Sankofa Wetland Park Monitoring Report

April - June 2023

By: Robert R. Lane, PhD
John W. Day, PhD
Rachael G. Hunter, PhD
Comite Resources
21245 Smith Rd.
Covington, LA 70435

For: Rashida Ferdinand
Executive Director
Sankofa Community Dev. Corp.
5200 Dauphine St.
New Orleans, LA 70117

June 30, 2023

Comite Resources, Inc.
21245 Smith Road
Covington, LA 70435

John W. Day, Ph.D.
jwday@comiteres.com
Robert R. Lane, Ph.D. 225-247-3917
rlane@comiteres.com
Rachael G. Hunter, Ph.D. 225-439-3931
rhunter@comiteres.com

Sankofa Wetland Park Monitoring Report
Summary of Activities: April-June 2023

Sampling Design

A preliminary sampling design was developed, shown below, consisting of five monitoring sites (S1 through S5) set approximately equidistant and in the planned path of the linear pond of the Sankofa Wetland Park (Figure 1). The St. Bernard drainage ditch at the bridge to the Viola wastewater treatment plant is also being monitored (site SB). The wetland triangle was being monitored at the platform during 2022, however, the expansion of the wetland park has cut off access. Attempts were made to a find another sampling location, but the southeast corner of the triangle is clogged with floating aquatic vegetation as is the southwest corner, which is also guarded.

Figure 1. Location of sampling sites at the Sankofa Wetland Park (S1-S5) and the St. Bernard drainage ditch (SB).

Site visits

April 25, 2023: Comite Resources field technicians visited the Sankofa Wetland Park to carry out monthly monitoring. Dissolved oxygen, conductivity, temperature, salinity and pH were measured at monitoring sites S1 through S5 and SB using a handheld probe. The staff gauge was 30.0 cm at 12:35 pm. A river otter (*Lontra canadensis*) was spotted in the new part of the pond. Someone built a haphazard bridge crossing the pond near the triangle platform.

Figure 2. Garbage dumped at the wetland park – found on April 27th.

Dissolved oxygen was 2.3 mg/L at the bridge (SB), which flows into the wetland park, and ranged from 1.6 to 6.7 mg/L at sites S1 through S5 in the wetland park. Conductivity was 888.5 mS at the bridge, and generally decreased going west in the park from 1039.8 mS at site S1 to 635.1 mS at site S5. Salinity was 0.48 ppt at the bridge (SB), and generally decreased going west in the park from 0.55 ppt at site S1 to 0.31 ppt at site S5. Temperature was lowest at the bridge (SB), and generally increased going west into the wetland park from 22.0˚C at site S1 to 24.6˚C at site S5. pH was highest at the bridge (SB) and generally decreased going west into the wetland pond with 7.4 at site S1 and 7.3 at site S5.

Discrete water quality data from April 25, 2023.

Site	Date	DO (mg/l)	Cond. (mS)	Salinity (ppt)	Temp. (˚C)	pH	TDS (mg/L)
SB	4/25/23	2.3	888.5	0.48	20.8	7.5	0.63
S1	4/25/23	2.6	1039.8	0.55	22.0	7.4	0.72
S2	4/25/23	6.7	902.3	0.48	21.3	7.2	0.63
S3	4/25/23	1.6	833.0	0.44	22.2	7.3	0.57
S4	4/25/23	4.8	865.6	0.45	22.8	7.2	0.59
S5	4/25/23	4.7	635.1	0.31	24.6	7.3	0.42

A Great Egret at the wetland park on April 25th, 2023.

April 28, 2023: Rob Lane meet with Rashida F., Gary Shaffer and Scott Tabary to discuss issues with the pond. Alternative sources of freshwater were discussed and it was decided to pursue obtaining water from the pumping station reservoir. Dr. Shaffer proposed placing fill in the channel connecting the pond to the St. Bernard stormwater drainage system to prevent drainage of the pond. Other issues discussed were the garbage at Fats Domino Avenue and deepening the pond. It was also decided to discontinue monitoring in the wetland Triangle.

