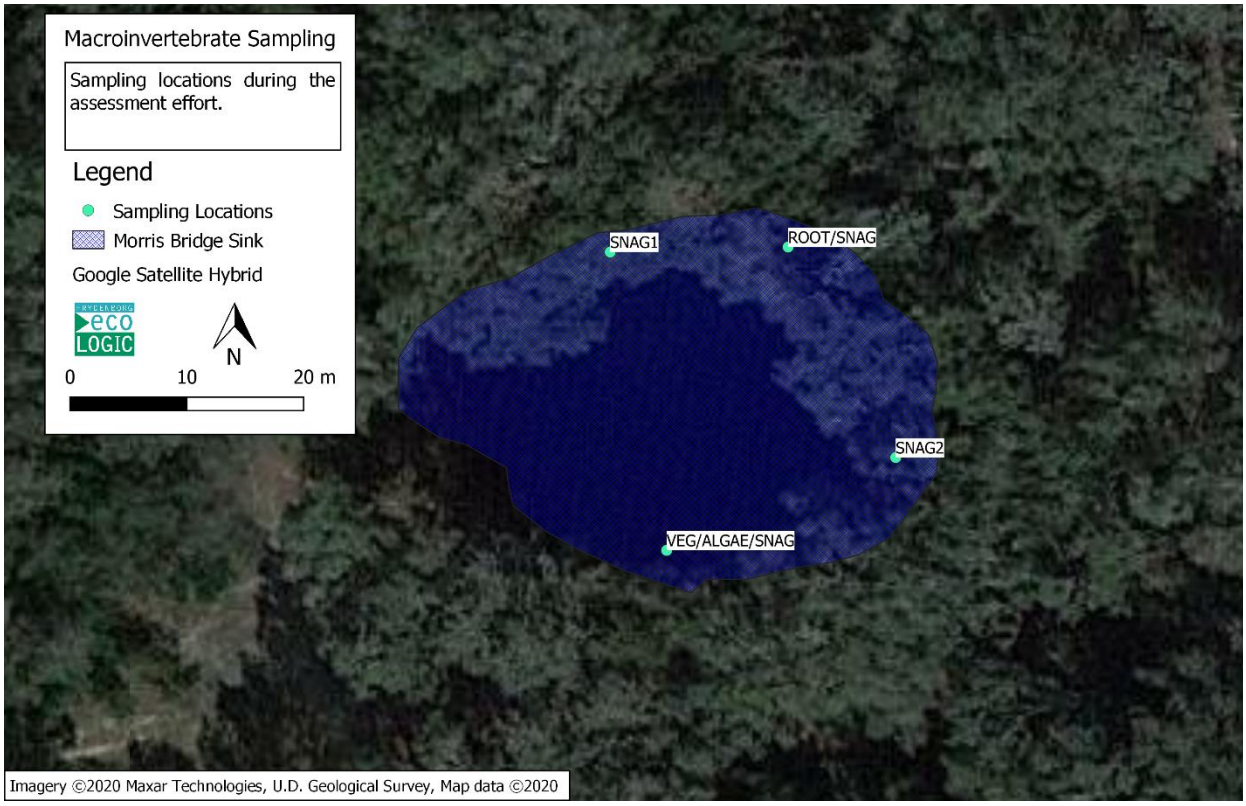

Figure 1. Locations of dip net sweep collection areas for the Morris Bridge Sink BioRecon.

3 METHODS

Sampling and analysis of benthic macroinvertebrates were conducted on April 25, 2023, using the BioRecon method (Florida Department of Environmental Protection [FDEP] Standard Operating Procedure [SOP] BRN 1000 and BRN 2000). Frydenborg EcoLogic is currently on the FDEP-approved registry for Stream Condition Index and BioRecon.

For BioRecon, four sweeps of the best available habitats were sampled (aquatic vegetation [*Chara* sp.], snags), and the contents of each sweep were field sorted using white plastic pans, forceps, and hand lenses (**Figure 1** and **Figure 2** provide site photographs). For field sorting, small aliquots of the detritus plus organism matrix were placed in a white plastic pan diluted with a small amount of site water. The density of detritus was maintained at a low level, so organisms were easily seen and captured. The entire pan was scanned for organisms, and when one was found, it was removed with forceps, examined with the hand lens, and its identity was determined to the lowest possible taxonomic level (*e.g.*, order, family, or genus). Taxa found were recorded on the BioRecon Field Sheet (FD 9000-1) and placed in a jar containing 90-percent ethanol. These procedures were repeated until all the material in each of the four sweeps had been examined. The specimens were transported to the laboratory, identified to the lowest practical taxonomic level, and six metrics were calculated from the resulting species list. Dr. John Epler, a well-published invertebrate taxonomist, conducted the laboratory analyses.

Figure 2. BioRecon sampling at Morris Bridge Sink.

Figure 3. Overview of Morris Bridge Sink on 4-25-23.

The following metrics were calculated and recorded:

- The number of long-lived taxa according to the list in BRN 2000;
- The sensitive taxa score according to the list in BRN 2000;
- The number of clinger taxa (according to Merritt and Cummins [1978], *An Introduction to the Aquatic Insects of North America*);
- The total number of taxa;
- The total number of *Ephemeroptera* (mayfly) taxa, and
- The total number of *Trichoptera* (caddisfly) taxa.

The resulting biological metrics were converted to BioRecon scores according to the scoring system in Tables BRN 2100-1, 2100-2, and 2100-3.

4 RESULTS AND DISCUSSION

Table 1 lists the benthic macroinvertebrate taxa list for Morris Bridge Sink, sampled using the BioRecon methodology (FDEP SOP BRN 1000)**.**

Table 1. Taxa list for April 2023 Morris Bridge Sink benthic macroinvertebrate sampling event.

Order	Common Name	Family	Genus	Species	Count
Clitellata	Worm	Naididae	*Dero*	*digitata* complex sp.	1
Gastropoda	Snail	Amnicolidae	*Amnicola*	*dalli*	2
Gastropoda	Snail	Cochliopidae	*Pyrgophorus*	*platyrachis*	1
Gastropoda	Snail	Planorbidae	*Planorbella*	*trivolvis*	5
Amphipoda	Scud	Hyalellidae	*Hyalella*	*azteca* complex sp.	9
Heteroptera	True bug	Nepidae	*Ranatra*	*australis*	1
Coleoptera	Beetle	Haliplidae	*Peltodytes*	*dietrichi*	1
Coleoptera	Beetle	Haliplidae	*Peltodytes*	*oppositus*	2
Coleoptera	Beetle	Hydrophilidae	*Tropisternus*	*blatchleyi*	1
Diptera	Midge	Chironomidae	*Chironomus*	sp.	1
Diptera	Midge	Chironomidae	*Goeldichironomus*	*cf. natans*	3
Diptera	Midge	Chironomidae	*Kiefferulus*	sp.	1
Diptera	Midge	Chironomidae	*Polypedilum*	*beckae*	2

Note: Appendix A provides a full phylogeny.

A total of 13 taxa were collected, with no individuals belonging to *Ephemeroptera* (mayflies). BioRecon metrics include the total number of taxa, number of *Ephemeroptera* taxa, number of *Trichoptera* taxa, number of sensitive taxa, number of clingers, and number of long-lived taxa. **Table 2 shows that t**he BioRecon score was calculated to be 0.08 (points were achieved for taxa richness only).

Table 2. Cumulative invertebrate results for Morris Bridge Sink.

Year	Total Taxa	Ephemeroptera	Trichoptera	Clingers	Long-lived Taxa	Sensitive Taxa	BioRecon Score
2016	11	0	0	0	1	0	0.24
2017	9	0	0	0	0	0	0
2018	Not Sampled						
2019	18	1	0	0	0	0	0.8
2020	22	2	0	0	0	0	1.4
2021	12	1	0	0	0	0	0.33
2022	14	1	0	0	0	0	0.47
2023	13	0	0	0	0	0	0.08

Sources: ADA and Earth Resources (2016); ADA and Earth Resources (2017); and Wood (2019).

Table 2 shows the BioRecon score for 2023 was the second lowest score reported for Morris Bridge Sink, only exceeding the 2017 score of zero). Extensive periphyton smothering (by *Cladophora* sp.) of near-shore habitats was present, and no mayflies were captured in 2023. Algal growth of this nature is known

to interfere with macroinvertebrate colonization in affected areas (FDEP, 2013). However, since the BioRecon interpretation system was developed for flowing streams (not sinkholes with no flow), the metric results are useful only to assess relative trends over time and cannot be used to assess the absolute health of the Morris Bridge Sink.

Table 3 lists wildlife and plants observed in or around Morris Bridge Sink.

Table 3. Wildlife and plants observed at Morris Bridge Sink on April 25, 2023.

Animals (Common Name)	Animals (Latin Name)
American crow	*Corvus brachyrhynchos*
Black vulture	*Coragyps atratus*
Blue jay	*Cyanocitta cristata*
Bull frog	*Lithobates catesbeianus*
Carolina wren	*Thryothorus ludovicianus*
Downy woodpecker	*Picoides pubescens*
Feral hog (damage observed)	*Sus scrofa*
Great-crested flycatcher	*Myiarchus crinitus*
Leopard frog	*Rana sphenocephal*
Mosquitofish	*Gambusia holbrooki*
Northern cardinal	*Cardinalis cardinalis*
Northern mockingbird	*Mimus polyglottos*
Northern parula warbler	*Setophaga americana*
Osprey	*Pandion haliaetus*
Raccoon (scat and tracks)	*Procyon lotor*
Red-bellied woodpecker	*Melanerpes carolinus*
Red-eyed vireo	*Vireo olivaceus*
Sailfin molly	*Poecilia latipinna*
White-eyed vireo	*Vireo griseus*
White-tailed deer	*Odocoileus virginianus*
Plants (Common Name)	**Plants (Latin Name)**
Beauty berry	*Callicarpa americana*
Beggartick	*Bidens spp.*
Blackberry	*Rubus argutus*
Broom sedge	*Andopogon glomeratus*
Buttonbush	*Cephalanthus occidentalis*
Cat briar	*Smilax spp.*
Cherry laurel	*Prunus caroliniana*
Climbing hempweed	*Mikanea scandens*
Common ragweed	*Ambrosia artemisiifolia*
Creeping beggarweed	*Desmodium incanum*

Plants (Common Name)	Plants (Latin Name)
Darrow's blueberry	*Vaccinium darrowii*
Duckweed	*Lemna minor*
Filamentous algae	*Cladophora sp.*
Laurel oak	*Quercus hemisphaerica*
Live oak	*Quercus virginiana*
Muscadine grape	*Vitis rotundifolia*
Palmetto	*Serenoa repens*
Pepper vine	*Ampelopsis arborea*
Pond cypress	*Taxodium ascendens*
Sabal palm	*Sabal palmetto*
Smartweed	*Polygonum hydropiperoides*
Stonewort	*Chara* sp.
Sugar hackberry	*Celtis leavigata*
Swamp laurel oak	*Quercus laurifolia*
Sword fern	*Nephrolepis cordifolia*

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6 APPENDIX

Table 4. Taxa list with full phylogeny for Morris Bridge Sink BioRecon, sampled April 25, 2023.

Phylum	Subphyllum	Class	Subclass	Order	Family	Genus	Species
Annelida		Clitellata	NA	Tubificude	Naididae	*Dero*	*digitata* complex sp.
Mollusca		Gastropoda	Caenogastropoda	Neotaenioglossa	Amnicolidae	*Amnicola*	*dalli*
Mollusca		Gastropoda	Caenogastropoda	Neotaenioglossa	Cochliopidae	*Pyrgophorus*	*platyrachis*
Mollusca		Gastropoda	Heterobrancha	Basommatophora	Planorbidae	*Planorbella*	*trivolvis*
Arthropoda	Crustacea	Malacostraca	Eumalacostraca	Amphipoda	Hyalellidae	*Hyalella*	*azteca* complex sp.
Arthropoda	Hexapoda	Insecta	Heteroptera	Heteroptera	Nepidae	*Ranatra*	*australis*
Arthropoda	Hexapoda	Insecta	Coleoptera	Coleoptera	Dytiscidae	*Coptotomus*	*interrogatus*
Arthropoda	Hexapoda	Insecta	Coleoptera	Coleoptera	Haliplidae	*Peltodytes*	sp.
Arthropoda	Hexapoda	Insecta	Coleoptera	Coleoptera	Haliplidae	*Peltodytes*	*dietrichi*
Arthropoda	Hexapoda	Insecta	NA	Diptera	Chironomidae	*Chironomus*	sp.
Arthropoda	Hexapoda	Insecta	NA	Diptera	Chironomidae	*Goeldichironomus*	*cf. natans*
Arthropoda	Hexapoda	Insecta	NA	Diptera	Chironomidae	*Kiefferulus*	sp.
Arthropoda	Hexapoda	Insecta	NA	Diptera	Chironomidae	*Polypedilum*	*beckae*

Table 5. Genus/species taxa list with metrics for Morris Bridge Sink BioRecon, sampled April 25, 2023.

Genus	Species	Count	Ephemerioptera	Trichoptera	Long-lived	Clingers	Sensitive
Dero	*digitata* complex sp.	1	0	0	0	0	0
Amnicola	*dalli*	2	0	0	0	0	0
Pyrgophorus	*platyrachis*	1	0	0	0	0	0
Planorbella	*trivolvis*	5	0	0	0	0	0
Hyalella	*azteca* complex sp.	9	0	0	0	0	0
Ranatra	*australis*	1	0	0	0	0	0
Peltodytes	*dietrichi*	1	0	0	0	0	0
Peltodytes	*oppositus*	2	0	0	0	0	0
Tropisternus	*blatchleyi*	1	0	0	0	0	0
Chironomus	sp.	1	0	0	0	0	0
Goeldichironomus	*cf. natans*	3	0	0	0	0	0
Kiefferulus	sp.	1	0	0	0	0	0
Polypedilum	*beckae*	2	0	0	0	0	0

Appendix G

2023 Morris Bridge Sink Zooplankton Report

Morris Bridge Sink Environmental Monitoring:
Task Work Assignment No. 23TW0004124
Task 5.2, Zooplankton Monitoring, Calendar Year 2023

Prepared for:

Southwest Florida Water Management District

Prepared by:

Frydenborg EcoLogic, L.L.C. and Jones Edmunds

June 2023

CONTENTS

FIGURES

TABLES

1 EXECUTIVE SUMMARY

To comply with Minimum Flows and Levels (MFL) requirements, up to 6 cfs of water from Morris Bridge Sink may be pumped to augment flow to the Hillsborough River. Consumptive Water Use Permit (WUP) No. 20020574.000 was issued to the Southwest Florida Water Management District (SWFWMD) to authorize this activity. This permit contains an Environmental Monitoring Plan (EMP) that includes measuring groundwater and surface water levels, wetland bathymetry and inundation analysis, annual vegetative health assessments, organic soil characterization, soil loss/subsidence monitoring, wildlife monitoring, and reporting requirements. In 2016, the SWFWMD implemented a supplementary sampling program (to augment the EMP requirements) to characterize the existing biological community of Morris Bridge Sink prior to MFL water withdrawals. This annual supplementary monitoring includes the following:

- Zooplankton;
- Benthic macroinvertebrates;
- Fish; and
- Water quality.

There has been no pumping from the sink to date for the purposes of MFL implementation. Baseline (pre-pumping) zooplankton data have been collected since 2016. Zooplankton collected in 2023 consisted of *Calanoida sp.*, *Rotifera* sp., and *Chironomidae* sp. at an average density of 2,000 organisms/m^3, slightly higher than the densities found in 2022. This was the highest number of taxa collected since 2019.

2 INTRODUCTION

The SWFWMD contracted with Jones Edmunds and Frydenborg EcoLogic to conduct the environmental monitoring associated with the consumptive use permit. Task 5.2 of this contract involves an assessment of Morris Bridge Sink's zooplankton community. A map of the sites assessed in the sink is found in **Figure 3-1**.

3 METHODS

On April 25, 2023**,** three zooplankton samples were collected from a canoe via vertical tows through the water column with a plankton net (8" diameter and 80 µm mesh) in accordance with the same methodology previously used in Morris Bridge Sink by SWFWMD (Flannery, 2019). The samples were collected in three locations in the sink (**Figure 3-1**):

1. Approximately 3 m from shore;
2. Approximately 6 m from shore; and
3. Near the center of the sink (approximately 12 m from shore).

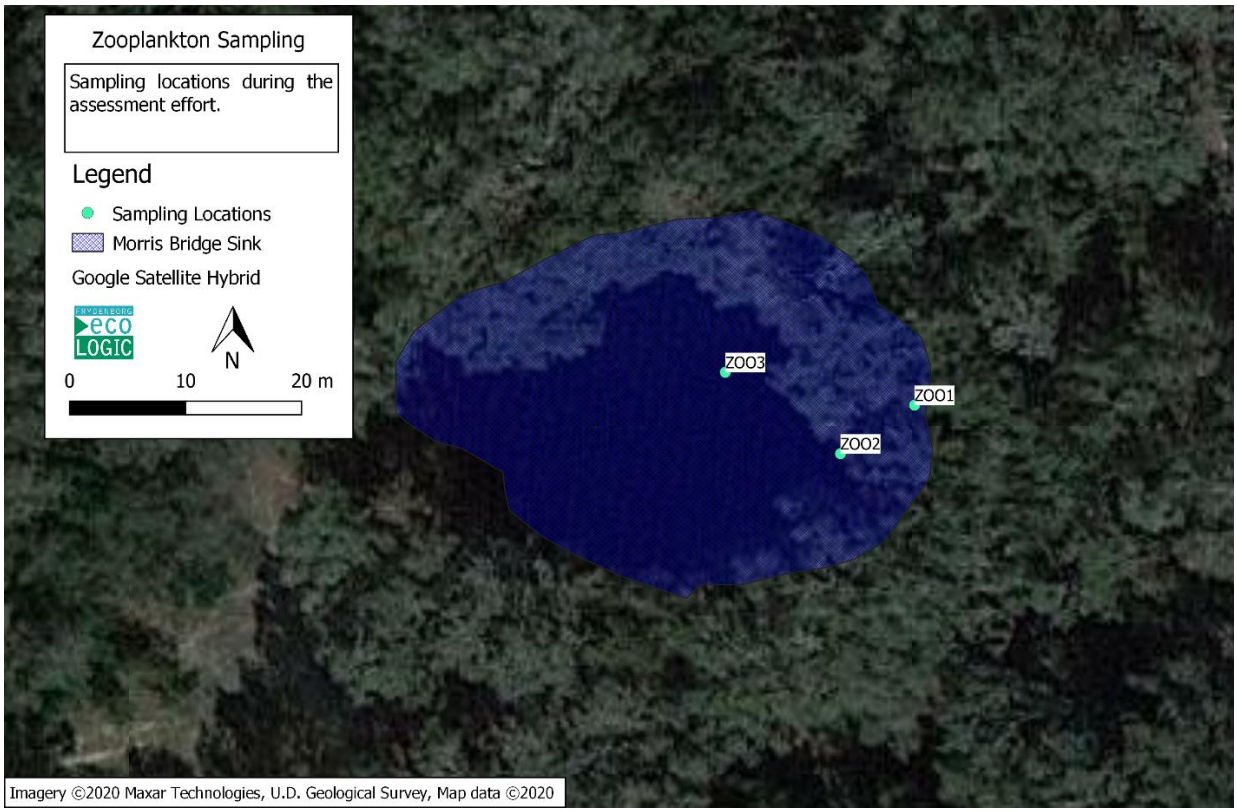

Figure 3-1. Zooplankton sampling locations in Morris Bridge Sink.

Figure 3-2. Zooplankton sampling at Morris Bridge Sink.

Station 1 was sampled at a depth of 2 m, while stations 2 and 3 were sampled at a depth of 4 m, because dissolved oxygen (DO) concentrations exceeded 3.0 mg/L to tnat depth. After each tow with the plankton

net, the contents of the net were transferred via rinse bottle to labelled 50 mL centrifuge tubes, and the net was examined to ensure that all material had been transferred. Samples were preserved in the field with 10% buffered formalin. Density calculations were completed in accordance with USEPA (2018).

In the laboratory, the entire volumes of all three tows were completely examined with no sub-sampling. Dr. John Epler, a well published invertebrate taxonomist, conducted the laboratory analyses. Species density was calculated using the data gathered in 2023 and compared to zooplankton data collected in previous years.

4 RESULTS AND DISCUSSION

Results from the 2023 sampling event are found in **Table 4-1**. Zooplankton taxa found included *Calanoida sp*., *Rotifera* p., and *Chironomidae* sp. at an average density of 2,000 organisms/m^3. The cumulative results are found in **Table 4-2.**

The 2023 zooplankton densities were slightly higher than those observed in 2022 (which was 1,412 (individuals/m^3. Phytoplankton abundance was low in 2023 (chlorophyll was 4.4 µg/L), which diminished the food supply for the zooplankton. However, dissolved oxygen was >3 mg/L at the surface at all three stations in 2023, and dissolved oxygen exceeded 3 mg/L down to a depth of 4 m at stations 2 and 3. which should have assisted with zooplankton success. Three zooplankton taxa (*Calanoida sp*., *Rotifera* p., and *Chironomidae* sp.) were collected in 2023, the highest number of taxa collected since 2019.

Wildlife and plants observed in or around Morris Bridge Sink are found in **Table 4-3.** Additional photos are found in **Figure 4-1** through **Figure 4-2.**

Table 4-1. Zooplankton results for Morris Bridge Sink, collected April 25, 2023.

	TOW 1 (2 m)	TOW 2 (4 m)	TOW 3 (4 m)
Volume Filtered by Net	0.064 m^3	0.128 m^3	0.128 m^3
Raw Number *Calanoida* sp. Enumerated	2	455	305
***Calanoida* sp. Density (#/m^3)**	31.3	3554.7	2382.8
Raw Number *Rotifera* sp. Enumerated	1	0	0
***Rotifera* sp. Density (#/m^3)**	15.6	0	0
Raw Number *Chironomidae* sp. Enumerated	1	0	0
***Chironomidae* sp. Density (#/m^3)**	15.6	0	0
Mean Zooplankton Density (#/m^3)	**2,000**		

Table 4-2. Cumulative zooplankton results collected at Morris Bridge Sink since 2016.

Year	Number of Taxa	Mean Abundance	Dominant Taxa
2016	0	0	NA

2017	0	0	NA
2018		Not sampled	
2019	3	18,645 (raw counts)	*Cladocera sp., Calanoida sp., Rotifera sp.*
2020	1	249.4 (individuals/m^3)	*Calanoida sp.*
2021	2	12,419 (individuals/m^3)	*Calanoida sp., Rotifera sp.*
2022	1	1,412 (individuals/m^3)	*Calanoida sp.*
2023	3	2,000 (individuals/m^3)	*Calanoida sp., Rotifera sp., Chironomidae*

Table 4-3. Wildlife and plants observed at Morris Bridge Sink on April 25, 2023.

Animals (Common Name)	Animals (Latin Name)
American crow	*Corvus brachyrhynchos*
Black vulture	*Coragyps atratus*
Blue jay	*Cyanocitta cristata*
Bull frog	*Lithobates catesbeianus*
Carolina wren	*Thryothorus ludovicianus*
Downy woodpecker	*Picoides pubescens*
Feral hog (damage observed)	*Sus scrofa*
Great-crested flycatcher	*Myiarchus crinitus*
Leopard frog	*Rana sphenocephal*
Mosquitofish	*Gambusia holbrooki*
Northern cardinal	*Cardinalis cardinalis*
Northern mockingbird	*Mimus polyglottos*
Northern parula warbler	*Setophaga americana*
Osprey	*Pandion haliaetus*
Raccoon (scat and tracks)	*Procyon lotor*
Red-bellied woodpecker	*Melanerpes carolinus*
Red-eyed vireo	*Vireo olivaceus*
Sailfin molly	*Poecilia latipinna*
White-eyed vireo	*Vireo griseus*
White-tailed deer	*Odocoileus virginianus*
Plants (Common Name)	**Plants (Latin Name)**
Beauty berry	*Callicarpa americana*
Beggartick	*Bidens spp.*
Blackberry	*Rubus argutus*
Broom sedge	*Andopogon glomeratus*
Buttonbush	*Cephalanthus occidentalis*

Cat briar	*Smilax spp.*
Cherry laurel	*Prunus caroliniana*
Climbing hempweed	*Mikanea scandens*
Common ragweed	*Ambrosia artemisiifolia*
Creeping beggarweed	*Desmodium incanum*
Darrow's blueberry	*Vaccinium darrowii*
Duckweed	*Lemna minor*
Filamentous algae	*Cladophora sp.*
Laurel oak	*Quercus hemisphaerica*
Live oak	*Quercus virginiana*
Muscadine grape	*Vitis rotundifolia*
Palmetto	*Serenoa repens*
Pepper vine	*Ampelopsis arborea*
Pond cypress	*Taxodium ascendens*
Sabal palm	*Sabal palmetto*
Smartweed	*Polygonum hydropiperoides*
Stonewort	*Chara* sp.
Sugar hackberry	*Celtis leavigata*
Swamp laurel oak	*Quercus laurifolia*
Sword fern	*Nephrolepis cordifolia*

Figure 4-1. Overview of Morris Bridge Sink on 4-25-23.

Figure 4-2. Morris Bridge Sink on 4-25-23 at staff guage.

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Appendix H

2023 Fish Sampling Report

Morris Bridge Sink Environmental Monitoring: Task Work Assignment No. 23TW0004124
Task 5.4, Fish Monitoring, Calendar Year 2023

Prepared for:

Southwest Florida Water Management District

Prepared by:

Frydenborg EcoLogic, L.L.C. and Jones Edmunds

May 2023

CONTENTS

FIGURES

TABLES

1 EXECUTIVE SUMMARY

To comply with Minimum Flows and Levels (MFL) requirements, up to 6 cubic feet per second (cfs) of water from the Morris Bridge Sink may be pumped to augment flow to the Hillsborough River. Consumptive Water Use Permit (WUP) No. 20020574.000 was issued to the Southwest Florida Water Management District (SWFWMD) to authorize this activity. This permit contains an Environmental Monitoring Plan (EMP) that includes measuring groundwater and surface water levels, wetland bathymetry and inundation analysis, annual vegetative health assessments, organic soil characterization, soil loss/subsidence monitoring, wildlife monitoring, and reporting requirements. In 2016, SWFWMD implemented a supplementary sampling program (to augment the EMP requirements) to characterize the existing biological community of Morris Bridge Sink before MFL water withdrawals. This annual supplementary monitoring includes the following:

- Zooplankton;
- Benthic macroinvertebrates;
- Fish; and
- Water quality.

No pumping from the sink has occurred to date for the MFL implementation. Baseline (pre-pumping) fish community data have been collected since 2016. Fish in Morris Bridge Sink were collected on April 25, 2023. A total of two fish species (*Gambusia holbrooki* and *Poecilia latipinna*) and 489 fish individuals were collected. *Gambusia holbrooki* and *Poecilia latipinna* continue to be the most common species found in the sink. In 2023, 489 individual fish were captured, second only to 2021, when 855 individuals were captured.

2 INTRODUCTION

SWFWMD contracted with Jones Edmunds and Frydenborg EcoLogic to conduct the environmental monitoring associated with WUP No. 20020574.000. Task 5.4 of this contract involves assessing the Morris Bridge Sink's fish community, using a seine net. **Figure 1** is a map of the sites sampled in the Sink for fish.