May 5, 2023: Rob Lane met with Emily Giesemann, Scott Tabary, Gary Shaffer and Rashida F. to discuss with Huy Tran options for obtaining water for the wetland pond during drought. Three options were discussed: the culvert at Tupelo St., the uptake pond at the pumpstation to the west of the park, and from the pumpstation outlet pipe. Huy Tran thought the last alternative potentially possible. Rashida mentioned that Bayou St. John has a similar system that could be used as a model. It was decided that we would all meet May 9th at 1pm at the wetland park to continue the discussion during a site visit.

May 9, 2023: Rob Lane met with Scott Tabary, Gary Shaffer and Rashida F. at the wetland park to meet with Huy Tran. Unfortunately, Huy Tran did not make the meeting. Nonetheless, the rest of the team met and it was decided that Dr. Lane would make the first draft of a white paper discussing the need for additional water input at the park – below is what was sent to the group for review.

Water Level Control in the Sankofa Wetland Park

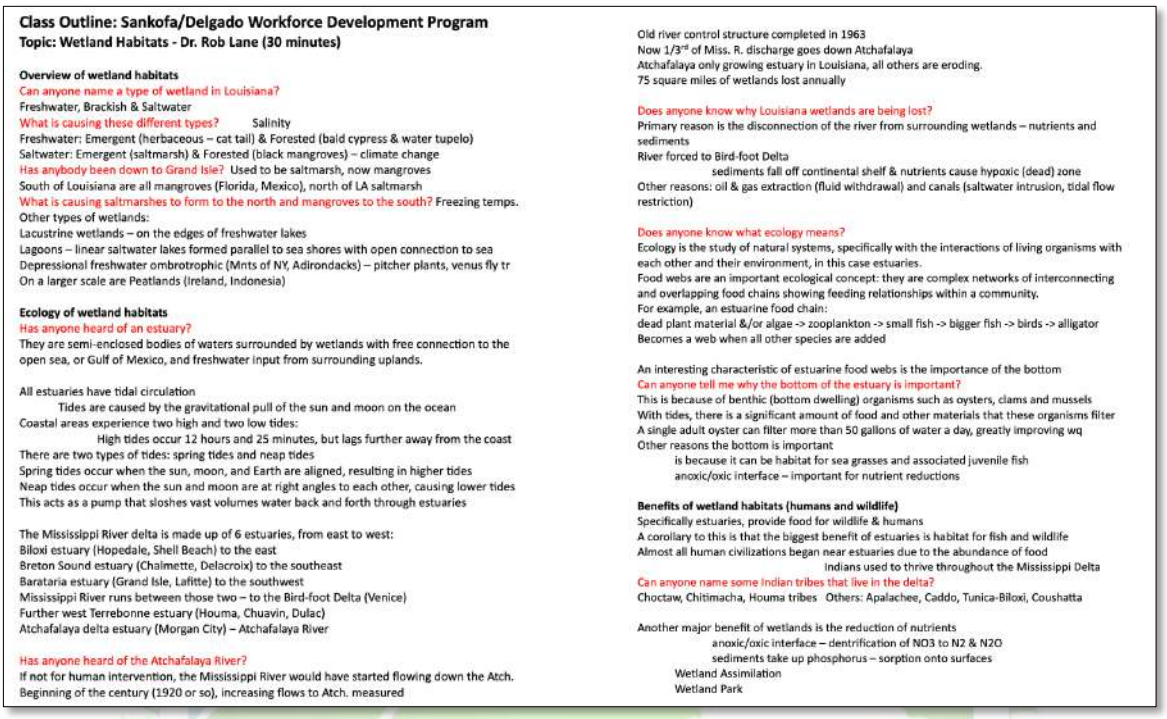
Currently, water levels in the Sankofa wetland pond are directly tied to the St. Bernard stormwater drainage canal system, which is connected at the east end of the wetland park. This has resulted in water levels in the wetland park being controlled by water levels in the St. Bernard drainage system (i.e., they are at the same level). Since the wetland park is directly connected to the St. Bernard stormwater drainage canal system, during large storms when water levels are elevated in the St. Bernard storm drainage canal system, the wetland park acts as a retention pond, holding water during peak storm discharge and then releasing it back into the drainage system. The St. Bernard and the Lower Ninth Ward storm drainage canal systems intersect near the park. The Lower Ninth Ward canal system water level, however, is maintained at -15 ft, while the St. Bernard system is kept above -7ft. The connection is at a culvert on Florida Ave. where water can be heard falling from the St. Bernard canal at around -7ft to the Ninth Ward system at -15 ft. Thus during large storms water flows into the wetland park from the St. Bernard canal system and flows out of the park partially (or mostly) through the Lower Ninth Ward canal system.