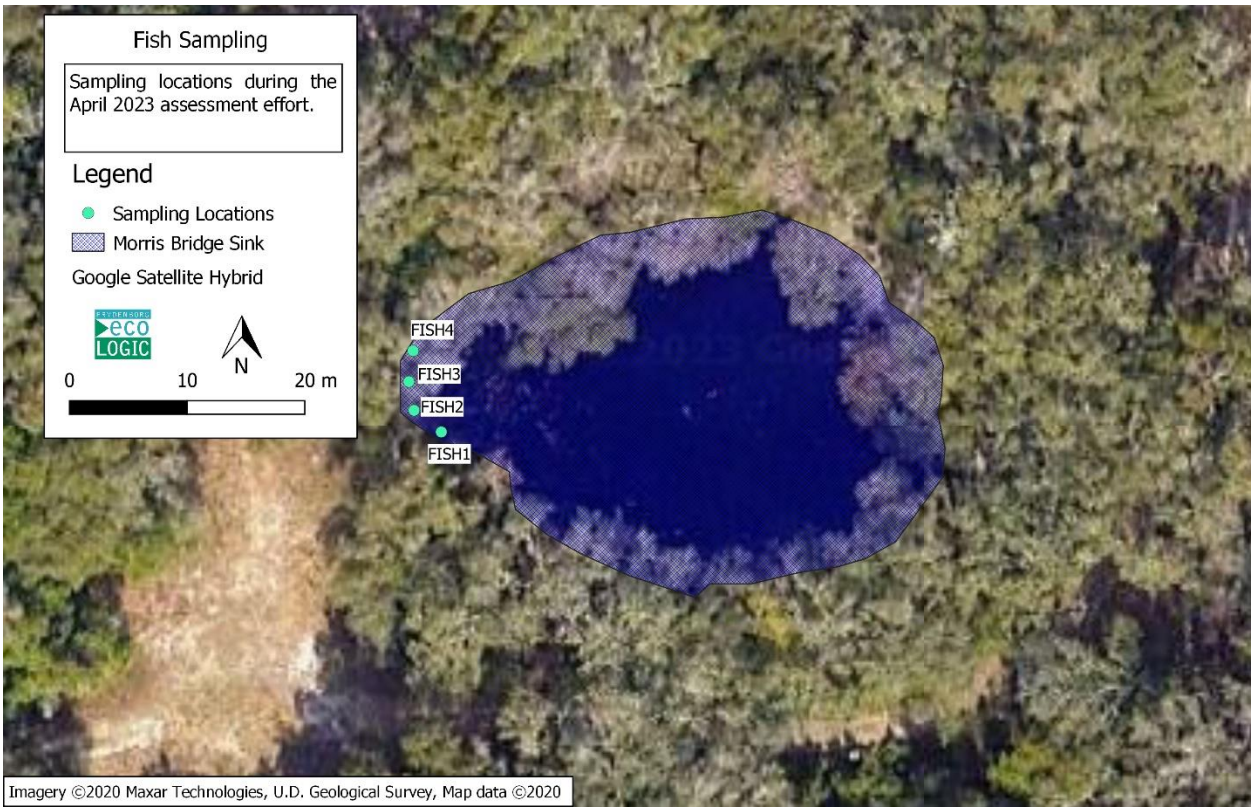

Figure 1. Location of fish sampling areas (seine net) in Morris Bridge Sink.

3 METHODS

Fish were collected on April 25, 2023, using a 4-foot by 12-foot nylon seine net, with a 0.125-inch mesh. The wadable littoral shelf of the sink was sampled with the seine net on four separate deployments in slightly different locations **(Figure 1**). Floating mats of algae (*Cladophora* sp.) and submersed growths of stonewort (*Chara* sp.) were present. For each deployment, fish were concentrated via gravity at the center of the net after it was oriented horizontally. The fish were then transferred to a bucket containing water from the Sink. Using a small aquarium dip net, fish were then placed into white plastic trays containing a small amount of water from the Sink so the fish could be visually inspected, identified, and enumerated. After identification and enumeration, the fish from each white plastic tray were released back into the Sink. These methods were followed until all the fish from each seine deployment were identified (using Bosanko, 2009) and counted. Four seine deployments were conducted, resulting in four replicate species lists for the sampling effort.

4 RESULTS AND DISCUSSION

Table 1 presents the results of the fish assessment. Figure 2 and **Figure 3** show photographs of the fish. Two fish species (*Gambusia holbrooki* and *Poecilia latipinna*) and 489 fish individuals were collected. **Table 2** shows the cumulative results of fish sampling in Morris Bridge Sink conducted since 2016.

Table 1. Fish taxa and individuals found for each seine deployment.

Date	Seine Deployment	Lat.	Long.	Taxon	Count
4-25-23	1	28.076796	-82.334699	Gambusia holbrooki	126
4-25-23	1	28.076796	-82.334699	Poecilia (Molliensia) latipinna	2
4-25-23	2	28.076827	-82.334710	Gambusia holbrooki	94
4-25-23	3	28.076866	-82.334893	Gambusia holbrooki	133
4-25-23	4	28.076899	-82.334669	Gambusia holbrooki	132
4-25-23	4	28.076899	-82.334669	Poecilia (Molliensia) latipinna	2
				Total taxa	**2**
				Total Abundance	**489**

Figure 2. Photo of *Gambusia holbrooki*.

Figure 3. Photo of *Poecilia latipinna*.

Table 2. Cumulative results of fish sampling in Morris bridge Sink conducted since 2016 .

Year	Net Mesh Size (in.)	Total Taxa	Total Individuals	Taxa Present
2016	0.25	2	116	*Gambusia holbrooki, Poecilia latipinna*
2017	0.25	2	84	*Gambusia holbrooki, Poecilia latipinna*
2018				Not sampled
2019	0.25	2	112	*Gambusia holbrooki, Poecilia latipinna*
2020	0.25	2	44	*Gambusia holbrooki, Poecilia latipinna*
2021	0.125	2	855	*Gambusia holbrooki, Poecilia latipinna*
2022	0.125	3	137	*Gambusia holbrooki, Poecilia latipinna, Ameirus nebulosus*
2023	0.125	2	489	*Gambusia holbrooki, Poecilia latipinna*

Note: Past data from ADA and Earth Resources, 2016; ADA and Earth Resources, 2017; and Wood, 2019).

More fish individuals (489) were captured in 2023 than the 137 individuals collected in 2022, likely because of the areas with lower periphyton abundance, allowing for more effective seine net deployments. Additionally, the dissolved oxygen levels observed in 2023 were above 70-percent saturation in the top meter of the water column, favorable for fish success. Since only two species of fish continue to be observed is likely due to the restricted fish recruitment potential from other waterbodies.

Table 3 lists the wildlife and plants observed in or around Morris Bridge Sink. **Figure 4** and **Figure 5** provide additional site photographs**.**

Table 3. Wildlife and plants observed at Morris Bridge Sink on April 25, 2023.

Animals (Common Name)	Animals (Latin Name)
American crow	*Corvus brachyrhynchos*
Black vulture	*Coragyps atratus*
Blue jay	*Cyanocitta cristata*
Bull frog	*Lithobates catesbeianus*
Carolina wren	*Thryothorus ludovicianus*
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Northern mockingbird	*Mimus polyglottos*
Northern parula warbler	*Setophaga americana*
Osprey	*Pandion haliaetus*
Raccoon (scat and tracks)	*Procyon lotor*
Red-bellied woodpecker	*Melanerpes carolinus*
Red-eyed vireo	*Vireo olivaceus*

Animals (Common Name)	Animals (Latin Name)
Sailfin molly	*Poecilia latipinna*
White-eyed vireo	*Vireo griseus*
White-tailed deer	*Odocoileus virginianus*
Plants (Common Name)	**Plants (Latin Name)**
Beauty berry	*Callicarpa americana*
Beggartick	*Bidens spp.*
Blackberry	*Rubus argutus*
Broom sedge	*Andopogon glomeratus*
Buttonbush	*Cephalanthus occidentalis*
Cat briar	*Smilax spp.*
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Darrow's blueberry	*Vaccinium darrowii*
Duckweed	*Lemna minor*
Filamentous algae	*Cladophora sp.*
Laurel oak	*Quercus hemisphaerica*
Live oak	*Quercus virginiana*
Muscadine grape	*Vitis rotundifolia*
Palmetto	*Serenoa repens*
Pepper vine	*Ampelopsis arborea*
Pond cypress	*Taxodium ascendens*
Sabal palm	*Sabal palmetto*
Smartweed	*Polygonum hydropiperoides*
Stonewort	*Chara* sp.
Sugar hackberry	*Celtis leavigata*
Swamp laurel oak	*Quercus laurifolia*
Sword fern	*Nephrolepis cordifolia*

Figure 4. Morris Bridge Sink on April 25, 2023.

Figure 5. Morris Bridge Sink on April 25, 2023 at the staff gauge.

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Appendix I

2023 Water-Quality Monitoring Report

Morris Bridge Sink Environmental Monitoring: Task Work Assignment No. 23TW0004124
Task 5.5, Water Quality Monitoring, Calendar Year 2023

Prepared for:

Southwest Florida Water Management District

Prepared by:

Frydenborg EcoLogic, L.L.C. and Jones Edmunds

June 2023

CONTENTS

FIGURES

TABLES

1 EXECUTIVE SUMMARY

To comply with Minimum Flows and Levels (MFL) requirements, up to 6 cubic feet per second (cfs) of water from Morris Bridge Sink may be pumped to augment flow to the Hillsborough River. Consumptive Water Use Permit (WUP) No. 20020574.000 was issued to the Southwest Florida Water Management District (SWFWMD) to authorize this activity. This permit contains an Environmental Monitoring Plan (EMP) that includes measuring groundwater and surface water levels, wetland bathymetry and inundation analyses, annual vegetative health assessments, organic soil characterizations, soil loss/subsidence monitoring, wildlife monitoring, and reporting requirements. In 2016, SWFWMD implemented a supplementary sampling program (to augment the EMP requirements) to characterize the existing biological community of Morris Bridge Sink before MFL water withdrawals. This annual supplementary monitoring includes the following:

- Zooplankton;
- Benthic macroinvertebrates;
- Fish; and
- Water quality.

No pumping from the Sink has occurred to date for the MFL implementation. Baseline (pre-pumping) water quality data have been collected since 2016. This report includes water quality data collected on April 25, 2023. Many water-quality constituents, including alkalinity, total suspended solids, and major ions (*e.g.*, bromide, calcium, sulfate) were within the range of values typically found in Floridan aquifer-fed springs (Scott et al., 2004). Chlorophyll *a* was 4.4 micrograms per liter (µg/L) during the 2023 event, indicating low phytoplankton growth (although periphyton mats were observed). None of the wet chemistry analytes (*e.g.,* nitrate, total nitrogen, total phosphorus) appeared to suggest adverse effects caused by humans, and generally reflected water characteristic of Floridan aquifer springs in the region. For the 2023 sampling event, dissolved oxygen ranged from a high of 73-percent saturation near the surface to a low of 2.4-percent saturation at a depth of 10 meters (m). Low dissolved oxygen is characteristic of Floridan aquifer waters (Scott et al., 2004).

2 INTRODUCTION

SWFWMD contracted with Jones Edmunds and Frydenborg EcoLogic to conduct the environmental monitoring associated with the consumptive use permit. Task 5.5 of this contract involves assessing the Morris Bridge Sink water quality, using surface grabs for wet chemistry analyses and a multi-parameter Sonde for vertical profiles to a depth of 10 meters (m). **Figure 1** provides a map of the water quality sampling sites in the sink.

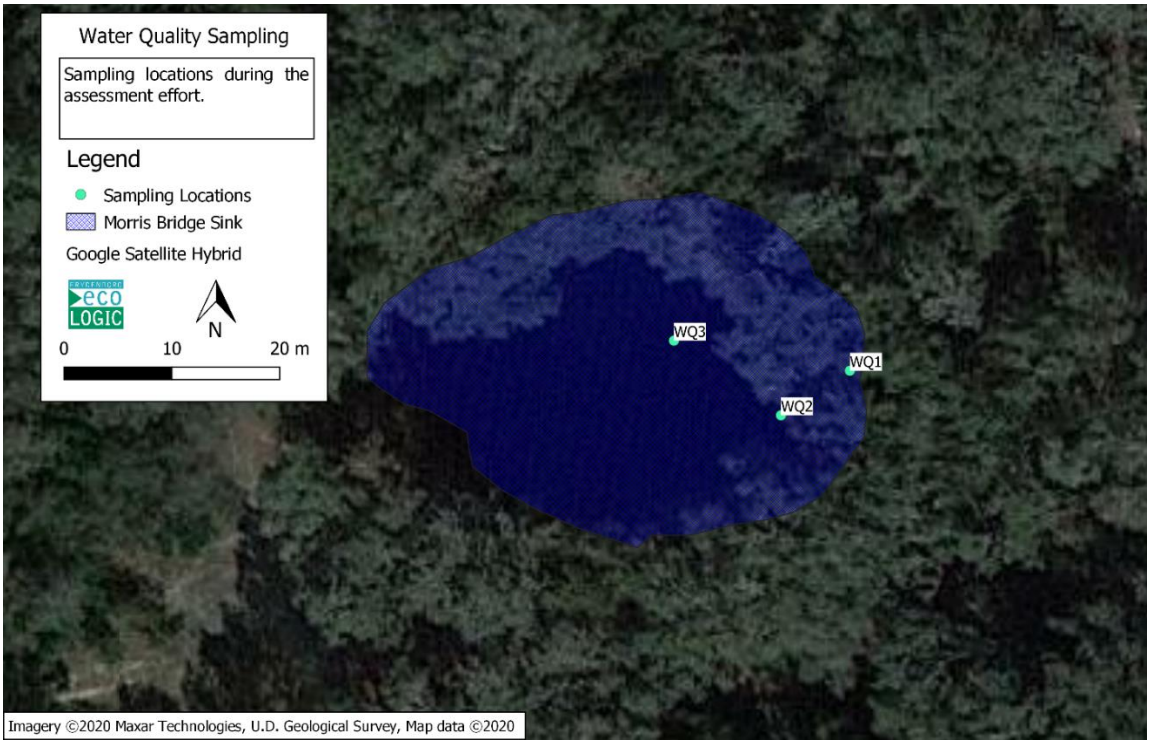

Figure 1. Locations for physical-chemical depth profiles (Stations 1 through3) and surface grab sample for wet chemistry sample (Station 3) April 25, 2023, in Morris Bridge Sink.

3 METHODS

Water quality sampling was conducted by Frydenborg EcoLogic according to Florida Department of Environmental Protection (FDEP) Standard Operating Procedure (SOP) FS 2100, which includes references to FA 1000, FC 1000, FD 1000, FM 1000, FQ 1000, FS 1000, FS 2000, and FT 1000 through FT 2000 (FDEP, 2017). The sampling occurred on April 25, 2023. For surface water grab sampling, an intermediate container was rinsed three times with water from the Sink at a location approximately 1 m away from the sampling point. At the sampling point (Station 3), this intermediate container was inverted and lowered to a depth of approximately 0.4 m, where its position was upturned to allow water to enter the vessel. The container was then raised to the surface and its contents poured into the remaining sample containers, some of which contained required preservatives (see the Chain-of-Custody form). All filled containers were immediately placed on ice, and the required information was recorded. The samples were transported to the laboratory within 3 hours of collection so that all holding times could be met. Advanced Environmental Laboratories of Tampa, Florida, a laboratory certified by the Florida Department of Health, was used for sample analyses.

A calibrated and verified Hydrolab multi-parameter Sonde was used to measure three separate water quality depth profiles (temperature, pH, salinity/conductivity, dissolved oxygen) at three locations in the Sink (**Figure 1**), following FDEP SOP FT 1000 (and associated SOPs, such as calibration and documentation procedures. The Sonde measurements were collected at the surface and at half-meter intervals to 5 m, with an additional set of measurements taken at 10 m. A Secchi disk was used to measured light penetration.

4 RESULTS AND DISCUSSION

4.1 WET CHEMISTRY RESULTS

Table 1 shows the results of the water quality sampling (wet chemistry) in Morris Bridge Sink. Bromide, fluoride, nitrate, nitrite, nitrate-nitrite, total nitrogen, total phosphorus, and total suspended solids were not present at their respective method detection limits (MDLs) (see **Table 1**), therefore, were reported as the MDL value. Because the Sink represents a karst window to the Floridan aquifer, water-quality parameters such as alkalinity, total dissolved solids, and major ions (*e.g.*, TDS, calcium, sulfate) were within the range of values typically found in Floridan aquifer-fed springs (Scott et al., 2004).

Chlorophyll *a* was measured at the low value of 4.4 micrograms per liter (µg/L) during the 2023 event. During the 2023 sampling event, the staff gauge (22.2 feet) was over 2 feet lower than in 2022 (which was 24.5 feet). The Secchi depth (2.5 m) was higher than that observed in 2022.

Table 2 presents the cumulative wet chemistry results, and these data are discussed here. Parameters potentially associated with human enrichment, such as nitrate-nitrite, did not appear to be problematic (see **Table 2**). Nitrate-nitrite levels from 2016 to 2023 were consistently lower than the nitrate-nitrite water-quality criterion of 0.35 milligram per liter (mg/L) for spring vents (Numeric Nutrient Criterion [NNC] found in Chapter 62-302.531, of the Florida Administrative Code [FAC]). Similarly, total phosphorus was less than the method detection limit in 2023 (MDL = 0.15 mg/L) complying with the NNC West Central stream nutrient threshold of 0.49 mg/L during all years (Chapter 62-302.531, FAC). None of the wet chemistry analytes appeared to suggest adverse effects caused by humans.

Table 1. Results of April 25, 2023, Morris Bridge Sink water quality sampling (wet chemistry).

Parameter	Value	Units	Qualifier*
Alkalinity	150	mg/L	
Bromide	0.2	mg/L	U
Calcium	72	mg/L	
Chloride	12	mg/L	
Chlorophyll a	4.4	ug/L	
Color	Not sampled	PCU	
Fluoride	0.4	mg/L	U
Nitrate	0.09	mg/L	U
Nitrate-Nitrite	0.24	mg/L	U
Nitrite	0.09	mg/L	U
Ortho-phosphate	0.013	mg/L	U
Sulfate	47	mg/L	
Total Kjeldahl Nitrogen (TKN)	0.097	mg/L	I
Total Dissolved Solids	250	mg/L	
Total Nitrogen	0.12	mg/L	U
Total Phosphorus	0.15	mg/L	U
Total Suspended Solids	1	mg/L	U

*U = Below laboratory method detection limit, J = Estimated value due to routine laboratory quality assurance exceedance, I = Below practical quantitation limit.

Table 2. Cumulative water quality results (wet chemistry) for Morris Bridge Sink.

Parameter	2016	2017	2018	2019	March 2020	Nov. 2020	2021	2022	2023
Alkalinity (mg/L)	-	-	-	-	170	120	160	130	150
Bromide (mg/L)	0.077	0.069	-	0.069	0.18*	0.2*	0.2*	0.2*	0.2*
Calcium (mg/L)	-	-	-	67.6	74	53	74	75	72
Chloride (mg/L)	13	10.9	-	12.4	15	10	13	13	12
Chlorophyll a (ug/L)	2.2	2.2	-	8.3	2.5*	13	120	2.5*	4.4
Color (PCU)	-	-	-	20	13	24	4.3*	5	-
Fluoride (mg/L)	0.22	0.16	-	0.15	0.2*	0.4*	0.4*	0.4*	0.4*
Nitrate (mg/L)	0.01	0.025	-	0.025	0.079*	0.28*	0.092*	0.092*	0.09*
Nitrate-Nitrite (mg/L)	-	-	-	-	0.14*	0.28*	0.12*	0.12*	0.24*
Nitrite (mg/L)	0.025	0.025	-	0.025	0.077*	0.081*	0.081*	0.081*	0.09*
Ortho-phosphorus (mg/L)	-	-	-	0.038	0.039	0.013*	0.013*	0.03	0.013*
Secchi (m)	6.5	5.2	-	2.9	6.5	1.4	1.3	1.3	2.5
Sulfate (mg/L)	46.3	49	-	38.7	42	27	68	58	47
TKN (mg/L)	-	-	-	NA	0.075*	0.21	0.115	0.087*	0.097
Total Dissolved Solids (mg/L)	278	293	-	233	330	200	240	322	250
Total Nitrogen	0.28	0.34	-	0.58	0.18*	0.49	0.147	0.12*	0.12*
Total Phosphorus (mg/L)	-	-	-	0.065	0.15	0.15*	0.15*	0.15*	0.15*
Total Suspended Solids (mg/L)	5	5	-	5	2*	1.2*	1*	1*	1*

*= Value reported is the laboratory MDL.
Sources: Past data from ADA and Earth Resources, 2016; ADA and Earth Resources, 2017; and Earth Resources, 2019.

4.2 Depth Profile Results

Table 3 shows the Hydrolab meter profile readings for the April 25, 2023 sampling event. **Figure 2** through **Figure 5** show the depth profiles plots of the three Morris Bridge Sink stations. During the April 2023 sampling event, minimal variations were observed over depth for specific conductance (ranging from 416 to 444 micromhos per centimeter [µmhos/cm]), pH (ranging from 8.0 standard units [SU] to 7.6 SU), or temperature (ranging from 23.7 to 22.5 degrees Celsius [°C]). Dissolved oxygen was more variable, ranging from a high of 73-percent saturation near the surface to a low of 2.4-percent saturation at a depth of 10 m. Low dissolved oxygen is characteristic of Floridan aquifer waters (Scott et al., 2004).

Table 3. Hydrolab meter profile readings for Morris Bridge Sink sampled April 25, 2023.

Date	Depth (m)	Temp (°C)	DO (mg/L)	DO (%)	pH (SU)	Sp Cond (µS/cm)	Salinity (PSU)	Site
4-25-23	**0.0**	23.7	6	70.6	7.8	423	0.2	1
4-25-23	**-0.5**	23.7	6.1	72	7.8	423	0.21	1
4-25-23	**-1.0**	23.7	6	71.6	7.8	423	0.21	1
4-25-23	**-1.5**	23.7	6	71.6	7.8	423	0.21	1
4-25-23	**-2.0**	23.7	6	71	7.8	423	0.21	1
4-25-23	**-2.5**	23.7	6	70	7.8	423	0.21	1
4-25-23	**-3.0**	23.7	6	71	7.8	423	0.21	1
4-25-23	**0.0**	23.6	6.2	73	8	423	0.21	2
4-25-23	**-0.5**	23.7	6.2	73	8	423	0.21	2
4-25-23	**-1.0**	23.7	6.1	72.6	8	423	0.21	2
4-25-23	**-1.5**	23.7	6.1	72.6	8	423	0.21	2
4-25-23	**-2.0**	23.7	6.1	72	7.9	423	0.21	2
4-25-23	**-2.5**	23.7	5.9	70	7.9	423	0.21	2
4-25-23	**-3.0**	23.7	5.7	67.3	7.9	423	0.21	2
4-25-23	**-3.5**	23.6	5.4	64	7.9	422	0.21	2
4-25-23	**-4.0**	23.6	3.7	45	7.9	416	0.21	2
4-25-23	**-4.5**	23.4	2.5	29	7.8	416	0.21	2
4-25-23	**-5.0**	23.4	2.3	27.3	7.8	418	0.21	2
4-25-23	**-10.0**	22.5	0.2	2.4	7.6	444	0.22	2
4-25-23	**0.0**	23.7	6.1	73	7.7	423	0.21	3
4-25-23	**-0.5**	23.7	6.1	72	7.7	423	0.21	3
4-25-23	**-1.0**	23.7	6.1	72	7.7	423	0.21	3
4-25-23	**-1.5**	23.7	6.1	72	7.7	423	0.21	3
4-25-23	**-2.0**	23.7	6.1	72	7.7	423	0.21	3
4-25-23	**-2.5**	23.7	6.1	72	7.7	423	0.21	3
4-25-23	**-3.0**	23.7	6	70	7.7	423	0.21	3
4-25-23	**-3.5**	23.7	5.6	66	7.7	423	0.21	3
4-25-23	**-4.0**	23.6	3.7	44	7.7	419	0.21	3
4-25-23	**-4.5**	23.5	2.6	30	7.7	418	0.21	3
4-25-23	**-5.0**	23.4	2.3	27	7.6	419	0.21	3
4-25-23	**-10.0**	22.5	0.21	2.4	7.6	444	0.21	3

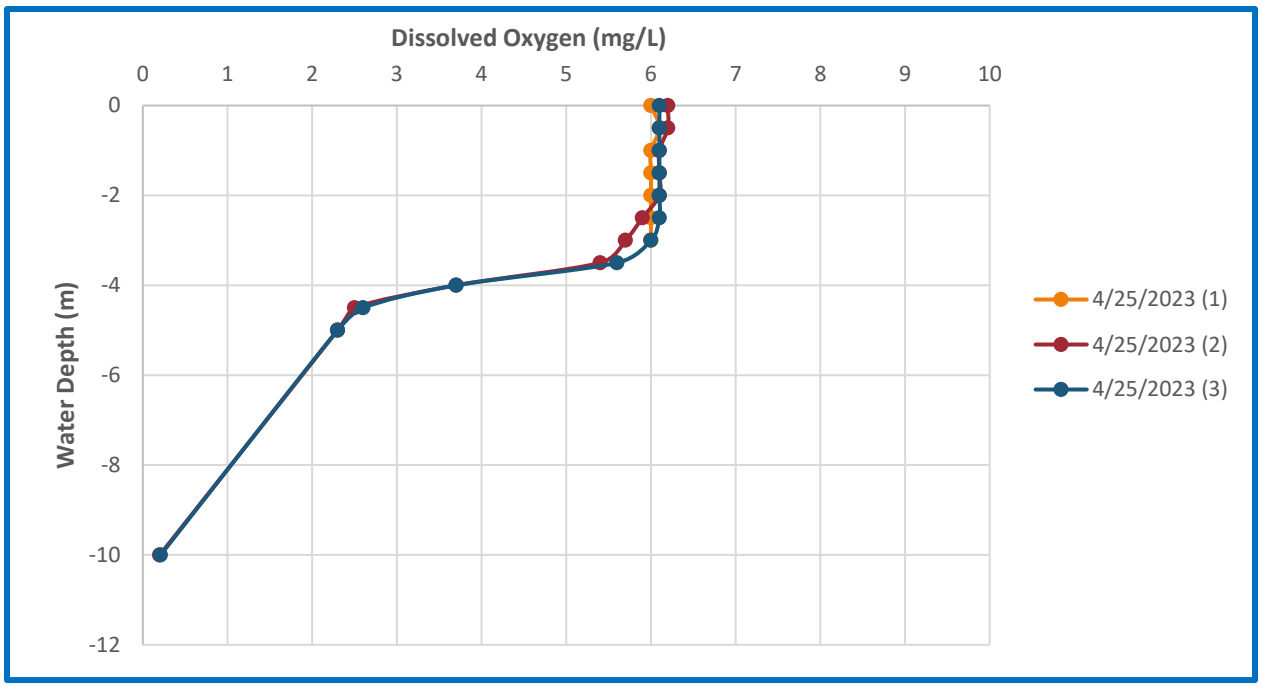

Figure 2. Depth profile for dissolved oxygen (mg/L) in Morris Bridge Sink on April 25, 2023.

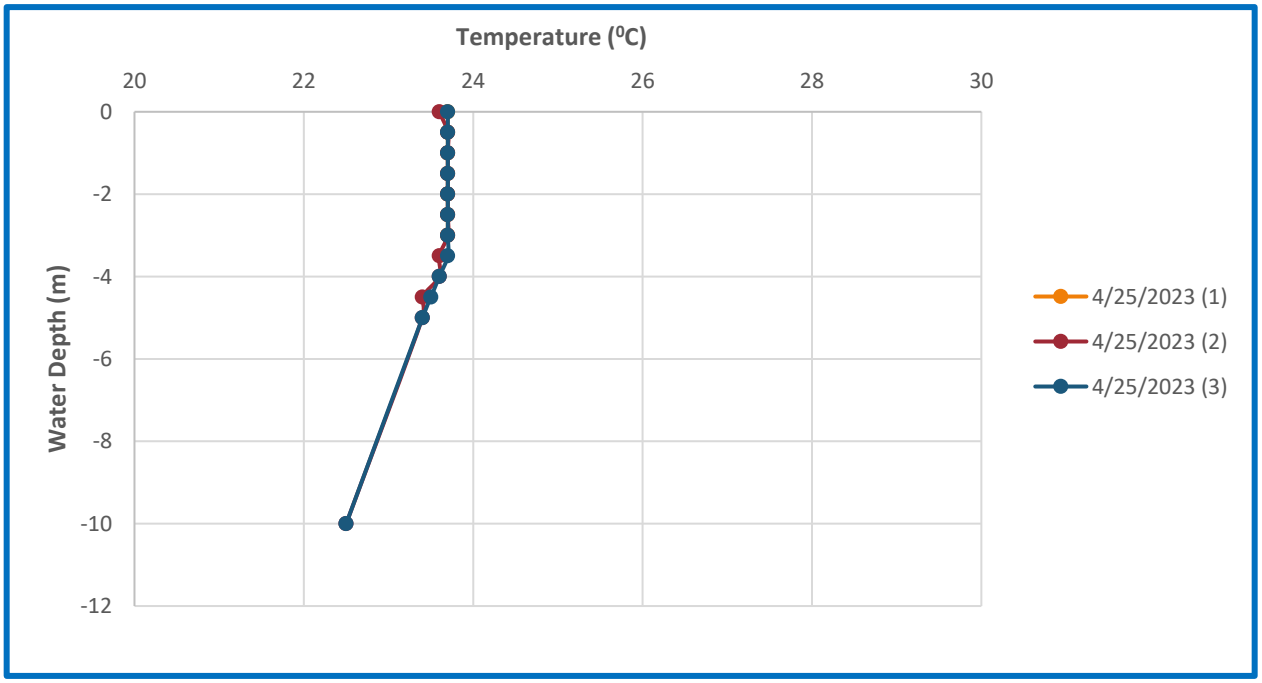

Figure 3. Depth profile for Temperature (°C) in Morris Bridge Sink on April 25, 2023.

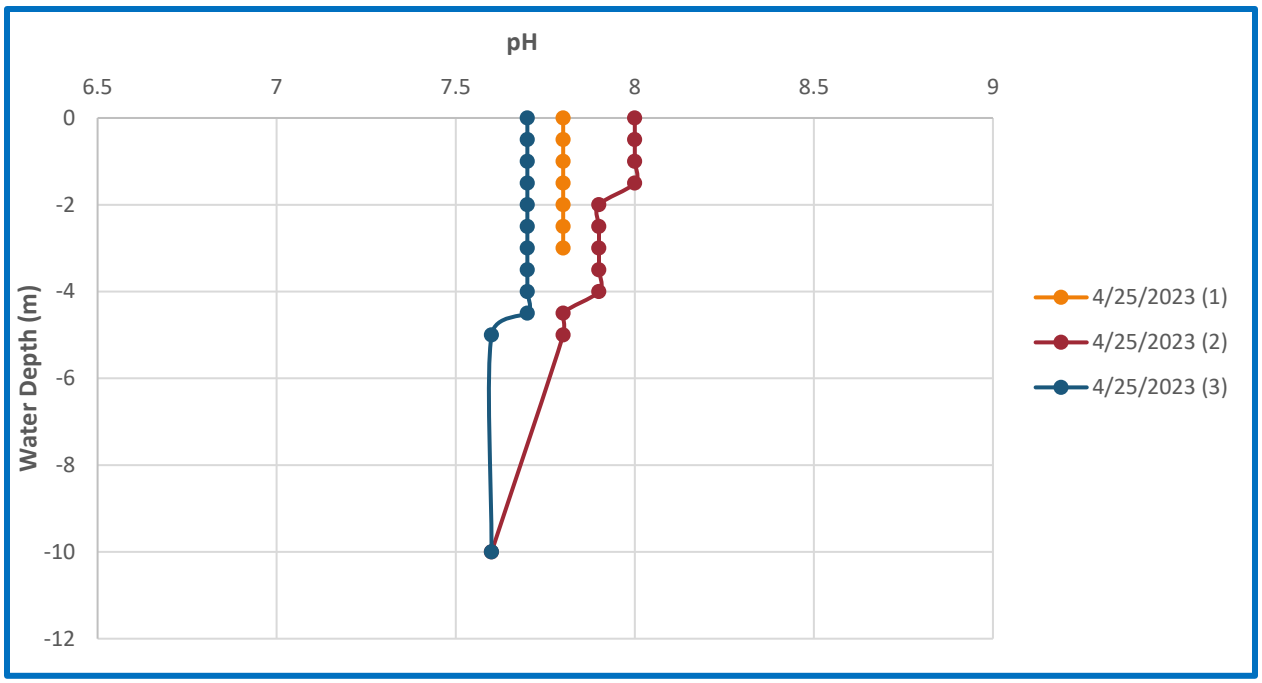

Figure 4. Depth profile for pH (SU) in Morris Bridge Sink on April 25, 2023.

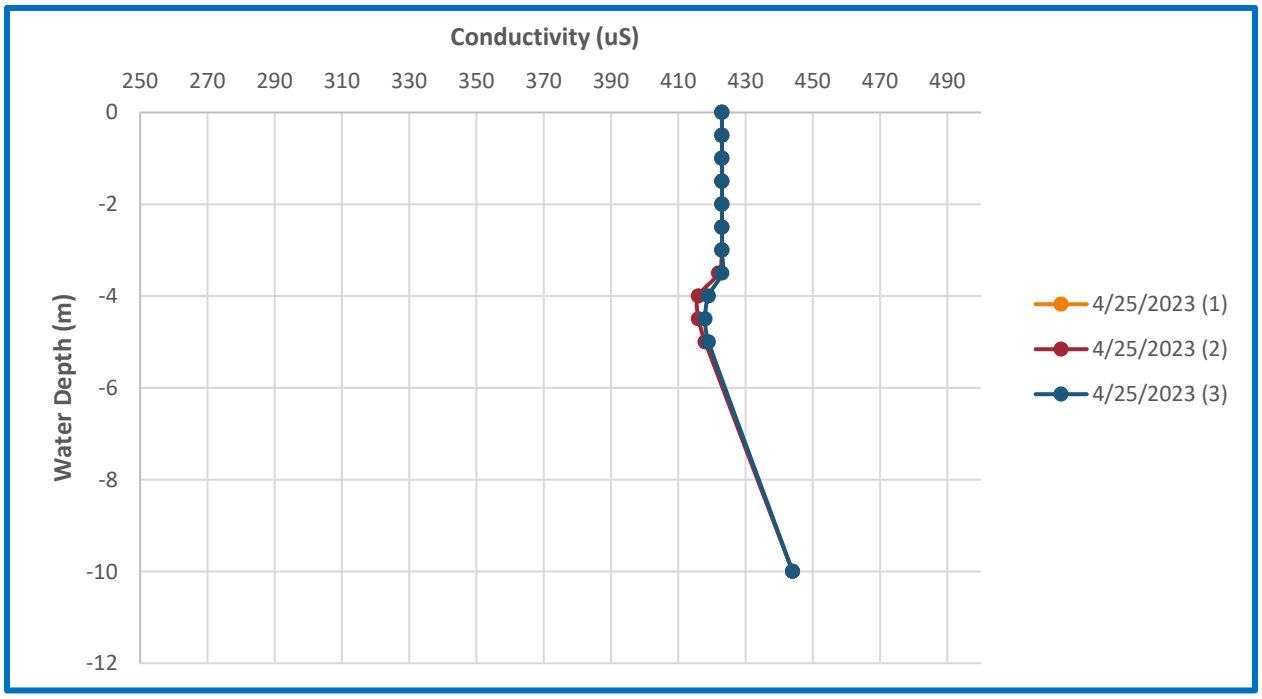

Figure 5. Depth profile for specific conductance (µS or µmhos/cm) in Morris Bridge Sink on April 25, 2023.

4.3 WILDLIFE OBSERVATIONS

Table 4 lists the wildlife and plants observed in or around Morris Bridge Sink. **Figure 6** and **Figure 7** provide additional site photographs.

Table 4. Wildlife and plants observed at Morris Bridge Sink on April 12, 2022.

Animals (Common Name)	Animals (Latin Name)
American crow	*Corvus brachyrhynchos*
Black vulture	*Coragyps atratus*
Blue jay	*Cyanocitta cristata*
Bull frog	*Lithobates catesbeianus*
Carolina wren	*Thryothorus ludovicianus*
Downy woodpecker	*Picoides pubescens*
Feral hog (damage observed)	*Sus scrofa*
Great-crested flycatcher	*Myiarchus crinitus*
Leopard frog	*Rana sphenocephal*
Mosquitofish	*Gambusia holbrooki*
Northern cardinal	*Cardinalis cardinalis*
Northern mockingbird	*Mimus polyglottos*
Northern parula warbler	*Setophaga americana*
Osprey	*Pandion haliaetus*
Raccoon (scat and tracks)	*Procyon lotor*
Red-bellied woodpecker	*Melanerpes carolinus*
Red-eyed vireo	*Vireo olivaceus*
Sailfin molly	*Poecilia latipinna*
White-eyed vireo	*Vireo griseus*
White-tailed deer	*Odocoileus virginianus*
Plants (Common Name)	**Plants (Latin Name)**
Beauty berry	*Callicarpa americana*
Beggartick	*Bidens spp.*
Blackberry	*Rubus argutus*
Broom sedge	*Andopogon glomeratus*
Buttonbush	*Cephalanthus occidentalis*
Cat briar	*Smilax spp.*
Cherry laurel	*Prunus caroliniana*
Climbing hempweed	*Mikanea scandens*
Common ragweed	*Ambrosia artemisiifolia*
Creeping beggarweed	*Desmodium incanum*
Darrow's blueberry	*Vaccinium darrowii*
Duckweed	*Lemna minor*
Filamentous algae	*Cladophora sp.*

Plants (Common Name)	Plants (Latin Name)
Laurel oak	*Quercus hemisphaerica*
Live oak	*Quercus virginiana*
Muscadine grape	*Vitis rotundifolia*
Palmetto	*Serenoa repens*
Pepper vine	*Ampelopsis arborea*
Pond cypress	*Taxodium ascendens*
Sabal palm	*Sabal palmetto*
Smartweed	*Polygonum hydropiperoides*
Stonewort	*Chara* sp.
Sugar hackberry	*Celtis leavigata*
Swamp laurel oak	*Quercus laurifolia*
Sword fern	*Nephrolepis cordifolia*

Figure 6. Morris Bridge Sink near the staff gauge on 4-25-23

Figure 7. Overview of Morris Bridge Sink.

5 LITERATURE CITED

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Earth Resources (2019). *Morris Bridge Sink Water quality Monitoring Report*.

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Scott, T., Means, G., Meegan, R., Means, R., Upchurch, S., Copeland, R., Jones, J., Roberts, T., and Willet, A. (2004). *Springs of Florida*. Florida Geological Survey Bulletin Number 66.

6 APPENDIX

6.1 CUMULATIVE DEPTH PROFILE RESULTS

An excel file with cumulative results is included with this deliverable to the District.

Sample Date	Unique ID	Depth (m)	Temp (°F)	Temp (°C)	DO (mg/L)	DO (%)	pH (SU)	Sp Cond (uS/cm)	Sal (PSU)	Source	Sample Loc
7/20/2017	7/20/2017	**0**	82.1	27.83	4.76	60.6	7.68	338	0.338	Sid	1
7/20/2017	7/20/2017	**-0.5**	81.9	27.72	4.4	56.7	7.63	338	0.338	Sid	1
7/20/2017	7/20/2017	**-1**	81.9	27.72	4.32	54.9	7.63	338	0.338	Sid	1
7/20/2017	7/20/2017	**-1.5**	81.8	27.67	4.23	53.8	7.63	338	0.338	Sid	1
7/20/2017	7/20/2017	**-2**	81.8	27.67	4.36	55.4	7.63	338	0.338	Sid	1
7/20/2017	7/20/2017	**-2.5**	81.7	27.61	1.74	22.1	7.4	340	0.34	Sid	1
7/20/2017	7/20/2017	**-3**	80.8	27.11	0	0	7.22	349	0.349	Sid	1
11/14/2017	11/14/2017 (1)	**0**	72.7	22.62	0.24		7.64	432	0.432	Earth Res	1
11/14/2017	11/14/2017 (1)	**-0.5**	72.7	22.59	0.26		7.74	432	0.432	Earth Res	1
11/14/2017	11/14/2017 (1)	**-1**	72.7	22.61	0.19		7.75	431	0.431	Earth Res	1
11/14/2017	11/14/2017 (1)	**-1.5**	72.7	22.6	0.21		7.7	431	0.431	Earth Res	1
11/14/2017	11/14/2017 (1)	**-2**	72.7	22.59	0.21		7.69	431	0.431	Earth Res	1
11/14/2017	11/14/2017 (1)	**-2.5**	72.7	22.59	0.17		7.68	431	0.431	Earth Res	1
11/14/2017	11/14/2017 (1)	**-3**	72.7	22.59	0.17		7.68	431	0.431	Earth Res	1
11/14/2017	11/14/2017 (1)	**-3.5**	72.7	22.59	0.17		7.68	431	0.431	Earth Res	1
11/14/2017	11/14/2017 (1)	**-4**	72.7	22.59	0.17		7.68	431	0.431	Earth Res	1
11/14/2017	11/14/2017 (1)	**-4.5**	72.7	22.59	0.17		7.68	431	0.431	Earth Res	1
11/14/2017	11/14/2017 (1)	**-5**	72.7	22.59	0.16		7.68	431	0.431	Earth Res	1
11/14/2017	11/14/2017 (2)	**0**	72.9	22.73	0.16		7.69	430	0.43	Earth Res	2
11/14/2017	11/14/2017 (2)	**-0.5**	72.8	22.65	0.16		7.68	430	0.43	Earth Res	2
11/14/2017	11/14/2017 (2)	**-1**	72.8	22.64	0.16		7.68	430	0.43	Earth Res	2
11/14/2017	11/14/2017 (2)	**-1.5**	72.8	22.66	0.16		7.68	430	0.43	Earth Res	2
11/14/2017	11/14/2017 (2)	**-2**	72.7	22.61	0.16		7.68	430	0.43	Earth Res	2
11/14/2017	11/14/2017 (2)	**-2.5**	72.7	22.6	0.19		7.68	430	0.43	Earth Res	2
11/14/2017	11/14/2017 (2)	**-3**	72.7	22.6	0.16		7.67	430	0.43	Earth Res	2
11/14/2017	11/14/2017 (2)	**-3.5**	72.7	22.6	0.17		7.67	430	0.43	Earth Res	2
11/14/2017	11/14/2017 (2)	**-4**	72.7	22.6	0.17		7.66	430	0.43	Earth Res	2
11/14/2017	11/14/2017 (2)	**-4.5**	72.7	22.6	0.19		7.67	430	0.43	Earth Res	2

Sample Date	Unique ID	Depth (m)	Temp (°F)	Temp (°C)	DO (mg/L)	DO (%)	pH (SU)	Sp Cond (uS/cm)	Sal (PSU)	Source	Sample Loc
11/14/2017	11/14/2017 (2)	**-5**	72.7	22.6	0.18		7.66	430	0.43	Earth Res	2
11/14/2017	11/14/2017 (3)	**0**	73.3	22.92	0.41		7.71	430	0.43	Earth Res	3
11/14/2017	11/14/2017 (3)	**-0.5**	72.9	22.73	0.18		7.69	430	0.43	Earth Res	3
11/14/2017	11/14/2017 (3)	**-1**	72.8	22.69	0.17		7.68	430	0.43	Earth Res	3
11/14/2017	11/14/2017 (3)	**-1.5**	72.8	22.64	0.17		7.67	430	0.43	Earth Res	3
11/14/2017	11/14/2017 (3)	**-2**	72.7	22.62	0.19		7.67	430	0.43	Earth Res	3
11/14/2017	11/14/2017 (3)	**-2.5**	72.7	22.61	0.34		7.67	430	0.43	Earth Res	3
11/14/2017	11/14/2017 (3)	**-3**	72.7	22.61	0.19		7.67	430	0.43	Earth Res	3
11/14/2017	11/14/2017 (3)	**-3.5**	72.7	22.61	0.2		7.66	430	0.43	Earth Res	3
11/14/2017	11/14/2017 (3)	**-4**	72.7	22.6	0.3		7.65	430	0.43	Earth Res	3
11/14/2017	11/14/2017 (3)	**-4.5**	72.7	22.6	0.16		7.64	430	0.43	Earth Res	3
11/14/2017	11/14/2017 (3)	**-5**	72.7	22.6	0.16		7.62	430	0.43	Earth Res	3
9/17/2018	9/17/2018	**-0.5**	81.7	27.6	2.83	41	7	262	0.262	Sid	1
9/17/2018	9/17/2018	**-1**	81.3	27.4	0.39	4.9	6.9	263	0.263	Sid	1
9/17/2018	9/17/2018	**-1.5**	80.6	27	0.29	3.7	7	275	0.275	Sid	1
9/17/2018	9/17/2018	**-2**	80.2	26.8	0.25	3.1	7	278	0.278	Sid	1
9/17/2018	9/17/2018	**-2.5**	79.9	26.6	0.24	3	7	285	0.285	Sid	1
9/17/2018	9/17/2018	**-3**	79.5	26.4	0.23	2.9	6.9	305	0.305	Sid	1
9/17/2018	9/17/2018	**-3.5**	78.6	25.9	0.22	2.7	6.8	360	0.36	Sid	1
9/17/2018	9/17/2018	**-4**	77.5	25.3	0.22	2.7	6.9	367	0.367	Sid	1
9/17/2018	9/17/2018	**-4.5**	76.5	24.7	0.22	2.6	6.9	362	0.362	Sid	1
9/17/2018	9/17/2018	**-5**	75	23.9	0.2	2.4	7	353	0.353	Sid	1
9/17/2018	9/17/2018	**-8.9**	73.4	23	0.2	2.4	7.2	345	0.345	Sid	1
2/13/2019	2/13/2019	**-0.5**	70.7	21.5	2.5	28.5	6.73	452	0.452	Sid	1
2/13/2019	2/13/2019	**-1.1**	70.7	21.5	2.5	28.5	6.89	452	0.452	Sid	1
2/13/2019	2/13/2019	**-1.5**	70.7	21.5	2	22.3	6.93	453	0.453	Sid	1
2/13/2019	2/13/2019	**-2.1**	70.6	21.44	1.5	16.7	6.94	451	0.451	Sid	1
2/13/2019	2/13/2019	**-2.5**	70.5	21.39	1.4	15.4	6.96	449	0.449	Sid	1
2/13/2019	2/13/2019	**-3**	70.5	21.39	1.3	14.9	6.97	449	0.449	Sid	1
2/13/2019	2/13/2019	**-3.5**	70.5	21.39	1.4	15.4	6.98	452	0.452	Sid	1
2/13/2019	2/13/2019	**-4**	70.5	21.39	1.3	14.7	6.98	451	0.451	Sid	1
2/13/2019	2/13/2019	**-4.5**	70.4	21.33	1.3	14.7	6.99	451	0.451	Sid	1
2/13/2019	2/13/2019	**-5**	70.4	21.33	1.4	15.2	7	452	0.452	Sid	1
2/13/2019	2/13/2019	**-10**	70.2	21.22	1.1	12.6	7	455	0.455	Sid	1
5/22/2019	5/22/2019 (1)	**0**	80.9	27.17	8		7.95	409	0.409	Earth Res	1
5/22/2019	5/22/2019 (1)	**-0.5**	79.9	26.6	6		7.55	409	0.409	Earth Res	1
5/22/2019	5/22/2019 (1)	**-1**	79.9	26.6	6		7.53	403	0.403	Earth Res	1
5/22/2019	5/22/2019 (1)	**-1.5**	79.3	26.28	6		7.54	409	0.409	Earth Res	1
5/22/2019	5/22/2019 (1)	**-2**	79	26.09	6		7.56	409	0.409	Earth Res	1
5/22/2019	5/22/2019 (1)	**-2.5**	78.1	25.59	6		7.32	410	0.41	Earth Res	1
5/22/2019	5/22/2019 (1)	**-3**	77.5	25.25	6		7.12	408	0.408	Earth Res	1
5/22/2019	5/22/2019 (1)	**-3.5**	76.4	24.67	6		7.01	405	0.405	Earth Res	1
5/22/2019	5/22/2019 (1)	**-4**	75.3	24.04	6		6.98	397	0.397	Earth Res	1
5/22/2019	5/22/2019 (1)	**-4.5**	74.5	23.63	6		6.98	389	0.389	Earth Res	1
5/22/2019	5/22/2019 (1)	**-5**	73.8	23.22	6		6.98	380	0.38	Earth Res	1
5/22/2019	5/22/2019 (2)	**0**	80.7	27.08	5.9		7.86	409	0.409	Earth Res	2
5/22/2019	5/22/2019 (2)	**-0.5**	79.9	26.6	6		7.79	408	0.408	Earth Res	2

Sample Date	Unique ID	Depth (m)	Temp (°F)	Temp (°C)	DO (mg/L)	DO (%)	pH (SU)	Sp Cond (uS/cm)	Sal (PSU)	Source	Sample Loc
5/22/2019	5/22/2019 (2)	**-1**	79.6	26.45	5.9		7.68	409	0.409	Earth Res	2
5/22/2019	5/22/2019 (2)	**-1.5**	79.1	26.15	6		7.51	409	0.409	Earth Res	2
5/22/2019	5/22/2019 (2)	**-2**	78.8	26.01	6		7.35	410	0.41	Earth Res	2
5/22/2019	5/22/2019 (2)	**-2.5**	77.9	25.52	6		7.14	411	0.411	Earth Res	2
5/22/2019	5/22/2019 (2)	**-3**	77.3	25.15	5.9		7.04	409	0.409	Earth Res	2
5/22/2019	5/22/2019 (2)	**-3.5**	76.1	24.52	5.9		6.99	406	0.406	Earth Res	2
5/22/2019	5/22/2019 (2)	**-4**	75	23.88	5.9		6.98	395	0.395	Earth Res	2
5/22/2019	5/22/2019 (2)	**-4.5**	74.2	23.47	5.9		6.98	389	0.389	Earth Res	2
5/22/2019	5/22/2019 (2)	**-5**	73.9	23.29	6		7.13	384	0.384	Earth Res	2
5/22/2019	5/22/2019 (3)	**0**	80.9	27.18	5.9		7.85	410	0.41	Earth Res	3
5/22/2019	5/22/2019 (3)	**-0.5**	80.1	26.72	5.9		7.82	408	0.408	Earth Res	3
5/22/2019	5/22/2019 (3)	**-1**	79.7	26.48	5.9		7.76	409	0.409	Earth Res	3
5/22/2019	5/22/2019 (3)	**-1.5**	79.3	26.28	5.9		7.73	408	0.408	Earth Res	3
5/22/2019	5/22/2019 (3)	**-2**	78.4	25.79	5.9		7.31	410	0.41	Earth Res	3
5/22/2019	5/22/2019 (3)	**-2.5**	77.8	25.44	5.9		7.33	410	0.41	Earth Res	3
5/22/2019	5/22/2019 (3)	**-3**	77.3	25.19	5.9		7.05	408	0.408	Earth Res	3
5/22/2019	5/22/2019 (3)	**-3.5**	76.4	24.68	5.9		7	402	0.402	Earth Res	3
5/22/2019	5/22/2019 (3)	**-4**	75	23.9	5.9		7.03	390	0.39	Earth Res	3
5/22/2019	5/22/2019 (3)	**-4.5**	74.4	23.55	5.9		7.15	384	0.384	Earth Res	3
5/22/2019	5/22/2019 (3)	**-5**	73.9	23.3	5.9		7.35	380	0.38	Earth Res	3
6/17/2019	6/17/2019	**-0.5**	83.4	28.56	9.05	116.9	8.37	393	0.393	Sid	1
6/17/2019	6/17/2019	**-1**	83.4	28.56	9.38	121.1	8.42	392	0.392	Sid	1
6/17/2019	6/17/2019	**-1.5**	82.9	28.28	5.29	67.9	8.09	399	0.399	Sid	1
6/17/2019	6/17/2019	**-2**	82	27.78	1.45	18.5	7.48	401	0.401	Sid	1
6/17/2019	6/17/2019	**-2.5**	80.5	26.94	0.32	4.1	7.4	400	0.4	Sid	1
6/17/2019	6/17/2019	**-3**	78.8	26	0.31	3.8	7.32	395	0.395	Sid	1
6/17/2019	6/17/2019	**-3.5**	77.6	25.33	0.3	3.6	7.3	386	0.386	Sid	1
6/17/2019	6/17/2019	**-4**	76.6	24.78	0.29	3.5	7.3	383	0.383	Sid	1
6/17/2019	6/17/2019	**-4.5**	75.6	24.22	0.27	3.2	7.31	371	0.371	Sid	1
6/17/2019	6/17/2019	**-5.1**	75	23.89	0.27	3.2	7.33	364	0.364	Sid	1
6/17/2019	6/17/2019	**-10**	73.1	22.83	0.28	3.3	7.33	376	0.376	Sid	1
12/6/2019	12/06/2019 (1)	**0**	71.2	21.8	0.72		7.4	476	0	Jordan	1
12/6/2019	12/06/2019 (1)	**-0.5**	71.2	21.8	0.53		7.36	476	0.476	Jordan	1
12/6/2019	12/06/2019 (1)	**-1**	71.2	21.8	0.5		7.37	476	0.476	Jordan	1
12/6/2019	12/06/2019 (1)	**-1.5**	71.2	21.8	0.48		7.4	476	0.476	Jordan	1
12/6/2019	12/06/2019 (1)	**-2**	71.2	21.8	0.46		7.4	476	0.476	Jordan	1
12/6/2019	12/06/2019 (1)	**-2.5**	71.2	21.8	0.46		7.4	476	0.476	Jordan	1
12/6/2019	12/06/2019 (1)	**-3**	71.2	21.8	0.46		7.41	476	0.476	Jordan	1
12/6/2019	12/06/2019 (1)	**-3.5**	71.2	21.8	0.45		7.42	476	0.476	Jordan	1
12/6/2019	12/06/2019 (1)	**-4**	71.2	21.8	0.45		7.42	476	0.476	Jordan	1
12/6/2019	12/06/2019 (1)	**-4.5**	71.2	21.8	0.43		7.41	476	0.476	Jordan	1
12/6/2019	12/06/2019 (1)	**-5**	71.2	21.8	0.43		7.4	476	0.476	Jordan	1
12/6/2019	12/06/2019 (1)	**-10**	71.2	21.8	0.44		7.37	476	0.476	Jordan	1
12/6/2019	12/06/2019 (2)	**0**	71.2	21.8	0.73		7.45	476	0.476	Jordan	2
12/6/2019	12/06/2019 (2)	**-0.5**	71.2	21.8	0.57		7.45	476	0.476	Jordan	2
12/6/2019	12/06/2019 (2)	**-1**	71.2	21.8	0.51		7.45	476	0.476	Jordan	2
12/6/2019	12/06/2019 (2)	**-1.5**	71.2	21.8	0.49		7.45	476	0.476	Jordan	2