There are two main issues with the current configuration: (1) If St. Bernard Parish decides to lower water levels in their drainage canals then water levels in the wetland pond will be lowered accordingly; and (2) water levels in the park need to be raised about a foot, from about -7 ft to -6ft, due to high sections of the wetland pond bottom that are currently above water or with just a few inches of water. In order to partially solve these issues we intend to install two culverts with flap gates at the east end of the wetland park where it connects with the St. Bernard drainage canal so that water can only flow into the wetland park but not out, thus impeding drainage of the pond if water levels are lowered in the drainage canals.

There is, however, a need for additional water input into the wetland park in order to raise the water level above the high bottom elevations in the middle third of the park. Possible sources identified thus far include: (1) pumping water up from the box culvert near Tupelo St.; (2) pumping water up from the input pond of the pumping station to the west of the wetland park; and (3) diverting water from the outfall pipe of the pumping station to the west of the wetland park. Option 3 has been determined to not be feasible due to complications with the railroad that passes in between the outfall pipe and the park.

It should be noted that the very low water levels in the Lower Ninth Ward storm drainage canal system is detrimental to the Lower Ninth Ward as a whole. The soils of the Lower Ninth Ward are highly organic and formed under hydric and mostly anoxic conditions. When such soils are exposed to oxygen they rapidly breakdown, resulting in subsidence. It is for this reason that most land in the greater New Orleans metropolitan area is below sea level, with the ninth ward being at around -6ft elevation.

May 23, 2023: Rob Lane traveled to the Sankofa Park and gave a lecture on wetlands and water quality monitoring to students from Delgado. Below are notes that Dr. Lane used for the lecture.



Class Outline: Sankofa/Delgado Workforce Development Program
Topic: Wetland Habitats - Dr. Rob Lane (30 minutes)

Overview of wetland habitats
Can anyone name a type of wetland in Louisiana?
Freshwater, Brackish & Saltwater
What is causing these different types? Salinity
Freshwater: Emergent (herbaceous – cat tail) & Forested (bald cypress & water tupelo)
Saltwater: Emergent (saltmarsh) & Forested (black mangroves) – climate change
Has anybody been down to Grand Isle? Used to be saltmarsh, now mangroves
South of Louisiana are all mangroves (Florida, Mexico), north of LA saltmarsh
What is causing saltmarshes to form to the north and mangroves to the south? Freezing temps.
Other types of wetlands:
Lacustrine wetlands – on the edges of freshwater lakes
Lagoons – linear saltwater lakes formed parallel to sea shores with open connection to sea
Depressional freshwater ombrotrophic (Mnts of NY, Adirondacks) – pitcher plants, venus fly tr
On a larger scale are Peatlands (Ireland, Indonesia)

Ecology of wetland habitats
Has anyone heard of an estuary?
They are semi-enclosed bodies of waters surrounded by wetlands with free connection to the open sea, or Gulf of Mexico, and freshwater input from surrounding uplands.

All estuaries have tidal circulation
Tides are caused by the gravitational pull of the sun and moon on the ocean
Coastal areas experience two high and two low tides:
High tides occur 12 hours and 25 minutes, but lags further away from the coast
There are two types of tides: spring tides and neap tides
Spring tides occur when the sun, moon, and Earth are aligned, resulting in higher tides
Neap tides occur when the sun and moon are at right angles to each other, causing lower tides
This acts as a pump that sloshes vast volumes water back and forth through estuaries

The Mississippi River delta is made up of 6 estuaries, from east to west:
Biloxi estuary (Hopedale, Shell Beach) to the east
Breton Sound estuary (Chalmette, Delacroix) to the southeast
Barataria estuary (Grand Isle, Lafitte) to the southwest
Mississippi River runs between those two – to the Bird-foot Delta (Venice)
Further west Terrebonne estuary (Houma, Chuavin, Dulac)
Atchafalaya delta estuary (Morgan City) – Atchafalaya River