Sample Date	Unique ID	Depth (m)	Temp (°F)	Temp (°C)	DO (mg/L)	DO (%)	pH (SU)	Sp Cond (uS/cm)	Sal (PSU)	Source	Sample Loc
12/6/2019	12/06/2019 (2)	**-2**	71.2	21.8	0.48		7.45	476	0.476	Jordan	2
12/6/2019	12/06/2019 (2)	**-2.5**	71.2	21.8	0.43		7.43	476	0.476	Jordan	2
12/6/2019	12/06/2019 (3)	**0**	71.2	21.8	0.74		7.47	476	0.476	Jordan	3
12/6/2019	12/06/2019 (3)	**-0.5**	71.2	21.8	0.54		7.46	476	0.476	Jordan	3
12/6/2019	12/06/2019 (3)	**-1**	71.2	21.8	0.49		7.46	476	0.476	Jordan	3
12/6/2019	12/06/2019 (3)	**-1.5**	71.2	21.8	0.49		7.46	476	0.476	Jordan	3
12/6/2019	12/06/2019 (3)	**-2**	71.2	21.8	0.48		7.46	476	0.476	Jordan	3
12/6/2019	12/06/2019 (3)	**-2.5**	71.2	21.8	0.48		7.45	476	0.476	Jordan	3
12/6/2019	12/06/2019 (3)	**-3**	71.2	21.8	0.48		7.45	476	0.476	Jordan	3
12/6/2019	12/06/2019 (3)	**-3.5**	71.2	21.8	0.48		7.44	476	0.476	Jordan	3
12/6/2019	12/06/2019 (3)	**-4**	71.2	21.8	0.5		7.43	476	0.476	Jordan	3
12/6/2019	12/06/2019 (3)	**-4.5**	71.2	21.8	0.49		7.44	476	0.476	Jordan	3
12/6/2019	12/06/2019 (3)	**-5**	71.2	21.8	0.48		7.41	476	0.476	Jordan	3
12/6/2019	12/06/2019 (3)	**-10**	71.2	21.8	0.47		7.36	476	0.476	Jordan	3
1/10/2020	01/10/2020 (1)	**-0.5**	70.5	21.39	1.03	11.7	7.11	405	0.405	Jordan	1
1/10/2020	01/10/2020 (1)	**-1**	70.5	21.39	1.01	11.5	7.09	404.8	0.405	Jordan	1
1/10/2020	01/10/2020 (1)	**-1.5**	70.5	21.39	1	11.3	7.08	404.6	0.405	Jordan	1
1/10/2020	01/10/2020 (1)	**-2**	70.5	21.39	1	11.3	7.09	404.6	0.405	Jordan	1
1/10/2020	01/10/2020 (1)	**-2.5**	70.5	21.39	1	11.4	7.11	404.5	0.405	Jordan	1
1/10/2020	01/10/2020 (1)	**-3**	70.5	21.39	1	11.4	7.2	404.4	0.404	Jordan	1
1/10/2020	01/10/2020 (1)	**-3.5**	70.5	21.39	1	11.3	7.15	404.5	0.405	Jordan	1
1/10/2020	01/10/2020 (1)	**-4**	70.5	21.39	0.98	11.1	7.15	404.4	0.404	Jordan	1
1/10/2020	01/10/2020 (1)	**-4.5**	70.5	21.39	0.97	11	7.16	404.4	0.404	Jordan	1
1/10/2020	01/10/2020 (1)	**-5**	70.5	21.39	0.96	10.9	7.16	404.4	0.404	Jordan	1
1/10/2020	01/10/2020 (1)	**-5.5**	70.5	21.39	0.97	10.9	7.19	404.4	0.404	Jordan	1
1/10/2020	01/10/2020 (1)	**-6**	70.5	21.39	0.96	10.8	7.18	404.5	0.405	Jordan	1
1/10/2020	01/10/2020 (1)	**-6.5**	70.5	21.39	0.95	10.8	7.19	404.4	0.404	Jordan	1
1/10/2020	01/10/2020 (1)	**-7**	70.5	21.39	0.95	10.7	7.18	404.4	0.404	Jordan	1
1/10/2020	01/10/2020 (1)	**-7.5**	70.5	21.39	0.94	10.7	7.18	404.4	0.404	Jordan	1
1/10/2020	01/10/2020 (1)	**-8**	70.5	21.39	0.94	10.6	7.19	404.4	0.404	Jordan	1
1/10/2020	01/10/2020 (1)	**-8.5**	70.5	21.39	0.94	10.6	7.19	404.4	0.404	Jordan	1
1/10/2020	01/10/2020 (1)	**-9**	70.5	21.39	0.94	10.6	7.19	404.4	0.404	Jordan	1
1/10/2020	01/10/2020 (1)	**-9.5**	70.5	21.39	0.94	10.6	7.19	404.4	0.404	Jordan	1
1/10/2020	01/10/2020 (1)	**-10**	70.5	21.39	0.94	10.7	7.19	404.4	0.404	Jordan	1
1/10/2020	01/10/2020 (2)	**0**	70.5	21.39	1.73	19.6	7.42	405.9	0.406	Jordan	2
1/10/2020	01/10/2020 (2)	**-0.5**	70.5	21.39	1.04	11.7	7.3	405.6	0.406	Jordan	2
1/10/2020	01/10/2020 (2)	**-1**	70.5	21.39	1	11.4	7.3	405.5	0.406	Jordan	2
1/10/2020	01/10/2020 (2)	**-1.5**	70.5	21.39	0.99	11.2	7.29	405.3	0.405	Jordan	2
1/10/2020	01/10/2020 (2)	**-2**	70.5	21.39	0.98	11.1	7.29	405.4	0.405	Jordan	2
1/10/2020	01/10/2020 (3)	**0**	70.3	21.28	2.47	27.9	7.46	407.6	0.408	Jordan	3
1/10/2020	01/10/2020 (3)	**-0.5**	70.6	21.44	1.12	12.7	7.31	405.8	0.406	Jordan	3
1/10/2020	01/10/2020 (3)	**-1**	70.5	21.39	1.06	12	7.3	405.7	0.406	Jordan	3
1/10/2020	01/10/2020 (3)	**-1.5**	70.5	21.39	1.03	11.7	7.29	405.7	0.406	Jordan	3
1/10/2020	01/10/2020 (3)	**-2**	70.5	21.39	1.01	11.4	7.28	405.7	0.406	Jordan	3
1/10/2020	01/10/2020 (3)	**-2.5**	70.5	21.39	1	11.3	7.27	405.7	0.406	Jordan	3
1/10/2020	01/10/2020 (3)	**-3**	70.5	21.39	0.99	11.2	7.27	405.6	0.406	Jordan	3
1/10/2020	01/10/2020 (3)	**-3.5**	70.5	21.39	0.98	11	7.26	405.6	0.406	Jordan	3

Sample Date	Unique ID	Depth (m)	Temp (°F)	Temp (°C)	DO (mg/L)	DO (%)	pH (SU)	Sp Cond (uS/cm)	Sal (PSU)	Source	Sample Loc
1/10/2020	01/10/2020 (3)	**-4**	70.5	21.39	0.97	11	7.26	405.5	0.406	Jordan	3
1/10/2020	01/10/2020 (3)	**-4.5**	70.5	21.39	0.98	11	7.25	405.4	0.405	Jordan	3
1/10/2020	01/10/2020 (3)	**-5**	70.5	21.39	0.97	11	7.24	405.3	0.405	Jordan	3
1/10/2020	01/10/2020 (3)	**-5.5**	70.5	21.39	0.96	10.9	7.24	405.2	0.405	Jordan	3
1/10/2020	01/10/2020 (3)	**-6**	70.5	21.39	0.95	10.8	7.24	405.1	0.405	Jordan	3
1/10/2020	01/10/2020 (3)	**-6.5**	70.5	21.39	0.94	10.6	7.24	405	0.405	Jordan	3
1/10/2020	01/10/2020 (3)	**-7**	70.5	21.39	0.94	10.6	7.24	405	0.405	Jordan	3
1/10/2020	01/10/2020 (3)	**-7.5**	70.5	21.39	0.94	10.6	7.24	404.9	0.405	Jordan	3
1/10/2020	01/10/2020 (3)	**-8**	70.5	21.39	0.94	10.6	7.24	404.8	0.405	Jordan	3
1/10/2020	01/10/2020 (3)	**-8.5**	70.5	21.39	0.94	10.6	7.23	404.8	0.405	Jordan	3
1/10/2020	01/10/2020 (3)	**-9**	70.5	21.39	0.94	10.7	7.23	404.7	0.405	Jordan	3
1/10/2020	01/10/2020 (3)	**-9.5**	70.5	21.39	0.95	10.7	7.23	404.5	0.405	Jordan	3
1/10/2020	01/10/2020 (3)	**-10**	70.5	21.39	0.95	10.7	7.23	404.3	0.404	Jordan	3
1/10/2020	01/10/2020 (4)	**0**	70.4	21.33	2.12	24	7.53	405.8	0.406	Jordan	4
1/10/2020	01/10/2020 (4)	**-0.5**	70.6	21.44	1.41	15.9	7.36	405.5	0.406	Jordan	4
1/10/2020	01/10/2020 (4)	**-1**	70.5	21.39	1.19	13.5	7.32	405.3	0.405	Jordan	4
1/10/2020	01/10/2020 (4)	**-1.5**	70.5	21.39	1.1	12.4	7.31	405.3	0.405	Jordan	4
1/10/2020	01/10/2020 (4)	**-2**	70.5	21.39	1.01	11.5	7.29	405.4	0.405	Jordan	4
1/10/2020	01/10/2020 (4)	**-2.5**	70.5	21.39	0.99	11.2	7.29	405.4	0.405	Jordan	4
1/10/2020	01/10/2020 (4)	**-3**	70.5	21.39	0.99	11.2	7.29	405.3	0.405	Jordan	4
1/10/2020	01/10/2020 (4)	**-3.5**	70.5	21.39	0.98	11.1	7.28	405.2	0.405	Jordan	4
1/10/2020	01/10/2020 (4)	**-4**	70.5	21.39	0.97	10.9	7.28	404.9	0.405	Jordan	4
1/10/2020	01/10/2020 (5)	**0**	70.3	21.28	2.31	26.1	7.47	405.5	0.406	Jordan	5
1/10/2020	01/10/2020 (5)	**-0.5**	70.5	21.39	1.3	14.7	7.34	405.4	0.405	Jordan	5
1/10/2020	01/10/2020 (5)	**-1**	70.5	21.39	1.11	12.5	7.3	405.4	0.405	Jordan	5
1/10/2020	01/10/2020 (5)	**-1.5**	70.5	21.39	1.06	12	7.29	405.4	0.405	Jordan	5
1/10/2020	01/10/2020 (5)	**-2**	70.5	21.39	1.04	11.7	7.28	405.4	0.405	Jordan	5
1/10/2020	01/10/2020 (5)	**-2.5**	70.5	21.39	1.03	11.6	7.28	405.4	0.405	Jordan	5
1/10/2020	01/10/2020 (5)	**-3**	70.5	21.39	1.01	11.4	7.26	405.3	0.405	Jordan	5
1/10/2020	01/10/2020 (5)	**-3.5**	70.5	21.39	0.98	11.1	7.26	405.2	0.405	Jordan	5
1/10/2020	01/10/2020 (5)	**-4**	70.5	21.39	0.97	11	7.25	405.1	0.405	Jordan	5
2/14/2020	2/14/2020 (1)	**0**	72.4	22.44	3.79	43.8	7.09	435	0.435	Jordan	1
2/14/2020	2/14/2020 (1)	**-0.5**	71.6	22	2.35	26.9	6.99	436	0.436	Jordan	1
2/14/2020	2/14/2020 (1)	**-1**	71.1	21.72	1.78	20.3	6.96	435	0.435	Jordan	1
2/14/2020	2/14/2020 (1)	**-1.5**	70.9	21.61	1.71	19.4	6.98	435	0.435	Jordan	1
2/14/2020	2/14/2020 (1)	**-2**	70.8	21.56	1.57	17.8	6.98	434	0.434	Jordan	1
2/14/2020	2/14/2020 (1)	**-2.5**	70.7	21.5	1.32	15	6.97	432	0.432	Jordan	1
2/14/2020	2/14/2020 (1)	**-3**	70.6	21.44	1.25	14.1	6.97	431	0.431	Jordan	1
2/14/2020	2/14/2020 (1)	**-3.5**	70.6	21.44	1.25	14.2	6.98	432	0.432	Jordan	1
2/14/2020	2/14/2020 (1)	**-4**	70.6	21.44	1.24	14	6.99	432	0.432	Jordan	1
2/14/2020	2/14/2020 (1)	**-4.5**	70.5	21.39	1.19	13.5	6.99	432	0.432	Jordan	1
2/14/2020	2/14/2020 (1)	**-5**	70.5	21.39	1.17	13.3	6.99	433	0.433	Jordan	1
2/14/2020	2/14/2020 (1)	**-5.5**	70.4	21.33	1.01	11.4	7	434	0.434	Jordan	1
2/14/2020	2/14/2020 (1)	**-6**	70.3	21.28	0.96	10.8	7	435	0.435	Jordan	1
2/14/2020	2/14/2020 (1)	**-6.5**	70.2	21.22	0.77	8.6	6.99	437	0.437	Jordan	1
2/14/2020	2/14/2020 (1)	**-7**	70.1	21.17	0.62	6.9	6.99	438	0.438	Jordan	1
2/14/2020	2/14/2020 (1)	**-7.5**	70.1	21.17	0.59	6.7	7	439	0.439	Jordan	1

Sample Date	Unique ID	Depth (m)	Temp (°F)	Temp (°C)	DO (mg/L)	DO (%)	pH (SU)	Sp Cond (uS/cm)	Sal (PSU)	Source	Sample Loc
2/14/2020	2/14/2020 (1)	**-8**	70.1	21.17	0.58	6.6	7	439	0.439	Jordan	1
2/14/2020	2/14/2020 (1)	**-8.5**	70.1	21.17	0.58	6.6	7.01	439	0.439	Jordan	1
2/14/2020	2/14/2020 (1)	**-9**	70.1	21.17	0.58	6.6	7.01	439	0.439	Jordan	1
2/14/2020	2/14/2020 (1)	**-9.5**	70.1	21.17	0.58	6.6	7.02	439	0.439	Jordan	1
2/14/2020	2/14/2020 (1)	**-10**	70.1	21.17	0.58	6.5	7.02	439	0.439	Jordan	1
2/14/2020	2/14/2020 (2)	**0**	72.4	22.44	4.81	55.6	7.49	435	0.435	Jordan	2
2/14/2020	2/14/2020 (2)	**-0.5**	71.6	22	2.42	27.7	7.33	436	0.436	Jordan	2
2/14/2020	2/14/2020 (2)	**-1**	71.1	21.72	1.78	20.3	7.29	435	0.435	Jordan	2
2/14/2020	2/14/2020 (2)	**-1.5**	71	21.67	1.65	18.7	7.27	434	0.434	Jordan	2
2/14/2020	2/14/2020 (2)	**-2**	70.8	21.56	1.47	16.7	7.25	433	0.433	Jordan	2
2/14/2020	2/14/2020 (2)	**-2.5**	70.7	21.5	1.3	14.7	7.23	432	0.432	Jordan	2
2/14/2020	2/14/2020 (3)	**0**	72.4	22.44	4.95	57.2	7.49	435	0.435	Jordan	3
2/14/2020	2/14/2020 (3)	**-0.5**	71.7	22.06	3.08	35.3	7.33	435	0.435	Jordan	3
2/14/2020	2/14/2020 (3)	**-1**	71.4	21.89	2.22	25.4	7.31	435	0.435	Jordan	3
2/14/2020	2/14/2020 (3)	**-1.5**	71.1	21.72	1.78	20.3	7.29	436	0.436	Jordan	3
2/14/2020	2/14/2020 (3)	**-2**	70.9	21.61	1.37	15.6	7.27	432	0.432	Jordan	3
2/14/2020	2/14/2020 (3)	**-2.5**	70.8	21.56	1.29	14.7	7.25	431	0.431	Jordan	3
2/14/2020	2/14/2020 (3)	**-3**	70.7	21.5	1.26	14.3	7.25	431	0.431	Jordan	3
2/14/2020	2/14/2020 (3)	**-3.5**	70.6	21.44	1.15	13	7.23	431	0.431	Jordan	3
2/14/2020	2/14/2020 (3)	**-4**	70.6	21.44	1.06	12	7.22	430	0.43	Jordan	3
2/14/2020	2/14/2020 (3)	**-4.5**	70.5	21.39	1	11.3	7.21	430	0.43	Jordan	3
2/14/2020	2/14/2020 (3)	**-5**	70.5	21.39	0.98	11	7.2	430	0.43	Jordan	3
2/14/2020	2/14/2020 (3)	**-5.5**	70.5	21.39	0.99	11.2	7.19	431	0.431	Jordan	3
2/14/2020	2/14/2020 (3)	**-6**	70.4	21.33	0.99	11.1	7.19	432	0.432	Jordan	3
2/14/2020	2/14/2020 (3)	**-6.5**	70.3	21.28	0.8	9	7.18	435	0.435	Jordan	3
2/14/2020	2/14/2020 (3)	**-7**	70.1	21.17	0.6	6.8	7.17	439	0.439	Jordan	3
2/14/2020	2/14/2020 (3)	**-7.5**	70.1	21.17	0.58	6.5	7.16	439	0.439	Jordan	3
2/14/2020	2/14/2020 (3)	**-8**	70.1	21.17	0.57	6.4	7.16	439	0.439	Jordan	3
2/14/2020	2/14/2020 (3)	**-8.5**	70.1	21.17	0.56	6.4	7.15	439	0.439	Jordan	3
2/14/2020	2/14/2020 (3)	**-9**	70.1	21.17	0.55	6.2	7.15	439	0.439	Jordan	3
2/14/2020	2/14/2020 (3)	**-9.5**	70.1	21.17	0.56	6.3	7.15	439	0.439	Jordan	3
2/14/2020	2/14/2020 (3)	**-10**	70.1	21.17	0.56	6.3	7.15	439	0.439	Jordan	3
2/14/2020	2/14/2020 (4)	**0**	72.4	22.44	4.5	52	7.49	435	0.435	Jordan	4
2/14/2020	2/14/2020 (4)	**-0.5**	71.8	22.11	2.69	30.9	7.36	435	0.435	Jordan	4
2/14/2020	2/14/2020 (4)	**-1**	71.2	21.78	1.83	20.8	7.31	435	0.435	Jordan	4
2/14/2020	2/14/2020 (4)	**-1.5**	71	21.67	1.57	17.9	7.3	434	0.434	Jordan	4
2/14/2020	2/14/2020 (4)	**-2**	70.8	21.56	1.33	15.1	7.29	431	0.431	Jordan	4
2/14/2020	2/14/2020 (4)	**-2.5**	70.7	21.5	1.04	11.8	7.27	430	0.43	Jordan	4
2/14/2020	2/14/2020 (4)	**-3**	70.7	21.5	1.01	11.5	7.26	432	0.432	Jordan	4
2/14/2020	2/14/2020 (4)	**-3.5**	70.6	21.44	0.88	9.9	7.24	432	0.432	Jordan	4
2/14/2020	2/14/2020 (4)	**-4**	70.5	21.39	0.93	10.5	7.24	432	0.432	Jordan	4
2/14/2020	2/14/2020 (4)	**-4.5**	70.5	21.39	1.05	11.9	7.23	432	0.432	Jordan	4
2/14/2020	2/14/2020 (4)	**-5**	70.4	21.33	0.92	10.4	7.22	433	0.433	Jordan	4
2/14/2020	2/14/2020 (4)	**-5.5**	70.4	21.33	0.86	9.7	7.21	433	0.433	Jordan	4
2/14/2020	2/14/2020 (4)	**-6**	70.3	21.28	0.77	8.7	7.2	435	0.435	Jordan	4
2/14/2020	2/14/2020 (4)	**-6.5**	70.2	21.22	0.64	7.2	7.19	437	0.437	Jordan	4
2/14/2020	2/14/2020 (4)	**-7**	70.1	21.17	0.59	6.6	7.19	438	0.438	Jordan	4

Sample Date	Unique ID	Depth (m)	Temp (°F)	Temp (°C)	DO (mg/L)	DO (%)	pH (SU)	Sp Cond (uS/cm)	Sal (PSU)	Source	Sample Loc
2/14/2020	2/14/2020 (4)	**-7.5**	70.1	21.17	0.57	6.5	7.19	439	0.439	Jordan	4
2/14/2020	2/14/2020 (4)	**-8**	70.1	21.17	0.57	6.4	7.18	439	0.439	Jordan	4
2/14/2020	2/14/2020 (4)	**-8.5**	70.1	21.17	0.57	6.4	7.18	439	0.439	Jordan	4
2/14/2020	2/14/2020 (4)	**-9**	70.1	21.17	0.57	6.4	7.18	439	0.439	Jordan	4
2/14/2020	2/14/2020 (4)	**-9.5**	70.1	21.17	0.56	6.3	7.18	439	0.439	Jordan	4
2/14/2020	2/14/2020 (4)	**-10**	70.1	21.17	0.56	6.3	7.18	438	0.438	Jordan	4
2/14/2020	2/14/2020 (5)	**0**	72.4	22.44	4.37	50.5	7.48	434	0.434	Jordan	5
2/14/2020	2/14/2020 (5)	**-0.5**	71.8	22.11	2.72	31.2	7.36	436	0.436	Jordan	5
2/14/2020	2/14/2020 (5)	**-1**	71.5	21.94	2.06	23.5	7.33	436	0.436	Jordan	5
2/14/2020	2/14/2020 (5)	**-1.5**	71.1	21.72	1.67	19	7.3	436	0.436	Jordan	5
2/14/2020	2/14/2020 (5)	**-2**	70.9	21.61	1.5	17	7.29	434	0.434	Jordan	5
2/14/2020	2/14/2020 (5)	**-2.5**	70.8	21.56	1.37	15.5	7.28	434	0.434	Jordan	5
2/14/2020	2/14/2020 (5)	**-3**	70.7	21.5	1.27	14.4	7.27	434	0.434	Jordan	5
2/14/2020	2/14/2020 (5)	**-3.5**	70.6	21.44	0.98	11.1	7.24	434	0.434	Jordan	5
2/14/2020	2/14/2020 (5)	**-4**	70.6	21.44	0.95	10.8	7.23	434	0.434	Jordan	5
2/14/2020	2/14/2020 (5)	**-4.5**	70.5	21.39	0.95	10.7	7.23	434	0.434	Jordan	5
2/14/2020	2/14/2020 (5)	**-5**	70.5	21.39	0.86	9.8	7.22	435	0.435	Jordan	5
2/14/2020	2/14/2020 (5)	**-5.5**	70.4	21.33	0.75	8.5	7.22	435	0.435	Jordan	5
2/14/2020	2/14/2020 (5)	**-6**	70.3	21.28	0.65	7.3	7.21	435	0.435	Jordan	5
2/14/2020	2/14/2020 (5)	**-6.5**	70.1	21.17	0.56	6.4	7.2	438	0.438	Jordan	5
2/14/2020	2/14/2020 (5)	**-7**	70.1	21.17	0.57	6.4	7.2	438	0.438	Jordan	5
2/14/2020	2/14/2020 (5)	**-7.5**	70.1	21.17	0.57	6.4	7.2	438	0.438	Jordan	5
2/14/2020	2/14/2020 (5)	**-8**	70.1	21.17	0.56	6.3	7.2	438	0.438	Jordan	5
2/14/2020	2/14/2020 (5)	**-8.5**	70.1	21.17	0.55	6.2	7.19	438	0.438	Jordan	5
2/14/2020	2/14/2020 (5)	**-9**	70.1	21.17	0.56	6.3	7.19	438	0.438	Jordan	5
2/14/2020	2/14/2020 (5)	**-9.5**	70.1	21.17	0.54	6.1	7.18	438	0.438	Jordan	5
3/10/2020	3/10/2020 (1)	**-0.2**	70.5	21.4	1.1	13.2	7.5	443	0.443	Fr Eco	1
3/10/2020	3/10/2020 (1)	**-0.5**	70.5	21.4	0.9	10.2	7.4	444	0.444	Fr Eco	1
3/10/2020	3/10/2020 (1)	**-1**	70.5	21.4	0.9	9.5	7.4	444	0.444	Fr Eco	1
3/10/2020	3/10/2020 (1)	**-1.5**	70.5	21.4	0.9	10.6	7.4	444	0.444	Fr Eco	1
3/10/2020	3/10/2020 (1)	**-2**	70.5	21.4	1.1	11.3	7.4	443	0.443	Fr Eco	1
3/10/2020	3/10/2020 (1)	**-2.5**	70.5	21.4	1.1	12.7	7.4	443	0.443	Fr Eco	1
3/10/2020	3/10/2020 (1)	**-3**	70.5	21.4	1.1	12.8	7.4	443	0.443	Fr Eco	1
3/10/2020	3/10/2020 (2)	**-0.2**	70.5	21.4	0.7	8.7	7.5	444	0.444	Fr Eco	2
3/10/2020	3/10/2020 (2)	**-0.5**	70.7	21.5	0.8	8.5	7.4	445	0.445	Fr Eco	2
3/10/2020	3/10/2020 (2)	**-1**	70.7	21.5	0.7	8.2	7.4	444	0.444	Fr Eco	2
3/10/2020	3/10/2020 (2)	**-1.5**	70.7	21.5	0.6	6.8	7.4	444	0.444	Fr Eco	2
3/10/2020	3/10/2020 (2)	**-2**	70.7	21.5	0.6	7.2	7.4	444	0.444	Fr Eco	2
3/10/2020	3/10/2020 (2)	**-2.5**	70.7	21.5	0.7	7.9	7.4	445	0.445	Fr Eco	2
3/10/2020	3/10/2020 (2)	**-3**	70.7	21.5	0.7	8	7.4	445	0.445	Fr Eco	2
3/10/2020	3/10/2020 (2)	**-3.5**	70.7	21.5	0.7	8.2	7.4	445	0.445	Fr Eco	2
3/10/2020	3/10/2020 (2)	**-4**	70.7	21.5	0.7	8	7.4	445	0.445	Fr Eco	2
3/10/2020	3/10/2020 (2)	**-4.5**	70.7	21.5	0.9	9.8	7.4	444	0.444	Fr Eco	2
3/10/2020	3/10/2020 (2)	**-5**	70.7	21.5	0.9	10.3	7.4	444	0.444	Fr Eco	2
3/10/2020	3/10/2020 (2)	**-10**	70.7	21.5	0.8	8.9	7.4	445	0.445	Fr Eco	2
3/10/2020	3/10/2020 (3)	**-0.2**	70.5	21.4	0.9	11.2	7.4	444	0.444	Fr Eco	3
3/10/2020	3/10/2020 (3)	**-0.5**	70.5	21.4	0.9	9.6	7.4	445	0.445	Fr Eco	3