Has anyone heard of the Atchafalaya River?
If not for human intervention, the Mississippi River would have started flowing down the Atch.
Beginning of the century (1920 or so), increasing flows to Atch. measured

Old river control structure completed in 1963
Now 1/3rd of Miss. R. discharge goes down Atchafalaya
Atchafalaya only growing estuary in Louisiana, all others are eroding.
75 square miles of wetlands lost annually

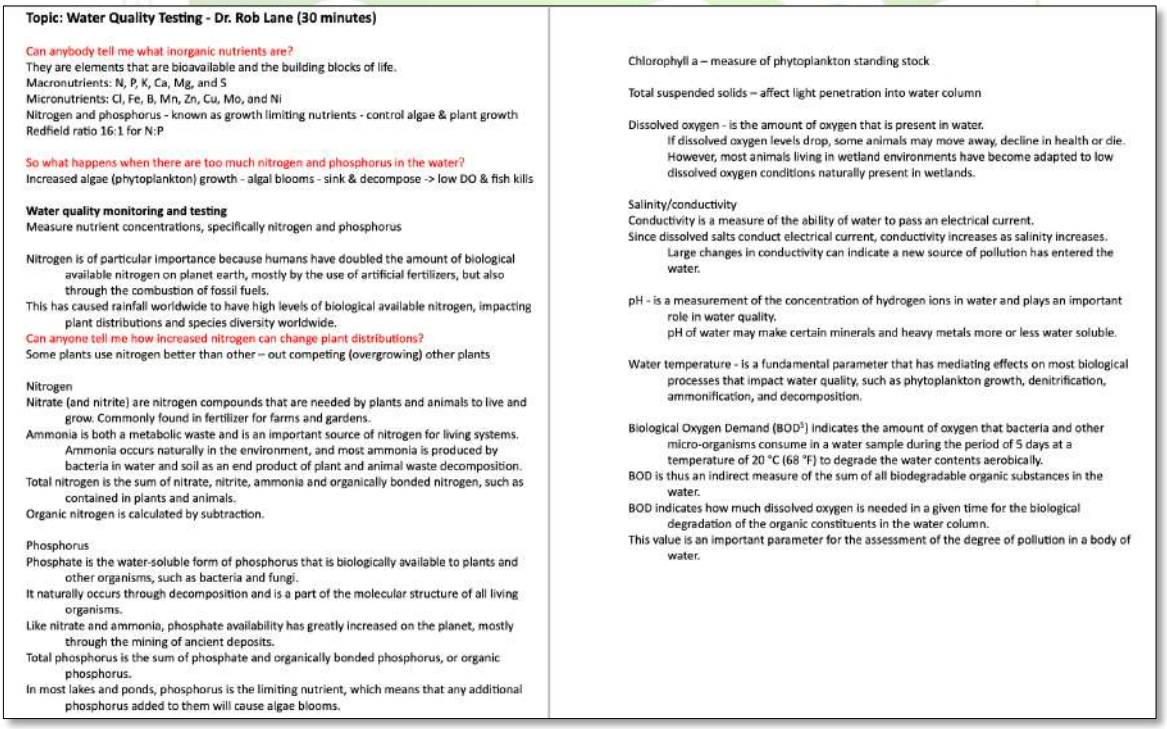
Does anyone know why Louisiana wetlands are being lost?
Primary reason is the disconnection of the river from surrounding wetlands – nutrients and sediments
River forced to Bird-foot Delta
sediments fall off continental shelf & nutrients cause hypoxic (dead) zone
Other reasons: oil & gas extraction (fluid withdrawal) and canals (saltwater intrusion, tidal flow restriction)

Does anyone know what ecology means?
Ecology is the study of natural systems, specifically with the interactions of living organisms with each other and their environment, in this case estuaries.
Food webs are an important ecological concept: they are complex networks of interconnecting and overlapping food chains showing feeding relationships within a community.
For example, an estuarine food chain:
dead plant material &/or algae -> zooplankton -> small fish -> bigger fish -> birds -> alligator
Becomes a web when all other species are added

An interesting characteristic of estuarine food webs is the importance of the bottom
Can anyone tell me why the bottom of the estuary is important?
This is because of benthic (bottom dwelling) organisms such as oysters, clams and mussels
With tides, there is a significant amount of food and other materials that these organisms filter
A single adult oyster can filter more than 50 gallons of water a day, greatly improving wq
Other reasons the bottom is important
is because it can be habitat for sea grasses and associated juvenile fish
anoxic/oxic interface – important for nutrient reductions

Benefits of wetland habitats (humans and wildlife)
Specifically estuaries, provide food for wildlife & humans
A corollary to this is that the biggest benefit of estuaries is habitat for fish and wildlife
Almost all human civilizations began near estuaries due to the abundance of food
Indians used to thrive throughout the Mississippi Delta
Can anyone name some Indian tribes that live in the delta?
Choctaw, Chitimacha, Houma tribes Others: Apalachee, Caddo, Tunica-Biloxi, Coushatta

Another major benefit of wetlands is the reduction of nutrients
anoxic/oxic interface – dentrification of NO3 to N2 & N2O
sediments take up phosphorus – sorption onto surfaces
Wetland Assimilation
Wetland Park



Topic: Water Quality Testing - Dr. Rob Lane (30 minutes)

Can anybody tell me what inorganic nutrients are?
They are elements that are bioavailable and the building blocks of life.
Macronutrients: N, P, K, Ca, Mg, and S
Micronutrients: Cl, Fe, B, Mn, Zn, Cu, Mo, and Ni
Nitrogen and phosphorus - known as growth limiting nutrients - control algae & plant growth
Redfield ratio 16:1 for N:P

So what happens when there are too much nitrogen and phosphorus in the water?
Increased algae (phytoplankton) growth - algal blooms - sink & decompose -> low DO & fish kills

Water quality monitoring and testing
Measure nutrient concentrations, specifically nitrogen and phosphorus

Nitrogen is of particular importance because humans have doubled the amount of biological available nitrogen on planet earth, mostly by the use of artificial fertilizers, but also through the combustion of fossil fuels.
This has caused rainfall worldwide to have high levels of biological available nitrogen, impacting plant distributions and species diversity worldwide.
Can anyone tell me how increased nitrogen can change plant distributions?
Some plants use nitrogen better than other – out competing (overgrowing) other plants

Nitrogen
Nitrate (and nitrite) are nitrogen compounds that are needed by plants and animals to live and grow. Commonly found in fertilizer for farms and gardens.
Ammonia is both a metabolic waste and is an important source of nitrogen for living systems. Ammonia occurs naturally in the environment, and most ammonia is produced by bacteria in water and soil as an end product of plant and animal waste decomposition.
Total nitrogen is the sum of nitrate, nitrite, ammonia and organically bonded nitrogen, such as contained in plants and animals.
Organic nitrogen is calculated by subtraction.

Phosphorus
Phosphate is the water-soluble form of phosphorus that is biologically available to plants and other organisms, such as bacteria and fungi.
It naturally occurs through decomposition and is a part of the molecular structure of all living organisms.
Like nitrate and ammonia, phosphate availability has greatly increased on the planet, mostly through the mining of ancient deposits.
Total phosphorus is the sum of phosphate and organically bonded phosphorus, or organic phosphorus.
In most lakes and ponds, phosphorus is the limiting nutrient, which means that any additional phosphorus added to them will cause algae blooms.

Chlorophyll a – measure of phytoplankton standing stock

Total suspended solids – affect light penetration into water column

Dissolved oxygen - is the amount of oxygen that is present in water.
If dissolved oxygen levels drop, some animals may move away, decline in health or die. However, most animals living in wetland environments have become adapted to low dissolved oxygen conditions naturally present in wetlands.

Salinity/conductivity
Conductivity is a measure of the ability of water to pass an electrical current.
Since dissolved salts conduct electrical current, conductivity increases as salinity increases.
Large changes in conductivity can indicate a new source of pollution has entered the water.

pH - is a measurement of the concentration of hydrogen ions in water and plays an important role in water quality.
pH of water may make certain minerals and heavy metals more or less water soluble.

Water temperature - is a fundamental parameter that has mediating effects on most biological processes that impact water quality, such as phytoplankton growth, denitrification, ammonification, and decomposition.