Sample Date	Unique ID	Depth (m)	Temp (°F)	Temp (°C)	DO (mg/L)	DO (%)	pH (SU)	Sp Cond (uS/cm)	Sal (PSU)	Source	Sample Loc
3/10/2020	3/10/2020 (3)	**-1**	70.5	21.4	0.9	9.9	7.4	444	0.444	Fr Eco	3
3/10/2020	3/10/2020 (3)	**-1.5**	70.5	21.4	0.9	10.4	7.4	444	0.444	Fr Eco	3
3/10/2020	3/10/2020 (3)	**-2**	70.5	21.4	0.9	10.6	7.4	444	0.444	Fr Eco	3
3/10/2020	3/10/2020 (3)	**-2.5**	70.5	21.4	0.9	10.5	7.4	444	0.444	Fr Eco	3
3/10/2020	3/10/2020 (3)	**-3**	70.7	21.5	0.9	9.2	7.4	444	0.444	Fr Eco	3
3/10/2020	3/10/2020 (3)	**-3.5**	70.7	21.5	0.9	9.6	7.4	444	0.444	Fr Eco	3
3/10/2020	3/10/2020 (3)	**-4**	70.7	21.5	0.9	10.5	7.4	444	0.444	Fr Eco	3
3/10/2020	3/10/2020 (3)	**-4.5**	70.7	21.5	0.9	10	7.4	444	0.444	Fr Eco	3
3/10/2020	3/10/2020 (3)	**-5**	70.5	21.4	0.9	10	7.4	444	0.444	Fr Eco	3
3/10/2020	3/10/2020 (3)	**-10**	70.5	21.4	0.9	10.2	7.4	444	0.444	Fr Eco	3
4/14/2020	4/14/2020 (1)	**-0.5**	78.3	25.72	6.75	82.8	7.5	416	0.416	DCB	1
4/14/2020	4/14/2020 (1)	**-1**	76	24.44	5.97	71.6	7.41	415	0.415	DCB	1
4/14/2020	4/14/2020 (1)	**-1.5**	75.4	24.11	6.23	74.3	7.46	415	0.415	DCB	1
4/14/2020	4/14/2020 (1)	**-2**	74.7	23.72	7.47	88.4	7.71	410	0.41	DCB	1
4/14/2020	4/14/2020 (1)	**-2.5**	73.9	23.28	8.71	102.1	7.88	399	0.399	DCB	1
4/14/2020	4/14/2020 (1)	**-3**	73.4	23	7.66	89.4	7.81	401	0.401	DCB	1
4/14/2020	4/14/2020 (1)	**-3.5**	72.8	22.67	5.3	61.4	7.47	398	0.398	DCB	1
4/14/2020	4/14/2020 (1)	**-4**	72.4	22.44	2.38	27.5	7.31	396	0.396	DCB	1
4/14/2020	4/14/2020 (1)	**-4.5**	72.4	22.44	1.83	21.2	7.27	396	0.396	DCB	1
4/14/2020	4/14/2020 (1)	**-5**	72.3	22.39	1.56	18	7.24	400	0.4	DCB	1
4/14/2020	4/14/2020 (1)	**-5.5**	72.2	22.33	1.44	16.6	7.24	403	0.403	DCB	1
4/14/2020	4/14/2020 (1)	**-6**	72	22.22	1.55	17.8	7.25	412	0.412	DCB	1
4/14/2020	4/14/2020 (1)	**-6.5**	71.9	22.17	1.68	19.3	7.26	414	0.414	DCB	1
4/14/2020	4/14/2020 (1)	**-7**	71.8	22.11	1.94	22.3	7.28	416	0.416	DCB	1
4/14/2020	4/14/2020 (1)	**-7.5**	71.8	22.11	1.68	19.2	7.25	417	0.417	DCB	1
4/14/2020	4/14/2020 (1)	**-8**	71.7	22.06	1.7	19.4	7.26	418	0.418	DCB	1
4/14/2020	4/14/2020 (1)	**-8.5**	71.6	22	1.68	19.2	7.27	419	0.419	DCB	1
4/14/2020	4/14/2020 (1)	**-9**	71.5	21.94	1.29	14.8	7.24	419	0.419	DCB	1
4/14/2020	4/14/2020 (1)	**-9.5**	71.5	21.94	1.23	14.1	7.24	420	0.42	DCB	1
4/14/2020	4/14/2020 (1)	**-10**	71.4	21.89	1.07	12.3	7.23	422	0.422	DCB	1
4/14/2020	4/14/2020 (2)	**-0.5**	78.3	25.72	6.7	82.3	7.86	415	0.415	DCB	2
4/14/2020	4/14/2020 (2)	**-1**	76.8	24.89	5.8	70.1	7.72	417	0.417	DCB	2
4/14/2020	4/14/2020 (2)	**-1.5**	75.5	24.17	6.03	71.9	7.75	414	0.414	DCB	2
4/14/2020	4/14/2020 (2)	**-2**	74.7	23.72	7.1	84	7.86	410	0.41	DCB	2
4/14/2020	4/14/2020 (2)	**-2.5**	74	23.33	5.87	69	7.69	410	0.41	DCB	2
4/14/2020	4/14/2020 (2)	**-3**	73.4	23	5.36	62.5	7.65	409	0.409	DCB	2
4/14/2020	4/14/2020 (2)	**-3.5**	72.9	22.72	5.39	62.6	7.63	401	0.401	DCB	2
4/14/2020	4/14/2020 (2)	**-4**	72.6	22.56	2.81	32.6	7.41	398	0.398	DCB	2
4/14/2020	4/14/2020 (2)	**-4.5**	72.4	22.44	2.09	24.1	7.39	396	0.396	DCB	2
4/14/2020	4/14/2020 (2)	**-5**	72.3	22.39	1.78	20.5	7.36	398	0.398	DCB	2
4/14/2020	4/14/2020 (2)	**-5.5**	72.2	22.33	1.5	17.3	7.34	403	0.403	DCB	2
4/14/2020	4/14/2020 (2)	**-6**	72.1	22.28	1.41	16.3	7.34	408	0.408	DCB	2
4/14/2020	4/14/2020 (2)	**-6.5**	71.9	22.17	1.74	20	7.37	414	0.414	DCB	2
4/14/2020	4/14/2020 (2)	**-7**	71.8	22.11	1.91	21.9	7.38	416	0.416	DCB	2
4/14/2020	4/14/2020 (2)	**-7.5**	71.8	22.11	2	23	7.38	417	0.417	DCB	2
4/14/2020	4/14/2020 (2)	**-8**	71.7	22.06	1.94	22.3	7.38	418	0.418	DCB	2
4/14/2020	4/14/2020 (2)	**-8.5**	71.7	22.06	1.78	20.4	7.37	419	0.419	DCB	2

Sample Date	Unique ID	Depth (m)	Temp (°F)	Temp (°C)	DO (mg/L)	DO (%)	pH (SU)	Sp Cond (uS/cm)	Sal (PSU)	Source	Sample Loc
4/14/2020	4/14/2020 (2)	**-9**	71.6	22	1.6	18.3	7.35	419	0.419	DCB	2
4/14/2020	4/14/2020 (2)	**-9.5**	71.5	21.94	1.4	16	7.34	420	0.42	DCB	2
4/14/2020	4/14/2020 (2)	**-10**	71.4	21.89	0.82	9.4	7.3	423	0.423	DCB	2
4/14/2020	4/14/2020 (3)	**-0.5**	78.3	25.72	6.68	81.9	7.87	416	0.416	DCB	3
4/14/2020	4/14/2020 (3)	**-1**	76.5	24.72	6.13	73.9	7.78	416	0.416	DCB	3
4/14/2020	4/14/2020 (3)	**-1.5**	75.5	24.17	5.7	68.1	7.73	415	0.415	DCB	3
4/14/2020	4/14/2020 (3)	**-2**	74.8	23.78	6.43	76.2	7.8	412	0.412	DCB	3
4/14/2020	4/14/2020 (3)	**-2.5**	73.9	23.28	9.21	108	8.08	405	0.405	DCB	3
4/14/2020	4/14/2020 (3)	**-3**	73.4	23	8.54	99.6	8.08	397	0.397	DCB	3
4/14/2020	4/14/2020 (3)	**-3.5**	72.8	22.67	5.73	66.5	7.69	396	0.396	DCB	3
4/14/2020	4/14/2020 (3)	**-4**	72.5	22.5	2.22	25.7	7.39	395	0.395	DCB	3
4/14/2020	4/14/2020 (3)	**-4.5**	72.4	22.44	1.74	20.1	7.37	393	0.393	DCB	3
4/14/2020	4/14/2020 (3)	**-5**	72.3	22.39	1.65	19	7.35	397	0.397	DCB	3
4/14/2020	4/14/2020 (3)	**-6**	72	22.22	1.35	15.5	7.34	411	0.411	DCB	3
4/14/2020	4/14/2020 (3)	**-6.5**	71.9	22.17	1.49	17.2	7.35	414	0.414	DCB	3
4/14/2020	4/14/2020 (3)	**-7**	71.8	22.11	1.66	19	7.36	416	0.416	DCB	3
4/14/2020	4/14/2020 (3)	**-7.5**	71.8	22.11	1.82	20.9	7.37	417	0.417	DCB	3
4/14/2020	4/14/2020 (3)	**-8.5**	71.7	22.06	1.5	17.2	7.35	418	0.418	DCB	3
4/14/2020	4/14/2020 (3)	**-9**	71.6	22	1.47	16.9	7.35	418	0.418	DCB	3
4/14/2020	4/14/2020 (3)	**-9.5**	71.5	21.94	1.32	15.1	7.33	421	0.421	DCB	3
4/14/2020	4/14/2020 (3)	**-10**	71.4	21.89	0.76	8.7	7.3	424	0.424	DCB	3
5/28/2020	5/28/2020 (1)	**-0.5**	80.8	27.1	8.05	101.2	8.42	371	0.371	DCB	1
5/28/2020	5/28/2020 (1)	**-1**	80.4	26.9	6.89	86.6	8.3	372	0.372	DCB	1
5/28/2020	5/28/2020 (1)	**-1.5**	79.5	26.4	3.41	42.4	7.87	377	0.377	DCB	1
5/28/2020	5/28/2020 (1)	**-2**	78.8	26	0.73	9	7.58	379	0.379	DCB	1
5/28/2020	5/28/2020 (1)	**-2.5**	77.5	25.3	0.3	3.6	7.42	380	0.38	DCB	1
5/28/2020	5/28/2020 (1)	**-3**	76.3	24.6	0.3	3.6	7.35	379	0.379	DCB	1
5/28/2020	5/28/2020 (1)	**-3.5**	75	23.9	0.3	3.6	7.33	374	0.374	DCB	1
5/28/2020	5/28/2020 (1)	**-4**	74.3	23.5	0.3	3.6	7.32	371	0.371	DCB	1
5/28/2020	5/28/2020 (1)	**-4.5**	73.9	23.3	0.31	3.6	7.32	365	0.365	DCB	1
5/28/2020	5/28/2020 (1)	**-5**	73.8	23.2	0.31	3.6	7.33	363	0.363	DCB	1
5/28/2020	5/28/2020 (1)	**-5.5**	73.4	23	0.31	3.6	7.33	356	0.356	DCB	1
5/28/2020	5/28/2020 (1)	**-6**	73.2	22.9	0.31	3.7	7.34	353	0.353	DCB	1
5/28/2020	5/28/2020 (1)	**-6.5**	73.2	22.9	0.31	3.7	7.33	365	0.365	DCB	1
5/28/2020	5/28/2020 (1)	**-7**	73.2	22.9	0.32	3.7	7.33	369	0.369	DCB	1
5/28/2020	5/28/2020 (1)	**-7.5**	73	22.8	0.32	3.7	7.32	373	0.373	DCB	1
5/28/2020	5/28/2020 (1)	**-8**	72.9	22.7	0.31	3.6	7.3	375	0.375	DCB	1
5/28/2020	5/28/2020 (1)	**-8.5**	72.9	22.7	0.31	3.6	7.3	378	0.378	DCB	1
5/28/2020	5/28/2020 (1)	**-9**	72.7	22.6	0.32	3.7	7.29	380	0.38	DCB	1
5/28/2020	5/28/2020 (1)	**-9.5**	72.5	22.5	0.32	3.7	7.28	382	0.382	DCB	1
5/28/2020	5/28/2020 (1)	**-10**	72.3	22.4	0.33	3.8	7.28	387	0.387	DCB	1
5/28/2020	5/28/2020 (2)	**-0.5**	80.8	27.1	8.4	101.8	8.4	371	0.371	DCB	2
5/28/2020	5/28/2020 (2)	**-1**	80.6	27	7.73	96.8	8.37	372	0.372	DCB	2
5/28/2020	5/28/2020 (2)	**-1.5**	79.9	26.6	4.88	60.7	8.1	377	0.377	DCB	2
5/28/2020	5/28/2020 (2)	**-2**	79	26.1	1.5	18.5	7.7	381	0.381	DCB	2
5/28/2020	5/28/2020 (2)	**-2.5**	77.7	25.4	0.47	5.5	7.5	383	0.383	DCB	2
5/28/2020	5/28/2020 (2)	**-3**	76.1	24.5	0.37	4.5	7.39	380	0.38	DCB	2

Sample Date	Unique ID	Depth (m)	Temp (°F)	Temp (°C)	DO (mg/L)	DO (%)	pH (SU)	Sp Cond (uS/cm)	Sal (PSU)	Source	Sample Loc
5/28/2020	5/28/2020 (2)	**-3.5**	75.2	24	0.37	4.5	7.36	377	0.377	DCB	2
5/28/2020	5/28/2020 (2)	**-4**	74.7	23.7	0.36	4.3	7.34	376	0.376	DCB	2
5/28/2020	5/28/2020 (2)	**-4.5**	74.1	23.4	0.35	4.2	7.34	370	0.37	DCB	2
5/28/2020	5/28/2020 (2)	**-5**	73.8	23.2	0.35	4.1	7.34	365	0.365	DCB	2
5/28/2020	5/28/2020 (2)	**-5.5**	71.8	22.1	0.34	4	7.33	361	0.361	DCB	2
5/28/2020	5/28/2020 (2)	**-6**	71.6	22	0.34	3.9	7.34	357	0.357	DCB	2
5/28/2020	5/28/2020 (2)	**-6.5**	73.2	22.9	0.34	3.9	7.34	358	0.358	DCB	2
5/28/2020	5/28/2020 (2)	**-7**	73.2	22.9	0.34	4		366	0.366	DCB	2
5/28/2020	5/28/2020 (2)	**-7.5**	73	22.8	0.33	3.9		371	0.371	DCB	2
5/28/2020	5/28/2020 (2)	**-8**	73	22.8	0.33	3.8		376	0.376	DCB	2
5/28/2020	5/28/2020 (2)	**-8.5**	72.9	22.7	0.33	3.9		375	0.375	DCB	2
5/28/2020	5/28/2020 (2)	**-9**	72.7	22.6	0.33	3.8		381	0.381	DCB	2
5/28/2020	5/28/2020 (2)	**-9.5**	72.5	22.5	0.33	3.8		383	0.383	DCB	2
5/28/2020	5/28/2020 (3)	**-0.5**	80.8	27.1	8.37	105.2	8.45	371	0.371	DCB	3
5/28/2020	5/28/2020 (3)	**-1**	80.6	27	7.34	92.5	8.34	372	0.372	DCB	3
5/28/2020	5/28/2020 (3)	**-1.5**	79.9	26.6	5.05	63.2	8.06	376	0.376	DCB	3
5/28/2020	5/28/2020 (3)	**-2**	78.8	26	0.64	7.9	7.68	381	0.381	DCB	3
5/28/2020	5/28/2020 (3)	**-2.5**	78.4	25.8	0.45	5.4	7.47	383	0.383	DCB	3
5/28/2020	5/28/2020 (3)	**-3**	76.3	24.6	0.38	4.6	7.41	380	0.38	DCB	3
5/28/2020	5/28/2020 (3)	**-3.5**	75.4	24.1	0.37	4.4	7.37	374	0.374	DCB	3
5/28/2020	5/28/2020 (3)	**-4**	74.7	23.7	0.35	4.2	7.35	372	0.372	DCB	3
5/28/2020	5/28/2020 (3)	**-4.5**	74.1	23.4	0.35	4.1	7.35	368	0.368	DCB	3
5/28/2020	5/28/2020 (3)	**-5**	73.8	23.2	0.34	4	7.35	363	0.363	DCB	3
5/28/2020	5/28/2020 (3)	**-5.5**	73.4	23	0.34	3.9	7.35	357	0.357	DCB	3
5/28/2020	5/28/2020 (3)	**-6**	73.2	22.9	0.34	3.9	7.35	355	0.355	DCB	3
5/28/2020	5/28/2020 (3)	**-6.5**	73.2	22.9	0.34	3.9	7.35	360	0.36	DCB	3
5/28/2020	5/28/2020 (3)	**-7**	73.2	22.9	0.33	3.8	7.34	368	0.368	DCB	3
5/28/2020	5/28/2020 (3)	**-7.5**	73	22.8	0.33	3.8	7.33	372	0.372	DCB	3
5/28/2020	5/28/2020 (3)	**-8**	73	22.8	0.33	3.8	7.32	375	0.375	DCB	3
5/28/2020	5/28/2020 (3)	**-8.5**	72.9	22.7	0.33	3.8	7.32	377	0.377	DCB	3
5/28/2020	5/28/2020 (3)	**-9**	72.7	22.6	0.33	3.8	7.3	380	0.38	DCB	3
5/28/2020	5/28/2020 (3)	**-9.5**	72.5	22.5	0.33	3.8	7.3	382	0.382	DCB	3
5/28/2020	5/28/2020 (3)	**-10**	72.3	22.4	0.33	3.8	7.29	386	0.386	DCB	3
6/19/2020	6/19/2020 (1)	**0**	81.7	27.61	6.75	85.7	7.48	344	0.344	Jordan	1
6/19/2020	6/19/2020 (1)	**-0.5**	81.3	27.39	6.18	78.1	7.73	338	0.338	Jordan	1
6/19/2020	6/19/2020 (1)	**-1**	81.1	27.28	5.7	71.9	7.74	337	0.337	Jordan	1
6/19/2020	6/19/2020 (1)	**-1.5**	81	27.22	5.58	70.3	7.73	338	0.338	Jordan	1
6/19/2020	6/19/2020 (1)	**-2**	80.8	27.11	2.91	36.7	7.51	339	0.339	Jordan	1
6/19/2020	6/19/2020 (1)	**-2.5**	80.1	26.72	1.18	14.7	7.44	343	0.343	Jordan	1
6/19/2020	6/19/2020 (1)	**-3**	77.3	25.17	0.88	10.7	7.27	353	0.353	Jordan	1
6/19/2020	6/19/2020 (1)	**-3.5**	76.3	24.61	0.58	7	7.23	349	0.349	Jordan	1
6/19/2020	6/19/2020 (1)	**-4**	75	23.89	0.48	5.7	7.21	344	0.344	Jordan	1
6/19/2020	6/19/2020 (1)	**-4.5**	74.3	23.5	0.45	5.3	7.21	338	0.338	Jordan	1
6/19/2020	6/19/2020 (1)	**-5**	74	23.33	0.44	5.1	7.22	335	0.335	Jordan	1
6/19/2020	6/19/2020 (1)	**-5.5**	73.6	23.11	0.42	4.9	7.24	332	0.332	Jordan	1
6/19/2020	6/19/2020 (1)	**-6**	73.4	23	0.41	4.8	7.25	330	0.33	Jordan	1
6/19/2020	6/19/2020 (1)	**-6.5**	73.3	22.94	0.4	4.7	7.24	338	0.338	Jordan	1

Sample Date	Unique ID	Depth (m)	Temp (°F)	Temp (°C)	DO (mg/L)	DO (%)	pH (SU)	Sp Cond (uS/cm)	Sal (PSU)	Source	Sample Loc
6/19/2020	6/19/2020 (1)	**-7**	73.2	22.89	0.4	4.7	7.23	347	0.347	Jordan	1
6/19/2020	6/19/2020 (1)	**-7.5**	73.1	22.83	0.39	4.6	7.23	353	0.353	Jordan	1
6/19/2020	6/19/2020 (1)	**-8**	72.9	22.72	0.39	4.5	7.22	356	0.356	Jordan	1
6/19/2020	6/19/2020 (1)	**-8.5**	72.8	22.67	0.39	4.5	7.22	359	0.359	Jordan	1
6/19/2020	6/19/2020 (1)	**-9**	72.7	22.61	0.39	4.5	7.21	360	0.36	Jordan	1
6/19/2020	6/19/2020 (1)	**-9.5**	72.6	22.56	0.38	4.4	7.2	363	0.363	Jordan	1
6/19/2020	6/19/2020 (1)	**-10**	72.5	22.5	0.37	4.3	7.21	366	0.366	Jordan	1
6/19/2020	6/19/2020 (2)	**0**	81.4	27.44	7.14	90.5	8.09	336	0.336	Jordan	2
6/19/2020	6/19/2020 (2)	**-0.5**	81.2	27.33	6.66	84.2	8.07	336	0.336	Jordan	2
6/19/2020	6/19/2020 (2)	**-1.5**	81	27.22	5.61	70.7	7.95	337	0.337	Jordan	2
6/19/2020	6/19/2020 (2)	**-2**	80.9	27.17	4.23	53.3	7.78	338	0.338	Jordan	2
6/19/2020	6/19/2020 (2)	**-2.5**	80.2	26.78	1.34	16.8	7.55	342	0.342	Jordan	2
6/19/2020	6/19/2020 (2)	**-3**	77.6	25.33	0.7	8.6	7.47	351	0.351	Jordan	2
6/19/2020	6/19/2020 (2)	**-3.5**	75.8	24.33	0.53	6.4	7.4	347	0.347	Jordan	2
6/19/2020	6/19/2020 (2)	**-4**	75.1	23.94	0.46	5.5	7.37	343	0.343	Jordan	2
6/19/2020	6/19/2020 (2)	**-4.5**	74.4	23.56	0.44	5.1	7.37	337	0.337	Jordan	2
6/19/2020	6/19/2020 (2)	**-5**	74	23.33	0.43	5	7.38	335	0.335	Jordan	2
6/19/2020	6/19/2020 (2)	**-5.5**	73.7	23.17	0.41	4.8	7.4	332	0.332	Jordan	2
6/19/2020	6/19/2020 (2)	**-6**	73.5	23.06	0.4	4.7	7.41	331	0.331	Jordan	2
6/19/2020	6/19/2020 (2)	**-6.5**	73.3	22.94	0.39	4.6	7.4	338	0.338	Jordan	2
6/19/2020	6/19/2020 (2)	**-7**	73.2	22.89	0.39	4.5	7.39	347	0.347	Jordan	2
6/19/2020	6/19/2020 (2)	**-7.5**	73.1	22.83	0.38	4.4	7.38	352	0.352	Jordan	2
6/19/2020	6/19/2020 (2)	**-8**	72.9	22.72	0.38	4.4	7.37	356	0.356	Jordan	2
6/19/2020	6/19/2020 (2)	**-8.5**	72.8	22.67	0.37	4.3	7.37	358	0.358	Jordan	2
6/19/2020	6/19/2020 (2)	**-9**	72.7	22.61	0.37	4.3	7.36	359	0.359	Jordan	2
6/19/2020	6/19/2020 (2)	**-9.5**	72.6	22.56	0.37	4.3	7.36	361	0.361	Jordan	2
6/19/2020	6/19/2020 (2)	**-10**	72.5	22.5	0.37	4.3	7.35	365	0.365	Jordan	2
6/19/2020	6/19/2020 (3)	**-0.5**	81.2	27.33	6.67	84.3	8.09	336	0.336	Jordan	3
6/19/2020	6/19/2020 (3)	**-1**	81.1	27.28	6	75.7	8.04	337	0.337	Jordan	3
6/19/2020	6/19/2020 (3)	**-1.5**	81	27.22	5.18	65.3	7.97	337	0.337	Jordan	3
6/19/2020	6/19/2020 (3)	**-2**	80.7	27.06	1.76	22.2	7.72	339	0.339	Jordan	3
6/19/2020	6/19/2020 (3)	**-2.5**	79.2	26.22	1.23	15.2	7.43	346	0.346	Jordan	3
6/19/2020	6/19/2020 (3)	**-3**	77.5	25.28	0.63	7.7	7.41	350	0.35	Jordan	3
6/19/2020	6/19/2020 (3)	**-3.5**	76.2	24.56	0.46	5.5	7.35	348	0.348	Jordan	3
6/19/2020	6/19/2020 (3)	**-4**	75.2	24	0.42	5	7.35	342	0.342	Jordan	3
6/19/2020	6/19/2020 (3)	**-4.5**	74.4	23.56	0.41	4.8	7.36	338	0.338	Jordan	3
6/19/2020	6/19/2020 (3)	**-5**	73.9	23.28	0.4	4.7	7.37	334	0.334	Jordan	3
6/19/2020	6/19/2020 (3)	**-5.5**	73.5	23.06	0.39	4.5	7.41	332	0.332	Jordan	3
6/19/2020	6/19/2020 (3)	**-6**	73.4	23	0.38	4.5	7.41	332	0.332	Jordan	3
6/19/2020	6/19/2020 (3)	**-6.5**	73.3	22.94	0.38	4.5	7.41	337	0.337	Jordan	3
6/19/2020	6/19/2020 (3)	**-7**	73.2	22.89	0.38	4.5	7.39	345	0.345	Jordan	3
7/17/2020	7/17/2020 (1)	**0**	85.6	29.78	8.73	115.1	8.37	346	0.346	Jordan	1
7/17/2020	7/17/2020 (1)	**-0.5**	83.7	28.72	8	103.6	8.39	341	0.341	Jordan	1
7/17/2020	7/17/2020 (1)	**-1**	83.3	28.5	6.99	90.2	8.27	343	0.343	Jordan	1
7/17/2020	7/17/2020 (1)	**-1.5**	83.2	28.44	6.68	86.1	8.24	343	0.343	Jordan	1
7/17/2020	7/17/2020 (1)	**-2**	83	28.33	5.26	67.7	8.22	345	0.345	Jordan	1
7/17/2020	7/17/2020 (1)	**-2.5**	82.8	28.22	3.09	39.7	8.01	349	0.349	Jordan	1

Sample Date	Unique ID	Depth (m)	Temp (°F)	Temp (°C)	DO (mg/L)	DO (%)	pH (SU)	Sp Cond (uS/cm)	Sal (PSU)	Source	Sample Loc
7/17/2020	7/17/2020 (1)	**-3**	81.7	27.61	1.3	16.5	7.79	360	0.36	Jordan	1
7/17/2020	7/17/2020 (1)	**-3.5**	80	26.67	0.77	9.6	7.57	369	0.369	Jordan	1
7/17/2020	7/17/2020 (1)	**-4**	77.6	25.33	0.59	7.2	7.41	370	0.37	Jordan	1
7/17/2020	7/17/2020 (1)	**-4.5**	75.9	24.39	0.44	5.3	7.13	365	0.365	Jordan	1
7/17/2020	7/17/2020 (1)	**-5**	75.3	24.06	0.43	5.1	7.14	358	0.358	Jordan	1
7/17/2020	7/17/2020 (1)	**-5.5**	74.2	23.44	0.42	5	7.17	345	0.345	Jordan	1
7/17/2020	7/17/2020 (1)	**-6**	73.8	23.22	0.4	4.6	7.22	340	0.34	Jordan	1
7/17/2020	7/17/2020 (1)	**-6.5**	73.7	23.17	0.39	4.6	7.22	343	0.343	Jordan	1
7/17/2020	7/17/2020 (1)	**-7**	73.6	23.11	0.39	4.6	7.22	344	0.344	Jordan	1
7/17/2020	7/17/2020 (1)	**-7.5**	73.5	23.06	0.38	4.5	7.22	346	0.346	Jordan	1
7/17/2020	7/17/2020 (1)	**-8**	73.3	22.94	0.38	4.4	7.21	349	0.349	Jordan	1
7/17/2020	7/17/2020 (1)	**-8.5**	73.2	22.89	0.38	4.4	7.23	359	0.359	Jordan	1
7/17/2020	7/17/2020 (1)	**-9**	73.1	22.83	0.37	4.3	7.24	364	0.364	Jordan	1
7/17/2020	7/17/2020 (1)	**-9.5**	73	22.78	0.37	4.3	7.25	366	0.366	Jordan	1
7/17/2020	7/17/2020 (1)	**-10**	72.9	22.72	0.37	4.2	7.26	369	0.369	Jordan	1
7/17/2020	7/17/2020 (2)	**0**	86.2	30.11	8.5	112.9	8.46	344	0.344	Jordan	2
7/17/2020	7/17/2020 (2)	**-0.5**	83.5	28.61	7.81	100.9	8.51	341	0.341	Jordan	2
7/17/2020	7/17/2020 (2)	**-1**	83.2	28.44	6.36	81.9	8.35	343	0.343	Jordan	2
7/17/2020	7/17/2020 (2)	**-1.5**	83.1	28.39	5.01	64.5	8.2	346	0.346	Jordan	2
7/17/2020	7/17/2020 (2)	**-2**	82.8	28.22	3.18	40.8	7.97	349	0.349	Jordan	2
7/17/2020	7/17/2020 (2)	**-2.5**	82.4	28	1.67	21.4	7.78	356	0.356	Jordan	2
7/17/2020	7/17/2020 (2)	**-3**	80.7	27.06	0.57	7.2	7.44	368	0.368	Jordan	2
7/17/2020	7/17/2020 (2)	**-3.5**	78.6	25.89	0.47	5.8	7.28	372	0.372	Jordan	2
7/17/2020	7/17/2020 (2)	**-4**	77.1	25.06	0.43	5.2	7.21	372	0.372	Jordan	2
7/17/2020	7/17/2020 (2)	**-4.5**	75.9	24.39	0.42	5	7.19	364	0.364	Jordan	2
7/17/2020	7/17/2020 (2)	**-5**	74.8	23.78	0.41	4.8	7.21	353	0.353	Jordan	2
7/17/2020	7/17/2020 (2)	**-5.5**	74.3	23.5	0.4	4.7	7.23	346	0.346	Jordan	2
7/17/2020	7/17/2020 (3)	**0**	84.8	29.33	9.18	120.2	8.57	340	0.34	Jordan	3
7/17/2020	7/17/2020 (3)	**-0.5**	83.8	28.78	8.47	109.8	8.55	340	0.34	Jordan	3
7/17/2020	7/17/2020 (3)	**-1**	83.3	28.5	7.38	95.2	8.49	341	0.341	Jordan	3
7/17/2020	7/17/2020 (3)	**-1.5**	83.1	28.39	6.04	77.8	8.36	344	0.344	Jordan	3
7/17/2020	7/17/2020 (3)	**-2**	83	28.33	4.75	61.1	8.18	346	0.346	Jordan	3
7/17/2020	7/17/2020 (3)	**-2.5**	82.7	28.17	2.53	32.5	8.01	350	0.35	Jordan	3
7/17/2020	7/17/2020 (3)	**-3**	81.8	27.67	1.11	14.1	7.76	362	0.362	Jordan	3
7/17/2020	7/17/2020 (3)	**-3.5**	79.6	26.44	0.64	7.9	7.52	371	0.371	Jordan	3
7/17/2020	7/17/2020 (3)	**-4**	77.2	25.11	0.48	5.8	7.3	369	0.369	Jordan	3
7/17/2020	7/17/2020 (3)	**-4.5**	75.9	24.39	0.44	5.3	7.22	364	0.364	Jordan	3
7/17/2020	7/17/2020 (3)	**-5**	75	23.89	0.43	5.1	7.21	358	0.358	Jordan	3
7/17/2020	7/17/2020 (3)	**-5.5**	74.6	23.67	0.42	5	7.23	350	0.35	Jordan	3
7/17/2020	7/17/2020 (3)	**-6**	73.9	23.28	0.42	4.9	7.25	343	0.343	Jordan	3
7/17/2020	7/17/2020 (3)	**-6.5**	73.7	23.17	0.41	4.8	7.26	343	0.343	Jordan	3
7/17/2020	7/17/2020 (3)	**-7**	73.6	23.11	0.4	4.7	7.27	345	0.345	Jordan	3
7/17/2020	7/17/2020 (3)	**-7.5**	73.4	23	0.39	4.6	7.27	349	0.349	Jordan	3
7/17/2020	7/17/2020 (3)	**-8**	73.3	22.94	0.38	4.5	7.27	353	0.353	Jordan	3
7/17/2020	7/17/2020 (3)	**-8.5**	73.2	22.89	0.38	4.4	7.27	358	0.358	Jordan	3
7/17/2020	7/17/2020 (3)	**-9**	73.1	22.83	0.38	4.4	7.27	362	0.362	Jordan	3
7/17/2020	7/17/2020 (3)	**-9.5**	73.1	22.83	0.38	4.4	7.29	364	0.364	Jordan	3