Biological Oxygen Demand (BOD^5) indicates the amount of oxygen that bacteria and other micro-organisms consume in a water sample during the period of 5 days at a temperature of 20 °C (68 °F) to degrade the water contents aerobically.
BOD is thus an indirect measure of the sum of all biodegradable organic substances in the water.
BOD indicates how much dissolved oxygen is needed in a given time for the biological degradation of the organic constituents in the water column.
This value is an important parameter for the assessment of the degree of pollution in a body of water.

May 23, 2023: While Dr. Lane gave the presentation to the Delgado students, Jason Day carried out monthly monitoring at the wetland park. Dissolved oxygen, conductivity, temperature, salinity and pH were measured at monitoring sites S1 through S5 and SB using a handheld probe. The staff gauge was 39.0 cm at 11:12 am. The river otter (*Lontra canadensis*) was again spotted in the new part of the pond. Water samples for nutrient (NOx, NH_3, TN, PO4, TP), BOD_5 and sediment analysis were collected at sites S1 through S5 and SB, and put on ice for transport to Pace Analytical in Baton Rouge for analysis. It should be noted that the laboratory mishandled the samples and thus these will be retaken in June.

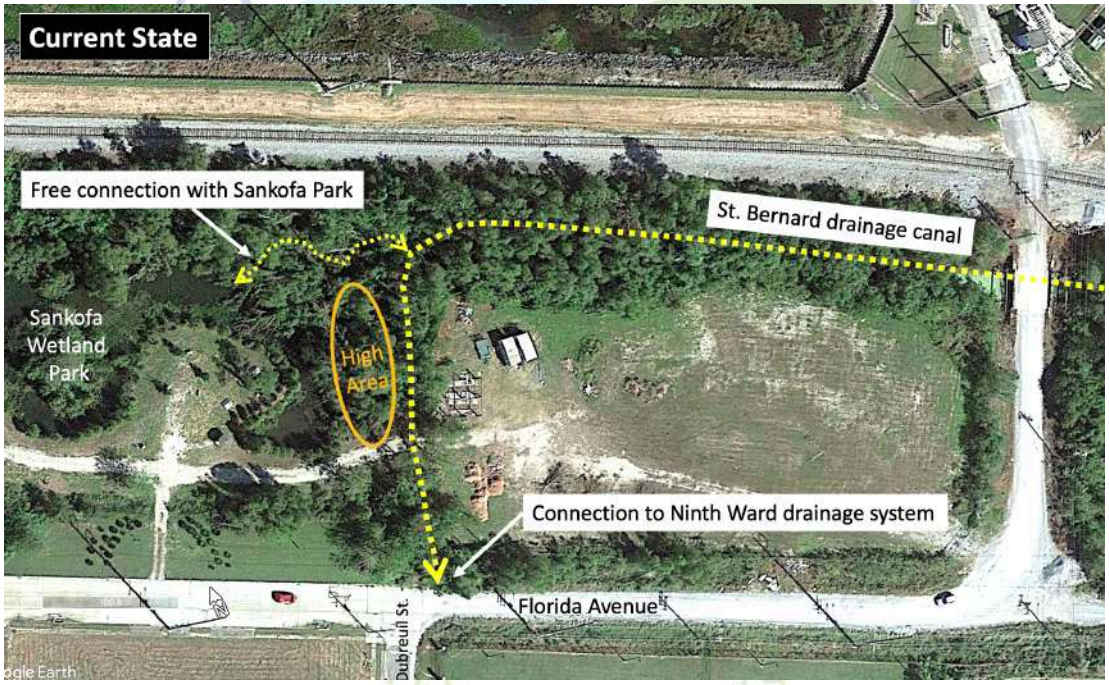
Discrete water quality data from May 23, 2023.

Site	Date	DO (mg/l)	Cond. (mS)	Salinity (ppt)	Temp. (˚C)	pH	TDS (mg/L)
SB	5/23/23	3.8	841.7	0.43	24.1	6.7	0.56
S1	5/23/23	4.1	965.6	0.48	25.3	6.9	0.62
S2	5/23/23	1.0	906.4	0.42	21.3	7.3	0.55
S3	5/23/23	3.9	872.0	0.40	29.5	7.3	0.52
S4	5/23/23	1.1	914.2	0.41	30.1	7.1	0.54
S5	5/23/23	1.0	636.5	0.29	29.3	7.1	0.38

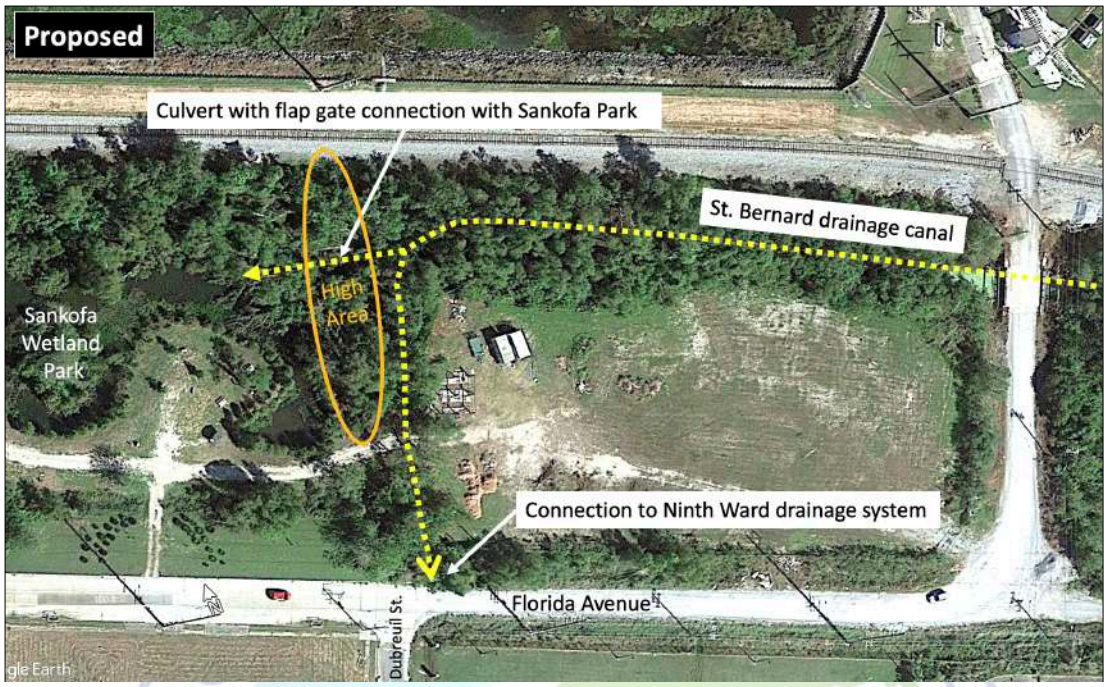
A river otter (Lontra canadensis) in the new part of the pond on May 23rd, 2023.

Dissolved oxygen was 3.8 mg/L at the bridge (SB), and ranged from 1.0 to 4.1 mg/L at sites S1 through S5 in the wetland park. Conductivity was 841.7 mS at the bridge, and generally decreased going west in the park from 965.6 mS at site S1 to 636.5 mS at site S5. Salinity was 0.43 ppt at the bridge (SB), and generally decreased going west in the park from 0.48 ppt at site S1 to 0.29 ppt at site S5. Temperature was lowest (24.1˚C) at the bridge (SB), and generally increased going west into the wetland park from 21.3˚C at site S2 to 30.1˚C at site S4. pH was lowest (6.7) at the bridge (SB) and generally decreased going west into the wetland pond with 6.9 at site S1 and 7.3 at site S3.

June 5, 2023: Rob Lane met virtually with Tom Willis, Gary Shaffer and Rashida F. concerning the instillation of flap gates at the Sankofa park. Dr. Lane agreed to provide a schematic of the proposed changes to the park, shown below.



In order to partially solve these issues we propose to install two culverts with flap gates at the east end of the wetland park where it connects with the St. Bernard drainage canal so that water can only flow into the wetland park but not out, thus impeding drainage of the pond if water levels are lowered in the drainage canals. This configuration will also increase the residence time of stormwater in the wetland park, allowing for further processing of the water by the wetland system.



We would like to be informed of when any significant drawdowns will occur. We also would like to know the invert elevation of the stormwater pipes located near the corner of Mustang and Aycock streets.