Sample Date	Unique ID	Depth (m)	Temp (°F)	Temp (°C)	DO (mg/L)	DO (%)	pH (SU)	Sp Cond (uS/cm)	Sal (PSU)	Source	Sample Loc
7/17/2020	7/17/2020 (3)	**-10**	73	22.78	0.39	4.5	7.29	367	0.367	Jordan	3
8/28/2020	8/28/2020 (1)	**0**	84.1	28.94	10.17	132.4	8.13	313	0.313	Jordan	1
8/28/2020	8/28/2020 (1)	**-0.5**	82.8	28.22	8.91	114.5	7.95	311	0.311	Jordan	1
8/28/2020	8/28/2020 (1)	**-1**	81.9	27.72	5.92	75.3	7.5	312	0.312	Jordan	1
8/28/2020	8/28/2020 (1)	**-1.5**	80.7	27.06	1.9	23.8	7.21	317	0.317	Jordan	1
8/28/2020	8/28/2020 (1)	**-2**	79.9	26.61	0.75	9.3	7.12	317	0.317	Jordan	1
8/28/2020	8/28/2020 (1)	**-2.5**	79.6	26.44	0.56	7	7.08	320	0.32	Jordan	1
8/28/2020	8/28/2020 (1)	**-3**	79.2	26.22	0.49	6.1	7.03	329	0.329	Jordan	1
8/28/2020	8/28/2020 (1)	**-3.5**	78.3	25.72	0.46	5.6	6.83	361	0.361	Jordan	1
8/28/2020	8/28/2020 (1)	**-4**	76.5	24.72	0.43	5.2	6.85	360	0.36	Jordan	1
8/28/2020	8/28/2020 (1)	**-4.5**	75.5	24.17	0.42	5	6.91	348	0.348	Jordan	1
8/28/2020	8/28/2020 (1)	**-5**	74.8	23.78	0.4	4.8	6.97	340	0.34	Jordan	1
8/28/2020	8/28/2020 (1)	**-5.5**	74.3	23.5	0.4	4.8	7.01	336	0.336	Jordan	1
8/28/2020	8/28/2020 (1)	**-6**	74	23.33	0.4	4.7	7.07	334	0.334	Jordan	1
8/28/2020	8/28/2020 (1)	**-6.5**	73.8	23.22	0.39	4.6	7.03	338	0.338	Jordan	1
8/28/2020	8/28/2020 (1)	**-7**	73.7	23.17	0.39	4.5	7.02	339	0.339	Jordan	1
8/28/2020	8/28/2020 (1)	**-7.5**	73.6	23.11	0.39	4.5	7	342	0.342	Jordan	1
8/28/2020	8/28/2020 (1)	**-8**	73.3	22.94	0.38	4.5	6.98	350	0.35	Jordan	1
8/28/2020	8/28/2020 (1)	**-8.5**	73.2	22.89	0.37	4.3	6.99	354	0.354	Jordan	1
8/28/2020	8/28/2020 (1)	**-9**	73.1	22.83	0.37	4.3	6.97	356	0.356	Jordan	1
8/28/2020	8/28/2020 (1)	**-9.5**	73	22.78	0.37	4.3	6.98	357	0.357	Jordan	1
8/28/2020	8/28/2020 (1)	**-10**	73	22.78	0.36	4.2	6.97	358	0.358	Jordan	1
8/28/2020	8/28/2020 (2)	**0**	85	29.44	9.4	123.6	8.51	308	0.308	Jordan	2
8/28/2020	8/28/2020 (2)	**-0.5**	82.7	28.17	8.48	109	8.47	309	0.309	Jordan	2
8/28/2020	8/28/2020 (2)	**-1**	81.8	27.67	10.09	128.4	8.67	305	0.305	Jordan	2
8/28/2020	8/28/2020 (2)	**-1.5**	80.8	27.11	4.99	62.8	7.83	314	0.314	Jordan	2
8/28/2020	8/28/2020 (2)	**-2**	79.8	26.56	2.09	26	7.57	316	0.316	Jordan	2
8/28/2020	8/28/2020 (2)	**-2.5**	79.5	26.39	0.74	9.2	7.43	315	0.315	Jordan	2
8/28/2020	8/28/2020 (2)	**-3**	79.1	26.17	0.48	5.9	7.34	325	0.325	Jordan	2
8/28/2020	8/28/2020 (2)	**-3.5**	77.5	25.28	0.45	5.5	7.11	364	0.364	Jordan	2
8/28/2020	8/28/2020 (2)	**-4**	76.8	24.89	0.42	5.1	7.1	363	0.363	Jordan	2
8/28/2020	8/28/2020 (2)	**-4.5**	75.6	24.22	0.42	5.1	7.17	349	0.349	Jordan	2
8/28/2020	8/28/2020 (2)	**-5**	75	23.89	0.42	5	7.23	343	0.343	Jordan	2
8/28/2020	8/28/2020 (2)	**-5.5**	74.4	23.56	0.41	4.9	7.25	338	0.338	Jordan	2
8/28/2020	8/28/2020 (2)	**-6**	74.1	23.39	0.41	4.8	7.27	334	0.334	Jordan	2
8/28/2020	8/28/2020 (2)	**-6.5**	73.8	23.22	0.4	4.7	7.24	337	0.337	Jordan	2
8/28/2020	8/28/2020 (2)	**-7**	73.7	23.17	0.39	4.6	7.22	341	0.341	Jordan	2
8/28/2020	8/28/2020 (2)	**-7.5**	73.5	23.06	0.39	4.5	7.2	345	0.345	Jordan	2
8/28/2020	8/28/2020 (2)	**-8**	73.4	23	0.39	4.6	7.19	349	0.349	Jordan	2
8/28/2020	8/28/2020 (2)	**-8.5**	73.3	22.94	0.38	4.4	7.17	352	0.352	Jordan	2
8/28/2020	8/28/2020 (2)	**-9**	73	22.78	0.37	4.3	7.2	359	0.359	Jordan	2
8/28/2020	8/28/2020 (2)	**-9.5**	73	22.78	0.37	4.3	7.18	360	0.36	Jordan	2
8/28/2020	8/28/2020 (2)	**-10**	73	22.78	0.37	4.3	7.16	359	0.359	Jordan	2
8/28/2020	8/28/2020 (3)	**0**	84.5	29.17	9.33	122	8.51	308	0.308	Jordan	3
8/28/2020	8/28/2020 (3)	**-0.5**	82.7	28.17	8.61	110.6	8.44	306	0.306	Jordan	3
8/28/2020	8/28/2020 (3)	**-1**	81.7	27.61	6.39	81.3	8	312	0.312	Jordan	3
8/28/2020	8/28/2020 (3)	**-1.5**	80.5	26.94	4.96	62.4	7.74	315	0.315	Jordan	3

Sample Date	Unique ID	Depth (m)	Temp (°F)	Temp (°C)	DO (mg/L)	DO (%)	pH (SU)	Sp Cond (uS/cm)	Sal (PSU)	Source	Sample Loc
8/28/2020	8/28/2020 (3)	**-2**	79.9	26.61	1.66	20.7	7.52	316	0.316	Jordan	3
8/28/2020	8/28/2020 (3)	**-2.5**	79.6	26.44	0.66	8.2	7.42	319	0.319	Jordan	3
8/28/2020	8/28/2020 (3)	**-3**	79.3	26.28	0.52	6.4	7.34	325	0.325	Jordan	3
8/28/2020	8/28/2020 (3)	**-3.5**	78.4	25.78	0.46	5.7	7.13	356	0.356	Jordan	3
8/28/2020	8/28/2020 (3)	**-4**	77.1	25.06	0.43	5.3	7.12	363	0.363	Jordan	3
8/28/2020	8/28/2020 (3)	**-4.5**	75.9	24.39	0.42	5	7.16	353	0.353	Jordan	3
8/28/2020	8/28/2020 (3)	**-5**	75	23.89	0.42	4.9	7.18	344	0.344	Jordan	3
10/22/2020	10/22/2020 (1)	**0**	78.1	21.61	4.48	54.9	6.16	334	0.334	Jordan	1
10/22/2020	10/22/2020 (1)	**-0.5**	77.1	21.56	3.46	42	6.69	316	0.316	Jordan	1
10/22/2020	10/22/2020 (1)	**-1**	76.8	21.5	3.35	40.5	6.76	313	0.313	Jordan	1
10/22/2020	10/22/2020 (1)	**-1.5**	76.7	21.44	3.18	38.4	6.93	313	0.313	Jordan	1
10/22/2020	10/22/2020 (1)	**-2**	76.7	21.44	3.11	37.6	6.95	312	0.312	Jordan	1
10/22/2020	10/22/2020 (1)	**-2.5**	76.7	21.39	3.06	37	6.99	312	0.312	Jordan	1
10/22/2020	10/22/2020 (1)	**-3**	76.7	21.39	3.01	36.3	7.04	312	0.312	Jordan	1
10/22/2020	10/22/2020 (1)	**-3.5**	76.7	21.39	2.98	35.9	7.06	312	0.312	Jordan	1
10/22/2020	10/22/2020 (1)	**-4**	76.5	21.33	1.29	15.5	7.08	319	0.319	Jordan	1
10/22/2020	10/22/2020 (1)	**-4.5**	76.2	21.28	0.68	8.2	7.08	330	0.33	Jordan	1
10/22/2020	10/22/2020 (1)	**-5**	75.7	21.17	0.55	6.6	7.09	341	0.341	Jordan	1
10/22/2020	10/22/2020 (1)	**-5.5**	75.4	21.17	0.48	5.7	7.1	349	0.349	Jordan	1
10/22/2020	10/22/2020 (1)	**-6**	74.9	21.17	0.44	5.3	7.11	348	0.348	Jordan	1
10/22/2020	10/22/2020 (1)	**-6.5**	74.4	21.17	0.43	5	7.13	341	0.341	Jordan	1
10/22/2020	10/22/2020 (1)	**-7**	74.3	21.17	0.42	4.9	7.13	339	0.339	Jordan	1
10/22/2020	10/22/2020 (1)	**-7.5**	74.2	21.17	0.41	4.8	7.13	339	0.339	Jordan	1
10/22/2020	10/22/2020 (1)	**-8**	74.1	21.17	0.41	4.8	7.13	339	0.339	Jordan	1
10/22/2020	10/22/2020 (1)	**-8.5**	73.9	22.44	0.41	4.8	7.12	342	0.342	Jordan	1
10/22/2020	10/22/2020 (1)	**-9**	73.7	22.11	0.4	4.7	7.11	345	0.345	Jordan	1
10/22/2020	10/22/2020 (1)	**-9.5**	73.6	21.78	0.4	4.7	7.09	349	0.349	Jordan	1
10/22/2020	10/22/2020 (1)	**-10**	73.3	21.67	0.39	4.6	7.07	356	0.356	Jordan	1
10/22/2020	10/22/2020 (2)	**0**	76.9	21.56	4.26	51.5	7.24	313	0.313	Jordan	2
10/22/2020	10/22/2020 (2)	**-0.5**	77	21.5	3.46	41.9	7.24	312	0.312	Jordan	2
10/22/2020	10/22/2020 (2)	**-1**	76.8	21.5	3.3	39.9	7.24	312	0.312	Jordan	2
10/22/2020	10/22/2020 (2)	**-1.5**	76.7	21.44	3.05	36.8	7.24	312	0.312	Jordan	2
10/22/2020	10/22/2020 (2)	**-2**	76.7	21.39	3	36.2	7.24	312	0.312	Jordan	2
10/22/2020	10/22/2020 (2)	**-2.5**	76.7	21.39	2.96	35.7	7.24	312	0.312	Jordan	2
10/22/2020	10/22/2020 (2)	**-3**	76.7	21.33	2.92	35.2	7.23	312	0.312	Jordan	2
10/22/2020	10/22/2020 (2)	**-3.5**	76.6	21.33	1.87	22.6	7.23	312	0.312	Jordan	2
10/22/2020	10/22/2020 (2)	**-4**	76.5	21.28	0.96	11.5	7.22	318	0.318	Jordan	2
10/22/2020	10/22/2020 (2)	**-4.5**	76.2	21.22	0.69	8.3	7.21	331	0.331	Jordan	2
10/22/2020	10/22/2020 (2)	**-5**	75.8	21.17	0.6	7.2	7.2	342	0.342	Jordan	2
10/22/2020	10/22/2020 (2)	**-5.5**	75.4	21.17	0.46	5.5	7.19	349	0.349	Jordan	2
10/22/2020	10/22/2020 (2)	**-6**	74.8	21.17	0.41	4.9	7.19	350	0.35	Jordan	2
10/22/2020	10/22/2020 (2)	**-6.5**	74.3	21.17	0.39	4.6	7.19	342	0.342	Jordan	2
10/22/2020	10/22/2020 (2)	**-7**	74.3	21.17	0.38	4.5	7.17	343	0.343	Jordan	2
10/22/2020	10/22/2020 (2)	**-7.5**	74.1	21.17	0.37	4.4	7.17	342	0.342	Jordan	2
10/22/2020	10/22/2020 (2)	**-8**	73.9	21.17	0.37	4.3	7.16	343	0.343	Jordan	2
10/22/2020	10/22/2020 (3)	**0**	77.5	22.44	3.74	45.6	7.27	311	0.311	Jordan	3
10/22/2020	10/22/2020 (3)	**-0.5**	76.8	22.11	3.29	39.8	7.29	312	0.312	Jordan	3

Sample Date	Unique ID	Depth (m)	Temp (°F)	Temp (°C)	DO (mg/L)	DO (%)	pH (SU)	Sp Cond (uS/cm)	Sal (PSU)	Source	Sample Loc
10/22/2020	10/22/2020 (3)	**-1**	76.8	21.94	3.26	39.4	7.29	312	0.312	Jordan	3
10/22/2020	10/22/2020 (3)	**-1.5**	76.7	21.72	3.16	38.2	7.29	312	0.312	Jordan	3
10/22/2020	10/22/2020 (3)	**-2**	76.7	21.61	3.1	37.4	7.28	312	0.312	Jordan	3
10/22/2020	10/22/2020 (3)	**-2.5**	76.7	21.56	3.04	36.7	7.28	311	0.311	Jordan	3
10/22/2020	10/22/2020 (3)	**-3**	76.7	21.5	3.06	36.9	7.27	312	0.312	Jordan	3
10/22/2020	10/22/2020 (3)	**-3.5**	76.7	21.44	3.04	36.7	7.27	312	0.312	Jordan	3
10/22/2020	10/22/2020 (3)	**-4**	76.6	21.44	1.69	20.4	7.27	315	0.315	Jordan	3
10/22/2020	10/22/2020 (3)	**-4.5**	76.3	21.39	0.75	9	7.25	326	0.326	Jordan	3
10/22/2020	10/22/2020 (3)	**-5**	75.8	21.39	0.59	7.1	7.24	337	0.337	Jordan	3
10/22/2020	10/22/2020 (3)	**-5.5**	75.5	21.33	0.47	5.6	7.23	347	0.347	Jordan	3
10/22/2020	10/22/2020 (3)	**-6**	75.1	21.28	0.43	5.1	7.24	350	0.35	Jordan	3
10/22/2020	10/22/2020 (3)	**-6.5**	74.6	21.17	0.41	4.9	7.24	346	0.346	Jordan	3
10/22/2020	10/22/2020 (3)	**-7**	74.3	21.17	0.41	4.8	7.25	340	0.34	Jordan	3
10/22/2020	10/22/2020 (3)	**-7.5**	74.1	21.17	0.38	4.5	7.24	338	0.338	Jordan	3
11/3/2020	11-03-2020 (1)	**-0.2**	74.3	23.5	1.4	16.3	7.8	322	0.322	Fr Eco	1
11/3/2020	11-03-2020 (1)	**-0.5**	74.5	23.6	1.4	16.5	7.9	323	0.323	Fr Eco	1
11/3/2020	11-03-2020 (1)	**-1**	74.5	23.6	1.4	16.1	7.9	322	0.322	Fr Eco	1
11/3/2020	11-03-2020 (1)	**-1.5**	74.5	23.6	1.4	16	7.9	323	0.323	Fr Eco	1
11/3/2020	11-03-2020 (1)	**-2**	74.5	23.6	1.3	15.8	7.9	323	0.323	Fr Eco	1
11/3/2020	11-03-2020 (1)	**-2.5**	74.5	23.6	1.4	15.9	7.9	323	0.323	Fr Eco	1
11/3/2020	11-03-2020 (1)	**-3**	74.5	23.6	1.4	15.9	7.9	323	0.323	Fr Eco	1
11/3/2020	11-03-2020 (1)	**-3.5**	74.5	23.6	1.4	16.1	7.9	322	0.322	Fr Eco	1
11/3/2020	11-03-2020 (1)	**-4**	74.5	23.6	1.4	16.1	7.9	322	0.322	Fr Eco	1
11/3/2020	11-03-2020 (1)	**-4.5**	74.5	23.6	1.4	16.2	7.9	322	0.322	Fr Eco	1
11/3/2020	11-03-2020 (2)	**-0.2**	74.5	23.6	1.4	16.3	7.9	323	0.323	Fr Eco	2
11/3/2020	11-03-2020 (2)	**-0.5**	74.5	23.6	1.4	16	7.9	323	0.323	Fr Eco	2
11/3/2020	11-03-2020 (2)	**-1**	74.5	23.6	1.3	15.7	7.9	323	0.323	Fr Eco	2
11/3/2020	11-03-2020 (2)	**-1.5**	74.5	23.6	1.3	15.6	7.9	323	0.323	Fr Eco	2
11/3/2020	11-03-2020 (2)	**-2**	74.5	23.6	1.3	15.7	7.8	323	0.323	Fr Eco	2
11/3/2020	11-03-2020 (2)	**-2.5**	74.5	23.6	1.3	15.5	7.8	323	0.323	Fr Eco	2
11/3/2020	11-03-2020 (2)	**-3**	74.5	23.6	1.3	15.4	7.8	323	0.323	Fr Eco	2
11/3/2020	11-03-2020 (2)	**-3.5**	74.5	23.6	1.3	15.3	7.8	323	0.323	Fr Eco	2
11/3/2020	11-03-2020 (2)	**-4**	74.5	23.6	1.3	15.2	7.8	323	0.323	Fr Eco	2
11/3/2020	11-03-2020 (2)	**-4.5**	74.5	23.6	1.3	15.3	7.8	323	0.323	Fr Eco	2
11/3/2020	11-03-2020 (2)	**-5**	74.5	23.6	1.3	15.2	7.8	323	0.323	Fr Eco	2
11/3/2020	11-03-2020 (2)	**-10**	74.5	23.6	1.3	15.2	7.8	323	0.323	Fr Eco	2
11/3/2020	11-03-2020 (3)	**-0.2**	74.5	23.6	1.4	16.2	8	323	0.323	Fr Eco	3
11/3/2020	11-03-2020 (3)	**-0.5**	74.5	23.6	1.3	15.7	7.9	323	0.323	Fr Eco	3
11/3/2020	11-03-2020 (3)	**-1**	74.5	23.6	1.3	15.6	7.9	323	0.323	Fr Eco	3
11/3/2020	11-03-2020 (3)	**-1.5**	74.5	23.6	1.3	15.6	7.9	323	0.323	Fr Eco	3
11/3/2020	11-03-2020 (3)	**-2**	74.5	23.6	1.3	15.7	7.9	323	0.323	Fr Eco	3
11/3/2020	11-03-2020 (3)	**-2.5**	74.7	23.7	1.3	15.7	7.9	323	0.323	Fr Eco	3
11/3/2020	11-03-2020 (3)	**-3**	74.5	23.6	1.3	15.1	7.9	324	0.324	Fr Eco	3
11/3/2020	11-03-2020 (3)	**-3.5**	74.5	23.6	1.3	14.9	7.9	324	0.324	Fr Eco	3
11/3/2020	11-03-2020 (3)	**-4**	74.5	23.6	1.3	14.9	7.9	324	0.324	Fr Eco	3
11/3/2020	11-03-2020 (3)	**-4.5**	74.5	23.6	1.3	15.2	7.9	323	0.323	Fr Eco	3
11/3/2020	11-03-2020 (3)	**-5**	74.5	23.6	1.3	15.4	7.9	323	0.323	Fr Eco	3

Sample Date	Unique ID	Depth (m)	Temp (°F)	Temp (°C)	DO (mg/L)	DO (%)	pH (SU)	Sp Cond (uS/cm)	Sal (PSU)	Source	Sample Loc
11/3/2020	11-03-2020 (3)	**-10**	74.5	23.6	0.9	11.2	7.8	328	0.328	Fr Eco	3
12/18/2020	12/18/2020 (1)	**0**	71.2	21.78	1.55	17.7	6.83	477	0.477	Jordan	1
12/18/2020	12/18/2020 (1)	**-0.5**	71.2	21.78	1.45	16.6	6.89	478	0.478	Jordan	1
12/18/2020	12/18/2020 (1)	**-1**	71.3	21.83	1.33	15.2	6.95	478	0.478	Jordan	1
12/18/2020	12/18/2020 (1)	**-1.5**	71.3	21.83	1.26	14.4	7	478	0.478	Jordan	1
12/18/2020	12/18/2020 (1)	**-2**	71.3	21.83	1.22	13.9	7.03	478	0.478	Jordan	1
12/18/2020	12/18/2020 (1)	**-2.5**	71.3	21.83	1.2	13.7	7.05	478	0.478	Jordan	1
12/18/2020	12/18/2020 (1)	**-3**	71.3	21.83	1.18	13.5	7.08	478	0.478	Jordan	1
12/18/2020	12/18/2020 (1)	**-3.5**	71.3	21.83	1.18	13.4	7.11	478	0.478	Jordan	1
12/18/2020	12/18/2020 (1)	**-4**	71.3	21.83	1.17	13.4	7.12	478	0.478	Jordan	1
12/18/2020	12/18/2020 (1)	**-4.5**	71.3	21.83	1.16	13.3	7.13	477	0.477	Jordan	1
12/18/2020	12/18/2020 (1)	**-5**	71.3	21.83	1.15	13.2	7.16	477	0.477	Jordan	1
12/18/2020	12/18/2020 (1)	**-5.5**	71.3	21.83	1.15	13.1	7.18	477	0.477	Jordan	1
12/18/2020	12/18/2020 (1)	**-6**	71.3	21.83	1.15	13.1	7.21	477	0.477	Jordan	1
12/18/2020	12/18/2020 (1)	**-6.5**	71.3	21.83	1.15	13.1	7.22	477	0.477	Jordan	1
12/18/2020	12/18/2020 (1)	**-7**	71.3	21.83	1.15	13.2	7.23	477	0.477	Jordan	1
12/18/2020	12/18/2020 (1)	**-7.5**	71.3	21.83	1.15	13.1	7.23	477	0.477	Jordan	1
12/18/2020	12/18/2020 (1)	**-8**	71.3	21.83	1.13	12.8	7.24	477	0.477	Jordan	1
12/18/2020	12/18/2020 (1)	**-8.5**	71.3	21.83	1.1	12.6	7.24	477	0.477	Jordan	1
12/18/2020	12/18/2020 (1)	**-9**	71.3	21.83	1.09	12.4	7.25	477	0.477	Jordan	1
12/18/2020	12/18/2020 (1)	**-9.5**	71.3	21.83	1.09	12.4	7.24	477	0.477	Jordan	1
12/18/2020	12/18/2020 (1)	**-10**	71.3	21.83	1.08	12.4	7.25	477	0.477	Jordan	1
12/18/2020	12/18/2020 (2)	**0**	70.4	21.33	2.22	25	7.32	483	0.483	Jordan	2
12/18/2020	12/18/2020 (2)	**-0.5**	71.3	21.83	1.73	19.8	7.27	478	0.478	Jordan	2
12/18/2020	12/18/2020 (2)	**-1**	71.3	21.83	1.43	16.3	7.25	478	0.478	Jordan	2
12/18/2020	12/18/2020 (2)	**-1.5**	71.3	21.83	1.29	14.8	7.25	478	0.478	Jordan	2
12/18/2020	12/18/2020 (2)	**-2**	71.2	21.78	1.24	14.2	7.25	478	0.478	Jordan	2
12/18/2020	12/18/2020 (2)	**-2.5**	71.3	21.83	1.25	14.2	7.25	478	0.478	Jordan	2
12/18/2020	12/18/2020 (2)	**-3**	71.2	21.78	1.24	14.1	7.25	478	0.478	Jordan	2
12/18/2020	12/18/2020 (2)	**-3.5**	71.2	21.78	1.25	14.3	7.25	478	0.478	Jordan	2
12/18/2020	12/18/2020 (2)	**-4**	71.3	21.83	1.1	12.6	7.24	477	0.477	Jordan	2
12/18/2020	12/18/2020 (2)	**-4.5**	71.3	21.83	1.08	12.4	7.24	477	0.477	Jordan	2
12/18/2020	12/18/2020 (2)	**-5**	71.3	21.83	1.08	12.3	7.24	477	0.477	Jordan	2
12/18/2020	12/18/2020 (2)	**-5.5**	71.3	21.83	1.08	12.3	7.25	477	0.477	Jordan	2
12/18/2020	12/18/2020 (2)	**-6**	71.3	21.83	1.08	12.4	7.25	477	0.477	Jordan	2
12/18/2020	12/18/2020 (2)	**-6.5**	71.3	21.83	1.08	12.4	7.25	477	0.477	Jordan	2
12/18/2020	12/18/2020 (2)	**-7**	71.3	21.83	1.08	12.3	7.25	477	0.477	Jordan	2
12/18/2020	12/18/2020 (2)	**-7.5**	71.3	21.83	1.09	12.4	7.25	477	0.477	Jordan	2
12/18/2020	12/18/2020 (2)	**-8**	71.3	21.83	1.09	12.4	7.25	477	0.477	Jordan	2
12/18/2020	12/18/2020 (2)	**-8.5**	71.3	21.83	1.09	12.5	7.25	477	0.477	Jordan	2
12/18/2020	12/18/2020 (2)	**-9**	71.3	21.83	1.1	12.5	7.25	477	0.477	Jordan	2
12/18/2020	12/18/2020 (2)	**-9.5**	71.3	21.83	1.1	12.6	7.25	477	0.477	Jordan	2
12/18/2020	12/18/2020 (2)	**-10**	71.3	21.83	1.1	12.6	7.25	477	0.477	Jordan	2
12/18/2020	12/18/2020 (3)	**0**	71.2	21.78	2.97	33.9	7.35	480	0.48	Jordan	3
12/18/2020	12/18/2020 (3)	**-0.5**	71.3	21.83	1.56	17.7	7.3	480	0.48	Jordan	3
12/18/2020	12/18/2020 (3)	**-1**	71.3	21.83	1.42	16.2	7.26	481	0.481	Jordan	3
12/18/2020	12/18/2020 (3)	**-1.5**	71.3	21.83	1.35	15.4	7.25	481	0.481	Jordan	3

Sample Date	Unique ID	Depth (m)	Temp (°F)	Temp (°C)	DO (mg/L)	DO (%)	pH (SU)	Sp Cond (uS/cm)	Sal (PSU)	Source	Sample Loc
12/18/2020	12/18/2020 (3)	**-2**	71.3	21.83	1.24	14.1	7.25	481	0.481	Jordan	3
12/18/2020	12/18/2020 (3)	**-2.5**	71.3	21.83	1.19	13.6	7.25	481	0.481	Jordan	3
12/18/2020	12/18/2020 (3)	**-3**	71.3	21.83	1.17	13.3	7.25	481	0.481	Jordan	3
12/18/2020	12/18/2020 (3)	**-3.5**	71.3	21.83	1.14	13	7.25	481	0.481	Jordan	3
12/18/2020	12/18/2020 (3)	**-4**	71.3	21.83	1.14	13	7.25	481	0.481	Jordan	3
12/18/2020	12/18/2020 (3)	**-4.5**	71.3	21.83	1.13	12.9	7.25	481	0.481	Jordan	3
12/18/2020	12/18/2020 (3)	**-5**	71.3	21.83	1.12	12.8	7.25	481	0.481	Jordan	3
12/18/2020	12/18/2020 (3)	**-5.5**	71.3	21.83	1.12	12.7	7.25	480	0.48	Jordan	3
12/18/2020	12/18/2020 (3)	**-6**	71.3	21.83	1.11	12.7	7.24	480	0.48	Jordan	3
12/18/2020	12/18/2020 (3)	**-6.5**	71.3	21.83	1.11	12.7	7.24	480	0.48	Jordan	3
12/18/2020	12/18/2020 (3)	**-7**	71.3	21.83	1.11	12.6	7.24	480	0.48	Jordan	3
12/18/2020	12/18/2020 (3)	**-7.5**	71.3	21.83	1.11	12.6	7.24	480	0.48	Jordan	3
12/18/2020	12/18/2020 (3)	**-8**	71.3	21.83	1.11	12.7	7.24	480	0.48	Jordan	3
12/18/2020	12/18/2020 (3)	**-8.5**	71.3	21.83	1.11	12.6	7.24	480	0.48	Jordan	3
12/18/2020	12/18/2020 (3)	**-9**	71.3	21.83	1.1	12.6	7.24	480	0.48	Jordan	3
12/18/2020	12/18/2020 (3)	**-9.5**	71.3	21.83	1.1	12.6	7.24	480	0.48	Jordan	3
12/18/2020	12/18/2020 (3)	**-10**	71.3	21.83	1.11	12.6	7.24	480	0.48	Jordan	3
1/29/2021	01/29/2021 (1)	**0**	69.9	21.06	2.18	24.5	6.81	483	0.483	Jordan	1
1/29/2021	01/29/2021 (1)	**-0.5**	69.7	20.94	1.92	21.5	6.86	480	0.48	Jordan	1
1/29/2021	01/29/2021 (1)	**-1**	69.7	20.94	1.89	21.2	6.87	480	0.48	Jordan	1
1/29/2021	01/29/2021 (1)	**-1.5**	69.7	20.94	1.87	20.9	6.88	480	0.48	Jordan	1
1/29/2021	01/29/2021 (1)	**-2**	69.7	20.94	1.85	20.7	6.89	480	0.48	Jordan	1
1/29/2021	01/29/2021 (1)	**-2.5**	69.7	20.94	1.83	20.5	6.9	480	0.48	Jordan	1
1/29/2021	01/29/2021 (1)	**-3**	69.7	20.94	1.82	20.4	6.9	480	0.48	Jordan	1
1/29/2021	01/29/2021 (1)	**-3.5**	69.7	20.94	1.81	20.3	6.91	479	0.479	Jordan	1
1/29/2021	01/29/2021 (1)	**-4**	69.7	20.94	1.8	20.2	6.91	479	0.479	Jordan	1
1/29/2021	01/29/2021 (1)	**-4.5**	69.7	20.94	1.79	20.1	6.92	479	0.479	Jordan	1
1/29/2021	01/29/2021 (1)	**-5**	69.7	20.94	1.79	20	6.93	479	0.479	Jordan	1
1/29/2021	01/29/2021 (1)	**-5.5**	69.7	20.94	1.79	20	6.93	479	0.479	Jordan	1
1/29/2021	01/29/2021 (1)	**-6**	69.7	20.94	1.78	20	6.93	479	0.479	Jordan	1
1/29/2021	01/29/2021 (1)	**-6.5**	69.7	20.94	1.78	19.9	6.94	479	0.479	Jordan	1
1/29/2021	01/29/2021 (1)	**-7**	69.7	20.94	1.77	19.8	6.95	479	0.479	Jordan	1
1/29/2021	01/29/2021 (1)	**-7.5**	69.7	20.94	1.76	19.7	6.95	479	0.479	Jordan	1
1/29/2021	01/29/2021 (1)	**-8**	69.7	20.94	1.75	19.7	6.95	479	0.479	Jordan	1
1/29/2021	01/29/2021 (1)	**-8.5**	69.6	20.89	1.76	19.7	6.96	479	0.479	Jordan	1
1/29/2021	01/29/2021 (1)	**-9**	69.6	20.89	1.76	19.7	6.96	479	0.479	Jordan	1
1/29/2021	01/29/2021 (1)	**-9.5**	69.6	20.89	1.76	19.7	6.97	479	0.479	Jordan	1
1/29/2021	01/29/2021 (1)	**-10**	69.7	20.94	1.75	19.6	6.97	479	0.479	Jordan	1
1/29/2021	1/29/2021 (2)	**0**	69.8	21	2.09	23.5	7.07	479	0.479	Jordan	2
1/29/2021	1/29/2021 (2)	**-0.5**	69.7	20.94	1.9	21.4	7.07	479	0.479	Jordan	2
1/29/2021	1/29/2021 (2)	**-1**	69.7	20.94	1.86	20.9	7.07	480	0.48	Jordan	2
1/29/2021	1/29/2021 (2)	**-1.5**	69.7	20.94	1.81	20.3	7.08	479	0.479	Jordan	2
1/29/2021	1/29/2021 (2)	**-2**	69.6	20.89	1.8	20.2	7.08	479	0.479	Jordan	2
1/29/2021	1/29/2021 (2)	**-2.5**	69.6	20.89	1.79	20.1	7.08	479	0.479	Jordan	2
1/29/2021	1/29/2021 (2)	**-3**	69.6	20.89	1.79	20.1	7.08	479	0.479	Jordan	2
1/29/2021	1/29/2021 (2)	**-3.5**	69.6	20.89	1.79	20.1	7.08	479	0.479	Jordan	2
1/29/2021	1/29/2021 (2)	**-4**	69.6	20.89	1.79	20.1	7.08	479	0.479	Jordan	2

Sample Date	Unique ID	Depth (m)	Temp (°F)	Temp (°C)	DO (mg/L)	DO (%)	pH (SU)	Sp Cond (uS/cm)	Sal (PSU)	Source	Sample Loc
1/29/2021	1/29/2021 (2)	**-4.5**	69.6	20.89	1.79	20.1	7.09	479	0.479	Jordan	2
1/29/2021	1/29/2021 (2)	**-5**	69.6	20.89	1.79	20	7.09	479	0.479	Jordan	2
1/29/2021	1/29/2021 (2)	**-5.5**	69.6	20.89	1.77	19.9	7.1	479	0.479	Jordan	2
1/29/2021	1/29/2021 (2)	**-6**	69.6	20.89	1.77	19.8	7.1	479	0.479	Jordan	2
1/29/2021	1/29/2021 (2)	**-6.5**	69.6	20.89	1.77	19.9	7.1	479	0.479	Jordan	2
1/29/2021	1/29/2021 (2)	**-7**	69.6	20.89	1.78	19.9	7.1	479	0.479	Jordan	2
1/29/2021	1/29/2021 (2)	**-7.5**	69.6	20.89	1.77	19.9	7.11	479	0.479	Jordan	2
1/29/2021	1/29/2021 (2)	**-8**	69.6	20.89	1.76	19.8	7.11	479	0.479	Jordan	2
1/29/2021	1/29/2021 (2)	**-8.5**	69.6	20.89	1.76	19.8	7.11	479	0.479	Jordan	2
1/29/2021	1/29/2021 (2)	**-9**	69.6	20.89	1.77	19.9	7.11	479	0.479	Jordan	2
1/29/2021	1/29/2021 (2)	**-9.5**	69.6	20.89	1.78	20	7.11	479	0.479	Jordan	2
1/29/2021	1/29/2021 (2)	**-10**	69.6	20.89	1.79	20	7.11	479	0.479	Jordan	2
1/29/2021	01/29/2021 (3)	**0**	69.9	21.06	2.41	27.1	7.18	479	0.479	Jordan	3
1/29/2021	01/29/2021 (3)	**-0.5**	69.7	20.94	1.85	20.7	7.17	479	0.479	Jordan	3
1/29/2021	01/29/2021 (3)	**-1**	69.7	20.94	1.77	19.8	7.17	479	0.479	Jordan	3
1/29/2021	01/29/2021 (3)	**-1.5**	69.7	20.94	1.75	19.7	7.17	479	0.479	Jordan	3
1/29/2021	01/29/2021 (3)	**-2**	69.7	20.94	1.75	19.6	7.17	479	0.479	Jordan	3
1/29/2021	01/29/2021 (3)	**-2.5**	69.7	20.94	1.74	19.5	7.17	479	0.479	Jordan	3
1/29/2021	01/29/2021 (3)	**-3**	69.7	20.94	1.74	19.5	7.17	479	0.479	Jordan	3
1/29/2021	01/29/2021 (3)	**-3.5**	69.7	20.94	1.74	19.5	7.16	479	0.479	Jordan	3
1/29/2021	01/29/2021 (3)	**-4**	69.7	20.94	1.74	19.6	7.16	479	0.479	Jordan	3
1/29/2021	01/29/2021 (3)	**-4.5**	69.7	20.94	1.74	19.5	7.16	479	0.479	Jordan	3
1/29/2021	01/29/2021 (3)	**-5**	69.7	20.94	1.74	19.5	7.16	479	0.479	Jordan	3
1/29/2021	01/29/2021 (3)	**-5.5**	69.7	20.94	1.73	19.4	7.17	479	0.479	Jordan	3
1/29/2021	01/29/2021 (3)	**-6**	69.7	20.94	1.73	19.4	7.17	479	0.479	Jordan	3
1/29/2021	01/29/2021 (3)	**-6.5**	69.7	20.94	1.71	19.2	7.17	479	0.479	Jordan	3
1/29/2021	01/29/2021 (3)	**-7**	69.7	20.94	1.72	19.3	7.17	479	0.479	Jordan	3
1/29/2021	01/29/2021 (3)	**-7.5**	69.7	20.94	1.72	19.2	7.17	479	0.479	Jordan	3
1/29/2021	01/29/2021 (3)	**-8**	69.7	20.94	1.69	19	7.17	479	0.479	Jordan	3
1/29/2021	01/29/2021 (3)	**-8.5**	69.7	20.94	1.68	18.9	7.17	479	0.479	Jordan	3
1/29/2021	01/29/2021 (3)	**-9**	69.7	20.94	1.69	19	7.17	479	0.479	Jordan	3
1/29/2021	01/29/2021 (3)	**-9.5**	69.7	20.94	1.7	19.1	7.17	479	0.479	Jordan	3
1/29/2021	01/29/2021 (3)	**-10**	69.7	20.94	1.7	19.1	7.17	479	0.479	Jordan	3
3/16/2021	3/16/2021 (1)	**0**	71.3	21.83	2.96	33.8	7.51	475	0.475	Jordan	1
3/16/2021	3/16/2021 (1)	**-0.5**	71.1	21.72	2.84	32.3	7.49	474	0.474	Jordan	1
3/16/2021	3/16/2021 (1)	**-1**	70.9	21.61	2.78	31.6	7.48	473	0.473	Jordan	1
3/16/2021	3/16/2021 (1)	**-1.5**	70.8	21.56	2.64	30	7.45	473	0.473	Jordan	1
3/16/2021	3/16/2021 (1)	**-2**	70.8	21.56	2.58	29.3	7.45	474	0.474	Jordan	1
3/16/2021	3/16/2021 (1)	**-2.5**	70.8	21.56	2.5	28.3	7.44	472	0.472	Jordan	1
3/16/2021	3/16/2021 (1)	**-3**	70.7	21.5	1.98	22.5	7.42	471	0.471	Jordan	1
3/16/2021	3/16/2021 (1)	**-3.5**	70.7	21.5	1.93	21.8	7.4	472	0.472	Jordan	1
3/16/2021	3/16/2021 (1)	**-4**	70.6	21.44	1.9	21.6	7.39	473	0.473	Jordan	1
3/16/2021	3/16/2021 (1)	**-4.5**	70.6	21.44	1.91	21.6	7.39	473	0.473	Jordan	1
3/16/2021	3/16/2021 (1)	**-5**	70.5	21.39	1.95	22	7.39	475	0.475	Jordan	1
3/16/2021	3/16/2021 (1)	**-5.5**	70.5	21.39	1.92	21.7	7.38	475	0.475	Jordan	1
3/16/2021	3/16/2021 (1)	**-6**	70.5	21.39	1.66	18.8	7.35	474	0.474	Jordan	1
3/16/2021	3/16/2021 (2)	**0**	71.9	22.17	2.91	33.4	7.42	474	0.474	Jordan	2

Sample Date	Unique ID	Depth (m)	Temp (°F)	Temp (°C)	DO (mg/L)	DO (%)	pH (SU)	Sp Cond (uS/cm)	Sal (PSU)	Source	Sample Loc
3/16/2021	3/16/2021 (2)	**-0.5**	71	21.67	2.61	29.8	7.4	473	0.473	Jordan	2
3/16/2021	3/16/2021 (2)	**-1**	70.9	21.61	2.64	30	7.4	474	0.474	Jordan	2
3/16/2021	3/16/2021 (2)	**-1.5**	70.8	21.56	2.71	30.8	7.4	474	0.474	Jordan	2
3/16/2021	3/16/2021 (2)	**-2**	70.8	21.56	2.76	31.3	7.41	474	0.474	Jordan	2
3/16/2021	3/16/2021 (2)	**-2.5**	70.7	21.5	2.72	30.9	7.4	474	0.474	Jordan	2
3/16/2021	3/16/2021 (2)	**-3**	70.7	21.5	2.26	25.6	7.39	474	0.474	Jordan	2
3/16/2021	3/16/2021 (2)	**-3.5**	70.7	21.5	2.06	23.4	7.37	474	0.474	Jordan	2
3/16/2021	3/16/2021 (2)	**-4**	70.6	21.44	2.01	22.8	7.36	473	0.473	Jordan	2
3/16/2021	3/16/2021 (2)	**-4.5**	70.6	21.44	1.97	22.3	7.36	474	0.474	Jordan	2
3/16/2021	3/16/2021 (2)	**-5**	70.5	21.39	1.97	22.3	7.36	475	0.475	Jordan	2
3/16/2021	3/16/2021 (2)	**-5.5**	70.4	21.33	1.99	22.5	7.36	475	0.475	Jordan	2
3/16/2021	3/16/2021 (2)	**-6**	70.4	21.33	1.96	22.2	7.36	475	0.475	Jordan	2
3/16/2021	3/16/2021 (2)	**-6.5**	70.4	21.33	1.38	15.6	7.34	476	0.476	Jordan	2
3/16/2021	3/16/2021 (2)	**-7**	70.4	21.33	1.33	15	7.33	477	0.477	Jordan	2
3/16/2021	3/16/2021 (2)	**-7.5**	70.4	21.33	1.27	14.3	7.32	477	0.477	Jordan	2
3/16/2021	3/16/2021 (2)	**-8**	70.4	21.33	1.24	14	7.32	477	0.477	Jordan	2
3/16/2021	3/16/2021 (2)	**-8.5**	70.4	21.33	1.23	13.9	7.32	477	0.477	Jordan	2
3/16/2021	3/16/2021 (2)	**-9**	70.4	21.33	1.21	13.7	7.32	477	0.477	Jordan	2
3/16/2021	3/16/2021 (2)	**-9.5**	70.4	21.33	1.21	13.7	7.32	477	0.477	Jordan	2
3/16/2021	3/16/2021 (2)	**-10**	70.4	21.33	1.23	13.9	7.32	477	0.477	Jordan	2
3/16/2021	3/16/2021 (3)	**0**	71.2	21.78	2.97	33.9	7.41	474	0.474	Jordan	3
3/16/2021	3/16/2021 (3)	**-0.5**	71.1	21.72	2.9	33.1	7.4	474	0.474	Jordan	3
3/16/2021	3/16/2021 (3)	**-1**	70.9	21.61	2.89	32.8	7.4	473	0.473	Jordan	3
3/16/2021	3/16/2021 (3)	**-1.5**	70.8	21.56	2.86	32.5	7.4	473	0.473	Jordan	3
3/16/2021	3/16/2021 (3)	**-2**	70.8	21.56	2.8	31.8	7.4	473	0.473	Jordan	3
3/16/2021	3/16/2021 (3)	**-2.5**	70.8	21.56	2.66	30.2	7.38	474	0.474	Jordan	3
3/16/2021	3/16/2021 (3)	**-3**	70.8	21.56	2.56	29.1	7.38	474	0.474	Jordan	3
3/16/2021	3/16/2021 (3)	**-3.5**	70.7	21.5	2.45	27.8	7.37	474	0.474	Jordan	3
3/16/2021	3/16/2021 (3)	**-4**	70.7	21.5	1.97	22.4	7.37	474	0.474	Jordan	3
3/16/2021	3/16/2021 (3)	**-4.5**	70.6	21.44	1.99	22.6	7.35	474	0.474	Jordan	3
3/16/2021	3/16/2021 (3)	**-5**	70.6	21.44	1.92	21.7	7.35	474	0.474	Jordan	3
3/16/2021	3/16/2021 (3)	**-5.5**	70.5	21.39	1.83	20.7	7.34	475	0.475	Jordan	3
3/16/2021	3/16/2021 (3)	**-6**	70.4	21.33	1.76	19.9	7.34	475	0.475	Jordan	3
3/16/2021	3/16/2021 (3)	**-6.5**	70.4	21.33	1.63	18.4	7.33	476	0.476	Jordan	3
3/16/2021	3/16/2021 (3)	**-7**	70.4	21.33	1.5	17	7.32	476	0.476	Jordan	3
3/16/2021	3/16/2021 (3)	**-7.5**	70.4	21.33	1.4	15.9	7.31	476	0.476	Jordan	3
4/21/2021	4/21/2021 (1)	**0**	74.3	23.5	5.6	65.7	7.5	453	0.453	Fr Eco	1
4/21/2021	4/21/2021 (1)	**-0.5**	74.3	23.5	5.6	65.4	7.5	453	0.453	Fr Eco	1
4/21/2021	4/21/2021 (1)	**-1**	74.3	23.5	5.6	65.4	7.4	453	0.453	Fr Eco	1
4/21/2021	4/21/2021 (1)	**-1.5**	74.3	23.5	5.6	65.7	7.4	457	0.457	Fr Eco	1
4/21/2021	4/21/2021 (1)	**-2**	74.3	23.5	3.7	45	7.3	450	0.45	Fr Eco	1
4/21/2021	4/21/2021 (1)	**-2.5**	73.4	23	3.6	42.7	7.3	445	0.445	Fr Eco	1
4/21/2021	4/21/2021 (1)	**-3**	72.9	22.7	2.1	25	7.2	448	0.448	Fr Eco	1
4/21/2021	4/21/2021 (1)	**-3.5**	72.5	22.5	1.3	14.7	7.2	448	0.448	Fr Eco	1
4/21/2021	4/21/2021 (2)	**0**	74.3	23.5	5.7	67.4	7.5	454	0.454	Fr Eco	2
4/21/2021	4/21/2021 (2)	**-0.5**	74.3	23.5	5.7	67.4	7.5	454	0.454	Fr Eco	2
4/21/2021	4/21/2021 (2)	**-1**	74.3	23.5	5.7	67.3	7.5	453	0.453	Fr Eco	2

Sample Date	Unique ID	Depth (m)	Temp (°F)	Temp (°C)	DO (mg/L)	DO (%)	pH (SU)	Sp Cond (uS/cm)	Sal (PSU)	Source	Sample Loc
4/21/2021	4/21/2021 (2)	**-1.5**	74.3	23.5	5.6	66.5	7.5	453	0.453	Fr Eco	2
4/21/2021	4/21/2021 (2)	**-2**	74.1	23.4	4.4	52	7.4	456	0.456	Fr Eco	2
4/21/2021	4/21/2021 (2)	**-2.5**	73.4	23	2.9	34	7.3	453	0.453	Fr Eco	2
4/21/2021	4/21/2021 (2)	**-3**	72.9	22.7	2.2	26	7.2	450	0.45	Fr Eco	2
4/21/2021	4/21/2021 (2)	**-3.5**	72.5	22.5	2.9	22	7.2	452	0.452	Fr Eco	2
4/21/2021	4/21/2021 (2)	**-4**	72.3	22.4	2.5	18	7.2	444	0.444	Fr Eco	2
4/21/2021	4/21/2021 (2)	**-4.5**	72.1	22.3	1.3	15	7.2	443	0.443	Fr Eco	2
4/21/2021	4/21/2021 (2)	**-5**	72.1	22.3	1.3	14	7.1	445	0.445	Fr Eco	2
4/21/2021	4/21/2021 (2)	**-10**	71.4	21.9	0.3	3	7	480	0.48	Fr Eco	2
4/21/2021	4/21/2021 (3)	**0**	74.3	23.5	5.7	65.2	7.5	453	0.453	Fr Eco	3
4/21/2021	4/21/2021 (3)	**-0.5**	74.3	23.5	5.7	66.8	7.5	453	0.453	Fr Eco	3
4/21/2021	4/21/2021 (3)	**-1**	74.3	23.5	5.6	65.6	7.4	452	0.452	Fr Eco	3
4/21/2021	4/21/2021 (3)	**-1.5**	74.3	23.5	5.4	64.1	7.4	452	0.452	Fr Eco	3
4/21/2021	4/21/2021 (3)	**-2**	74.3	23.5	3.7	44	7.4	452	0.452	Fr Eco	3
4/21/2021	4/21/2021 (3)	**-2.5**	73.6	23.1	4.5	52	7.3	452	0.452	Fr Eco	3
4/21/2021	4/21/2021 (3)	**-3**	72.9	22.7	3.7	44	7.3	441	0.441	Fr Eco	3
4/21/2021	4/21/2021 (3)	**-3.5**	72.5	22.5	2.2	28	7.2	445	0.445	Fr Eco	3
4/21/2021	4/21/2021 (3)	**-4**	72.3	22.4	1.7	20	7.2	445	0.445	Fr Eco	3
4/21/2021	4/21/2021 (3)	**-4.5**	72.1	22.3	1.3	15.3	7.2	442	0.442	Fr Eco	3
4/21/2021	4/21/2021 (3)	**-5**	72.1	22.3	1.2	14.2	7.1	442	0.442	Fr Eco	3
4/21/2021	4/21/2021 (3)	**-10**	71.4	21.9	0.3	3	7.1	440	0.44	Fr Eco	3
4/12/2022	4/12/2022 (1)	**0**	70.7	21.9	2.6	30	7.7	470	0.24	Fr Eco	1
4/12/2022	4/12/2022 (1)	**-0.5**	71.4	21.9	1.7	19.5	7.7	469	0.24	Fr Eco	1
4/12/2022	4/12/2022 (1)	**-1**	71.4	21.9	1.7	19.5	7.7	469	0.24	Fr Eco	1
4/12/2022	4/12/2022 (1)	**-1.5**	71.4	21.9	1.6	18.7	7.7	469	0.24	Fr Eco	1
4/12/2022	4/12/2022 (1)	**-2**	71.4	21.9	1.6	18.2	7.7	469	0.24	Fr Eco	1
4/12/2022	4/12/2022 (1)	**-2.5**	71.4	21.9	1.5	17.2	7.7	469	0.24	Fr Eco	1
4/12/2022	4/12/2022 (1)	**-3**	71.4	21.9	1.3	14.9	7.7	469	0.24	Fr Eco	1
4/12/2022	4/12/2022 (1)	**-3.5**	71.4	21.9	0.7	7.5	7.7	469	0.24	Fr Eco	1
4/12/2022	4/12/2022 (2)	**0**	71.2	21.8	1.8	21	7.7	469	0.24	Fr Eco	2
4/12/2022	4/12/2022 (2)	**-0.5**	71.4	21.9	1.7	19.7	7.7	469	0.24	Fr Eco	2
4/12/2022	4/12/2022 (2)	**-1**	71.4	21.9	1.7	19.4	7.7	469	0.24	Fr Eco	2
4/12/2022	4/12/2022 (2)	**-1.5**	71.4	21.9	1.9	21.4	7.7	469	0.24	Fr Eco	2
4/12/2022	4/12/2022 (2)	**-2**	71.4	21.9	1.9	21.3	7.7	469	0.24	Fr Eco	2
4/12/2022	4/12/2022 (2)	**-2.5**	71.4	21.9	1.9	22.3	7.7	469	0.24	Fr Eco	2
4/12/2022	4/12/2022 (2)	**-3**	71.4	21.9	1.6	18.3	7.7	469	0.24	Fr Eco	2
4/12/2022	4/12/2022 (2)	**-3.5**	71.4	21.9	1.6	18	7.7	469	0.24	Fr Eco	2
4/12/2022	4/12/2022 (2)	**-4**	71.4	21.9	1.4	17	7.6	469	0.24	Fr Eco	2
4/12/2022	4/12/2022 (2)	**-4.5**	71.4	21.9	0.9	11	7.6	469	0.24	Fr Eco	2
4/12/2022	4/12/2022 (2)	**-5**	71.4	21.9	0.7	7.8	7.6	469	0.24	Fr Eco	2
4/12/2022	4/12/2022 (2)	**-10**	71.1	21.7	0.4	4.7	7.6	470	0.24	Fr Eco	2
4/12/2022	4/12/2022 (3)	**0**	71.4	21.9	1.7	19	7.7	469	0.24	Fr Eco	3
4/12/2022	4/12/2022 (3)	**-0.5**	71.4	21.9	1.7	20	7.7	469	0.24	Fr Eco	3
4/12/2022	4/12/2022 (3)	**-1**	71.4	21.9	1.7	20	7.7	469	0.24	Fr Eco	3
4/12/2022	4/12/2022 (3)	**-1.5**	71.4	21.9	1.7	20	7.6	469	0.24	Fr Eco	3
4/12/2022	4/12/2022 (3)	**-2**	71.4	21.9	1.8	20	7.6	469	0.24	Fr Eco	3
4/12/2022	4/12/2022 (3)	**-2.5**	71.4	21.9	1.8	20.2	7.6	469	0.24	Fr Eco	3

Sample Date	Unique ID	Depth (m)	Temp (°F)	Temp (°C)	DO (mg/L)	DO (%)	pH (SU)	Sp Cond (uS/cm)	Sal (PSU)	Source	Sample Loc
4/12/2022	4/12/2022 (3)	**-3**	71.4	21.9	1.7	19.4	7.6	470	0.24	Fr Eco	3
4/12/2022	4/12/2022 (3)	**-3.5**	71.4	21.9	1.7	19.8	7.6	470	0.24	Fr Eco	3
4/12/2022	4/12/2022 (3)	**-4**	71.4	21.9	1.8	20	7.6	470	0.24	Fr Eco	3
4/12/2022	4/12/2022 (3)	**-4.5**	71.4	21.9	1.7	20	7.6	469	0.24	Fr Eco	3
4/12/2022	4/12/2022 (3)	**-5**	71.4	21.9	1.1	13	7.6	469	0.24	Fr Eco	3
4/12/2022	4/12/2022 (3)	**-10**	71.1	21.7	0.4	4.8	7.6	469	0.24	Fr Eco	3
4/25/2023	4/25/2023 (1)	**0**		23.7	6	70.6	7.8	423	0.2	Fr Eco	1
4/25/2023	4/25/2023 (1)	**-0.5**		23.7	6.1	72	7.8	423	0.21	Fr Eco	1
4/25/2023	4/25/2023 (1)	**-1**		23.7	6	71.6	7.8	423	0.21	Fr Eco	1
4/25/2023	4/25/2023 (1)	**-1.5**		23.7	6	71.6	7.8	423	0.21	Fr Eco	1
4/25/2023	4/25/2023 (1)	**-2**		23.7	6	71	7.8	423	0.21	Fr Eco	1
4/25/2023	4/25/2023 (1)	**-2.5**		23.7	6	70	7.8	423	0.21	Fr Eco	1
4/25/2023	4/25/2023 (1)	**-3**		23.7	6	71	7.8	423	0.21	Fr Eco	1
4/25/2023	4/25/2023 (2)	**0**		23.6	6.2	73	8	423	0.21	Fr Eco	2
4/25/2023	4/25/2023 (2)	**-0.5**		23.7	6.2	73	8	423	0.21	Fr Eco	2
4/25/2023	4/25/2023 (2)	**-1**		23.7	6.1	72.6	8	423	0.21	Fr Eco	2
4/25/2023	4/25/2023 (2)	**-1.5**		23.7	6.1	72.6	8	423	0.21	Fr Eco	2
4/25/2023	4/25/2023 (2)	**-2**		23.7	6.1	72	7.9	423	0.21	Fr Eco	2
4/25/2023	4/25/2023 (2)	**-2.5**		23.7	5.9	70	7.9	423	0.21	Fr Eco	2
4/25/2023	4/25/2023 (2)	**-3**		23.7	5.7	67.3	7.9	423	0.21	Fr Eco	2
4/25/2023	4/25/2023 (2)	**-3.5**		23.6	5.4	64	7.9	422	0.21	Fr Eco	2
4/25/2023	4/25/2023 (2)	**-4**		23.6	3.7	45	7.9	416	0.21	Fr Eco	2
4/25/2023	4/25/2023 (2)	**-4.5**		23.4	2.5	29	7.8	416	0.21	Fr Eco	2
4/25/2023	4/25/2023 (2)	**-5**		23.4	2.3	27.3	7.8	418	0.21	Fr Eco	2
4/25/2023	4/25/2023 (2)	**-10**		22.5	0.2	2.4	7.6	444	0.22	Fr Eco	2
4/25/2023	4/25/2023 (3)	**0**		23.7	6.1	73	7.7	423	0.21	Fr Eco	3
4/25/2023	4/25/2023 (3)	**-0.5**		23.7	6.1	72	7.7	423	0.21	Fr Eco	3
4/25/2023	4/25/2023 (3)	**-1**		23.7	6.1	72	7.7	423	0.21	Fr Eco	3
4/25/2023	4/25/2023 (3)	**-1.5**		23.7	6.1	72	7.7	423	0.21	Fr Eco	3
4/25/2023	4/25/2023 (3)	**-2**		23.7	6.1	72	7.7	423	0.21	Fr Eco	3
4/25/2023	4/25/2023 (3)	**-2.5**		23.7	6.1	72	7.7	423	0.21	Fr Eco	3
4/25/2023	4/25/2023 (3)	**-3**		23.7	6	70	7.7	423	0.21	Fr Eco	3
4/25/2023	4/25/2023 (3)	**-3.5**		23.7	5.6	66	7.7	423	0.21	Fr Eco	3
4/25/2023	4/25/2023 (3)	**-4**		23.6	3.7	44	7.7	419	0.21	Fr Eco	3
4/25/2023	4/25/2023 (3)	**-4.5**		23.5	2.6	30	7.7	418	0.21	Fr Eco	3
4/25/2023	4/25/2023 (3)	**-5**		23.4	2.3	27	7.6	419	0.21	Fr Eco	3
4/25/2023	4/25/2023 (3)	**-10**		22.5	0.21	2.4	7.6	444	0.21	Fr Eco	3

6.2 LABORATORY RESULTS FOR APRIL 2023

Advanced Environmental Laboratories, Inc
9610 Princess Palm Ave Tampa, FL 33619
Payments: P.O. Box 551580 Jacksonville, FL 32255-1580
Phone: (813) 630-9616
Fax: (813) 630-4327

FINAL

Workorder: Morris Bridge Sink (T2308189)

May 18, 2023

Russ Frydenborg
Frydenborg Ecologic
5016 Crestwood Ct
Tallahassee, FL 32311

RE: Workorder: T2308189 Morris Bridge Sink

Dear Russ Frydenborg:

Enclosed are the analytical results for sample(s) received by the laboratory on Tuesday April 25, 2023. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report. The analytical results for the samples contained in this report were submitted for analysis as outlined by the Chain of Custody and results pertain only to these samples.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Tim Preston
TPreston@AELLab.com

Certificate of Analysis

POWERED BY HORIZON v.13.1.0

NELAP Accredited E84589

Advanced Environmental Laboratories, Inc
9610 Princess Palm Ave Tampa, FL 33619
Payments: P.O. Box 551580 Jacksonville, FL 32255-1580
Phone: (813) 630-9616
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FINAL

Workorder: Morris Bridge Sink (T2308189)

Sample Summary

Lab ID	Sample ID	Matrix	Method	Date Collected	Date Received	Analytes Reported	Basis
T2308189001	MB5	WA	Calculation	04/25/2023 09:15	04/25/2023 12:20	1	NA
T2308189001	MB5	WA	EPA 300.0	04/25/2023 09:15	04/25/2023 12:20	6	NA
T2308189001	MB5	WA	EPA 351.2	04/25/2023 09:15	04/25/2023 12:20	1	NA
T2308189001	MB5	WA	EPA 365.1	04/25/2023 09:15	04/25/2023 12:20	1	NA
T2308189001	MB5	WA	EPA 365.4	04/25/2023 09:15	04/25/2023 12:20	1	NA
T2308189001	MB5	WA	SM 10200 H	04/25/2023 09:15	04/25/2023 12:20	1	NA
T2308189001	MB5	WA	SM 2320B	04/25/2023 09:15	04/25/2023 12:20	1	NA
T2308189001	MB5	WA	SM 2540 C	04/25/2023 09:15	04/25/2023 12:20	1	NA
T2308189001	MB5	WA	SM 2540D	04/25/2023 09:15	04/25/2023 12:20	1	NA
T2308189001	MB5	WA	SM 4500NO3-F	04/25/2023 09:15	04/25/2023 12:20	1	NA
T2308189001	MB5	WA	SW-846 6010	04/25/2023 09:15	04/25/2023 12:20	1	NA

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Workorder: Morris Bridge Sink (T2308189)

Workorder Summary

Batch Comments

WCAt/20504 - TKN,E351.2 Analysis,Water

The matrix spike recovery of Total Kjeldahl Nitrogen for T2308194004 was outside control criteria. Recoveries in the Laboratory Control Sample (LCS) and %RPD were acceptable, which indicates the analytical batch was in control. The matrix spike outlier suggests a potential bias in this matrix. No further corrective action was required.

WCAt/20505 - Total Phosphorus,E365.4,Water

The matrix spike recovery of Total Phosphorus (as P) for T2308168002 was outside control criteria. Recoveries in the Laboratory Control Sample (LCS) and %RPD were acceptable, which indicates the analytical batch was in control. The matrix spike outlier suggests a potential bias in this matrix. No further corrective action was required.

Analysis Results Comments

T2308189001 (MB5) - Corrected Chlorophyll A

Sample T2308189001 was filtered on 4/25/2023 at 16:00

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Workorder: Morris Bridge Sink (T2308189)

Analytical Results Qualifiers

Parameter Qualifiers

U	The compound was analyzed for but not detected.
I	The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

Lab Qualifiers

G	DOH Certification #E82001 (FL NELAC) AEL-Gainesville
S^	Not Certified
T	DOH Certification #E84589 (FL NELAC) AEL-Tampa

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Workorder: Morris Bridge Sink (T2308189)

Analytical Results

Lab ID: T2308189001 **Date Collected:** 04/25/2023 09:15 **Matrix:** Water
Sample ID: MB5 **Date Received:** 04/25/2023 12:20

Parameter	Results	Units	PQL	MDL	DF	Prepared	Analyzed	Lab
METALS (SW-846 3010A/SW-846 6010)								
Calcium	**72**	mg/L	1.0	0.20	1	05/02/2023 12:00	05/03/2023 12:33	T
WET CHEMISTRY (Calculation)								
Total Nitrogen	0.12 U	mg/L	0.20	0.12	1	05/17/2023 17:12	05/17/2023 17:12	S^
WET CHEMISTRY (Copper Sulfate Digestion/EPA 351.2)								
Total Kjeldahl Nitrogen	**0.097 I**	mg/L	0.20	0.050	1	04/28/2023 13:54	05/04/2023 12:26	T
WET CHEMISTRY (Copper Sulfate Digestion/EPA 365.4)								
Total Phosphorus (as P)	0.15 U	mg/L	0.20	0.15	1	04/28/2023 13:54	05/04/2023 12:26	T
WET CHEMISTRY (EPA 300.0)								
Bromide	0.20 U	mg/L	1.0	0.20	2	04/26/2023 17:03	04/26/2023 17:03	T
Chloride	**12**	mg/L	10	2.0	2	04/26/2023 17:03	04/26/2023 17:03	T
Fluoride	0.40 U	mg/L	1.0	0.40	2	04/26/2023 17:03	04/26/2023 17:03	T
Nitrate (as N)	0.90 U	mg/L	1.0	0.90	2	04/26/2023 17:03	04/26/2023 17:03	T
Nitrite (as N)	0.90 U	mg/L	1.0	0.90	2	04/26/2023 17:03	04/26/2023 17:03	T
Sulfate	**47**	mg/L	10	2.0	2	04/26/2023 17:03	04/26/2023 17:03	T
WET CHEMISTRY (EPA 365.1)								
Orthophosphate	0.013 U	mg/L	0.020	0.013	1	04/26/2023 09:00	04/26/2023 09:00	T
WET CHEMISTRY (SM 10200 H)								
Corrected Chlorophyll A	**4.4**	mg/m3	3.0	2.5	1	05/03/2023 09:00	05/03/2023 09:00	G
WET CHEMISTRY (SM 2320B)								
Alkalinity, Total	**150**	mg/L	20	5.0	1	05/01/2023 12:15	05/01/2023 12:15	T
WET CHEMISTRY (SM 2540 C)								
Total Dissolved Solids	**250**	mg/L	10	10	1	04/27/2023 02:00	04/27/2023 02:00	T
WET CHEMISTRY (SM 2540D)								
Total Suspended Solids	1.0 U	mg/L	1.0	1.0	1	04/28/2023 07:15	04/28/2023 07:15	T
WET CHEMISTRY (SM 4500NO3-F)								
Nitrate + Nitrite	0.24 U	mg/L	0.40	0.24	2	04/26/2023 16:23	04/26/2023 16:23	T

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Workorder: Morris Bridge Sink (T2308189)

Analytical Results

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Workorder: Morris Bridge Sink (T2308189)

QC Results

QC Batch: ICPt/3679
Preparation Method: SW-846 3010A
Associated Lab IDs: T2308189001
Analysis Method: SW-846 6010

Method Blank(4775148)

Parameter	Results	Units	PQL	MDL	Lab
Calcium	0.20 U	mg/L	1.0	0.20	T

Lab Control Sample (4775149)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Lab
Calcium	mg/L	10	10	103	80 - 120	T

Matrix Spike (4775150); Matrix Spike Duplicate (4775151); Original (T2307748001); Parent Lab Sample (T2307748001)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Dup Result	Dup Recovery	RPD	RPD Limit	Lab
Calcium	mg/L	10	11	113	75 - 125	11	112	1	20	T

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Workorder: Morris Bridge Sink (T2308189)

QC Results

QC Batch: WCAg/11081
Preparation Method: SM 10200 H
Associated Lab IDs: T2308189001
Analysis Method: SM 10200 H

Method Blank(4777246)

Parameter	Results	Units	PQL	MDL	Lab
Corrected Chlorophyll A	2.5 U	mg/m3	3.0	2.5	G

Sample Duplicate (4777248); Original (T2308160001); Parent Lab Sample (T2308189001)

Parameter	Original	Duplicate	Units	RPD	RPD Limit	Lab
Corrected Chlorophyll A	6.408	6.408	mg/m3	0	35	G

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Workorder: Morris Bridge Sink (T2308189)

QC Results

QC Batch: WCAt/20177
Preparation Method: EPA 365.1
Associated Lab IDs: T2308189001
Analysis Method: EPA 365.1

Method Blank(4766822)

Parameter	Results	Units	PQL	MDL	Lab
Orthophosphate	0.013 U	mg/L	0.020	0.013	T

Lab Control Sample (4766823)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Lab
Orthophosphate	mg/L	0.50	.51	103	90 - 110	T

Matrix Spike (4766824); Matrix Spike Duplicate (4766825); Original (T2308189001); Parent Lab Sample (T2308189001)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Dup Result	Dup Recovery	RPD	RPD Limit	Lab
Orthophosphate	mg/L	0.50	.52	104	90 - 110	.51	103	1	10	T

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Workorder: Morris Bridge Sink (T2308189)

QC Results

QC Batch: WCAt/20193
Preparation Method: SM 4500NO3-F
Associated Lab IDs: T2308189001
Analysis Method: SM 4500NO3-F

Method Blank(4768523)

Parameter	Results	Units	PQL	MDL	Lab
Nitrate + Nitrite	0.12 U	mg/L	0.20	0.12	T

Lab Control Sample (4768524)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Lab
Nitrate + Nitrite	mg/L	2	1.99	100	90 - 110	T

Matrix Spike (4768525); Matrix Spike Duplicate (4768526); Original (T2308134001); Parent Lab Sample (T2308134001)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Dup Result	Dup Recovery	RPD	RPD Limit	Lab
Nitrate + Nitrite	mg/L	2	2.19	109	90 - 110	2.14	107	2	10	T

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Workorder: Morris Bridge Sink (T2308189)

QC Results

QC Batch: WCAt/20219
Preparation Method: SM 2540 C
Associated Lab IDs: T2308189001
Analysis Method: SM 2540 C

Method Blank(4769769)

Parameter	Results	Units	PQL	MDL	Lab
Total Dissolved Solids	10 U	mg/L	10	10	T

Lab Control Sample (4769770)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Lab
Total Dissolved Solids	mg/L	660	670	101	85 - 115	T

Sample Duplicate (4769771); Original (T2308158002); Parent Lab Sample (T2308189001)

Parameter	Original	Duplicate	Units	RPD	RPD Limit	Lab
Total Dissolved Solids	240	224	mg/L	7	10	T

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Workorder: Morris Bridge Sink (T2308189)

QC Results

QC Batch: WCAt/20221
Preparation Method: EPA 300.0
Associated Lab IDs: T2308189001
Analysis Method: EPA 300.0

Method Blank(4769960)

Parameter	Results	Units	PQL	MDL	Lab
Fluoride	0.20 U	mg/L	0.50	0.20	T
Chloride	1.0 U	mg/L	5.0	1.0	T
Nitrite (as N)	0.45 U	mg/L	0.50	0.45	T
Bromide	0.10 U	mg/L	0.50	0.10	T
Nitrate (as N)	0.45 U	mg/L	0.50	0.45	T
Sulfate	1.0 U	mg/L	5.0	1.0	T

Lab Control Sample (4769961)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Lab
Fluoride	mg/L	5	4.9	98	90 - 110	T
Chloride	mg/L	50	49	99	90 - 110	T
Nitrite (as N)	mg/L	5	4.9	97	90 - 110	T
Bromide	mg/L	5	5	100	90 - 110	T
Nitrate (as N)	mg/L	5	5	100	90 - 110	T
Sulfate	mg/L	50	49	98	90 - 110	T

Matrix Spike (4769964); Matrix Spike Duplicate (4769965); Original (T2308093001); Parent Lab Sample (T2308093001)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Dup Result	Dup Recovery	RPD	RPD Limit	Lab
Fluoride	mg/L	2	2	98	90 - 110	2	98	0.51	10	T
Chloride	mg/L	20	31	97	90 - 110	31	97	0.43	10	T
Nitrite (as N)	mg/L	2	1.8	**88**	90 - 110	1.7	**87**	0.46	10	T
Bromide	mg/L	2	1.9	95	90 - 110	1.9	95	0.10	10	T
Nitrate (as N)	mg/L	2	1.7	**87**	90 - 110	1.8	**88**	0.80	10	T
Sulfate	mg/L	20	19	96	90 - 110	19	97	1.20	10	T

QC Result Comments

Matrix Spike - 4769964 - Nitrate (as N)

J4|Estimated Result

Matrix Spike - 4769964 - Nitrite (as N)

J4|Estimated Result

Matrix Spike Duplicate - 4769965 - Nitrate (as N)

J4|Estimated Result

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Workorder: Morris Bridge Sink (T2308189)

QC Result Comments

Matrix Spike Duplicate - 4769965 - Nitrite (as N)

J4|Estimated Result

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Workorder: Morris Bridge Sink (T2308189)

QC Results

QC Batch: WCAt/20255
Preparation Method: SM 2540D
Associated Lab IDs: T2308189001
Analysis Method: SM 2540D

Method Blank(4771172)

Parameter	Results	Units	PQL	MDL	Lab
Total Suspended Solids	1.0 U	mg/L	1.0	1.0	T

Lab Control Sample (4771173)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Lab
Total Suspended Solids	mg/L	200	204	102	85 - 115	T

Sample Duplicate (4771174); Original (T2308179001); Parent Lab Sample (T2308189001)

Parameter	Original	Duplicate	Units	RPD	RPD Limit	Lab
Total Suspended Solids	122	124	mg/L	2	10	T

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Workorder: Morris Bridge Sink (T2308189)

QC Results

QC Batch: WCAt/20288
Preparation Method: SM 2320B
Associated Lab IDs: T2308189001
Analysis Method: SM 2320B

Method Blank(4772628)

Parameter	Results	Units	PQL	MDL	Lab
Alkalinity, Total	5.0 U	mg/L	20	5.0	T

Lab Control Sample (4772629)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Lab
Alkalinity, Total	mg/L	100	98	98	75 - 125	T

Sample Duplicate (4772630); Original (T2308163001); Parent Lab Sample (T2308189001)

Parameter	Original	Duplicate	Units	RPD	RPD Limit	Lab
Alkalinity, Total	259.7821	259.1841	mg/L	0	20	T

Sample Duplicate (4772631); Original (M2302499003); Parent Lab Sample (T2308189001)

Parameter	Original	Duplicate	Units	RPD	RPD Limit	Lab
Alkalinity, Total	281.9514	284.9591	mg/L	1	20	T

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Workorder: Morris Bridge Sink (T2308189)

QC Results

QC Batch: WCAt/20504
Preparation Method: Copper Sulfate Digestion
Associated Lab IDs: T2308189001
Analysis Method: EPA 351.2

Method Blank(4771079)

Parameter	Results	Units	PQL	MDL	Lab
Total Kjeldahl Nitrogen	0.050 U	mg/L	0.20	0.050	T

Lab Control Sample (4771081)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Lab
Total Kjeldahl Nitrogen	mg/L	1	.953	95	90 - 110	T

Matrix Spike (4771083); Matrix Spike Duplicate (4771085); Original (T2308168002); Parent Lab Sample (T2308168002)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Dup Result	Dup Recovery	RPD	RPD Limit	Lab
Total Kjeldahl Nitrogen	mg/L	1	1.44	99	90 - 110	1.46	101	2	20	T

Matrix Spike (4771087); Matrix Spike Duplicate (4771089); Original (T2308194004); Parent Lab Sample (T2308194004)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Dup Result	Dup Recovery	RPD	RPD Limit	Lab
Total Kjeldahl Nitrogen	mg/L	1	.809	**71**	90 - 110	.762	**66**	6	20	T

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Workorder: Morris Bridge Sink (T2308189)

QC Results

QC Batch: WCAt/20505
Preparation Method: Copper Sulfate Digestion
Associated Lab IDs: T2308189001
Analysis Method: EPA 365.4

Method Blank(4771080)

Parameter	Results	Units	PQL	MDL	Lab
Total Phosphorus (as P)	0.15 U	mg/L	0.20	0.15	T

Lab Control Sample (4771082)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Lab
Total Phosphorus (as P)	mg/L	1	1.1	107	90 - 110	T

Matrix Spike (4771084); Matrix Spike Duplicate (4771086); Original (T2308168002); Parent Lab Sample (T2308168002)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Dup Result	Dup Recovery	RPD	RPD Limit	Lab
Total Phosphorus (as P)	mg/L	1	4	**57**	90 - 110	4	**57**	0	10	T

Matrix Spike (4771088); Matrix Spike Duplicate (4771090); Original (T2308194004); Parent Lab Sample (T2308194004)

Parameter	Units	Spiked Amount	Spike Result	Spike Recovery	Control Limits	Dup Result	Dup Recovery	RPD	RPD Limit	Lab
Total Phosphorus (as P)	mg/L	1	1	104	90 - 110	1.1	107	3	10	T

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Workorder: Morris Bridge Sink (T2308189)

QC Cross Reference

Lab ID	Sample ID	Prep Batch	Prep Method
ICPt/3679 - SW-846 6010			
T2308189001	MB5	DGMt/5956	SW-846 3010A
WCAg/11081 - SM 10200 H			
T2308189001	MB5		
WCAt/20177 - EPA 365.1			
T2308189001	MB5		
WCAt/20193 - SM 4500NO3-F			
T2308189001	MB5		
WCAt/20219 - SM 2540 C			
T2308189001	MB5		
WCAt/20221 - EPA 300.0			
T2308189001	MB5		
WCAt/20255 - SM 2540D			
T2308189001	MB5		
WCAt/20288 - SM 2320B			
T2308189001	MB5		
WCAt/20504 - EPA 351.2			
T2308189001	MB5	WCAt/20250	Copper Sulfate Digestion
WCAt/20505 - EPA 365.4			
T2308189001	MB5	WCAt/20250	Copper Sulfate Digestion

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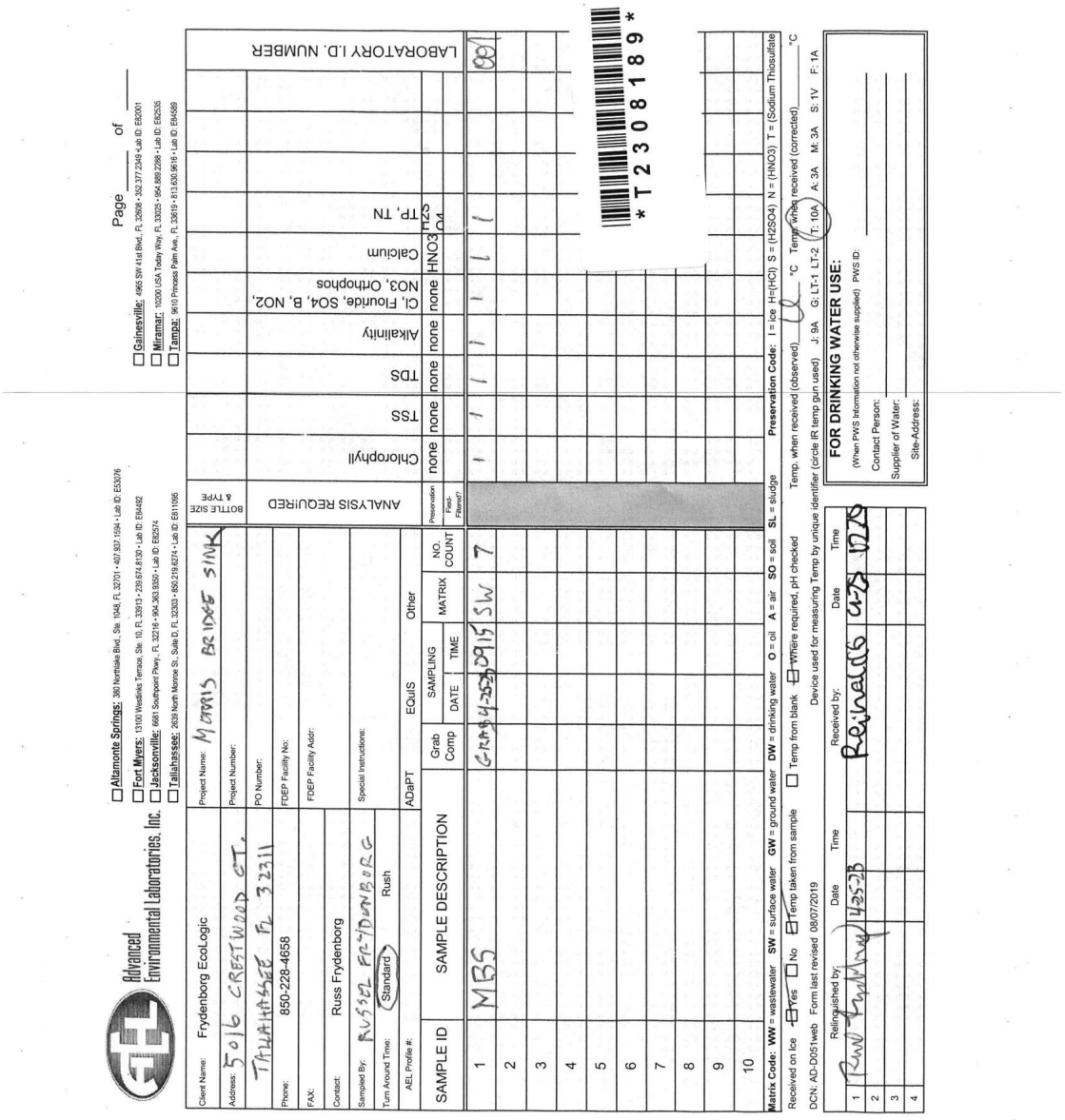
Workorder: Morris Bridge Sink (T2308189)



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