June 6, 2023: Comite Resources field technicians visited the Sankofa Wetland Park to carry out monthly monitoring. Dissolved oxygen, conductivity, temperature, salinity and pH were measured at monitoring sites S1 through S5 and SB using a handheld probe. Water samples for nutrient (NOx, NH_3, TN, PO4, TP), BOD_5 and sediment analysis were collected at sites S1 through S5 and SB, and put on ice for transport to Pace Analytical in Baton Rouge for analysis. The staff gauge was 27.0 cm at 10:30 am.

Discrete water quality data from June 6, 2023.

Site	Date	DO (mg/l)	Cond. (mS)	Salinity (ppt)	Temp. (˚C)	pH	TDS (mg/L)
SB	6/6/23	5.0	823.3	0.40	25.5	6.8	0.53
S1	6/6/23	4.8	1126.5	0.56	25.1	6.9	0.73
S2	6/6/23	5.8	911.3	0.44	26.0	7.2	0.58
S3	6/6/23	4.8	1001.6	0.48	26.0	6.9	0.56
S4	6/6/23	7.0	1054.1	0.50	27.9	7.5	0.66
S5	6/6/23	6.3	794.1	0.35	27.1	7.0	0.49

Dissolved oxygen was 5.0 mg/L at the bridge (SB), and ranged from 4.8 to 7.0 mg/L at sites S1 through S5 in the wetland park. Conductivity was 823.3 mS at the bridge, and generally decreased going west in the park from 1126.5 mS at site S1 to 794.1 mS at site S5. Salinity was 0.40 ppt at the

bridge (SB), and generally decreased going west in the park from 0.56 ppt at site S1 to 0.35 ppt at site S5. Temperature was 25.5˚C at the bridge (SB), and generally increased going west into the wetland park from 25.1˚C at site S1 to 27.9˚C at site S4. pH was lowest (6.8) at the bridge (SB) and ranged from 6.9 to 7.5 in the wetland park.

*Black-bellied whistling-ducks (*Dendrocygna autumnalis*)* at the wetland park on June 6th, 2023.

Water quality results from June 6, 2023.

Site	Date	NO_x (mg/L)	NH_3 (mg/L)	TN (mg/L)	PO_4 (mg/L)	TP (mg/L)	TSS (mg/L)	BOD_5 (mg/L)
SB	6/6/2023	0.074	7.0	7.9	0.607	0.81	14	6
S1	6/6/2023	<0.05	0.12	1.7	0.313	0.36	11	5
S2	6/6/2023	<0.05	<0.10	0.98	<0.05	<0.10	8	3
S3	6/6/2023	<0.05	<0.10	2.3	<0.05	0.26	156	6
S4	6/6/2023	<0.05	<0.10	2.6	<0.05	0.21	62	9
S5	6/6/2023	<0.05	<0.10	2.2	<0.05	0.23	36	12

Nitrate+nitrite (NO_x) concentrations were 0.07 mg/L at the Bridge site (SB) and below detection (<0.05 mg/L) at the wetland park sites (sites S1-S5). Ammonia (NH_3) concentrations were 7.0 mg/L at the Bridge while much lower at the wetland park with 0.12 mg/L at site S1 and below detection (0.10 mg/L) at the rest of the wetland sites. Total nitrogen (TN) concentrations were 7.9 mg/L at the Bridge, and ranged from 0.98 to 2.6 mg/L at the wetland park sites. Phosphate (PO_4) concentrations were 0.61 mg/L at the Bridge, 0.31 mg/L at site S1, and below detection (<0.05 mg/L) at sites S2-S5. Total phosphorus (TP) was 0.81 mg/L at the Bridge, 0.36 mg/L at site S1, below detection (<0.10 mg/L) at site S2, and ranged

from 0.21 to 0.26 mg/L at sites S3-S5. Total suspended solids (TSS) concentrations were 14 mg/L at the Bridge, 11 mg/L at site S1, 8 mg/L at site S2, a whopping 156 mg/L at site S3 (presumably due to very shallow water at that site being disturbed by humans crossing there), 62 mg/L at site S4 and 36 mg/L at site S5. Five-day biological oxygen demand (BOD_5) was 6 mg/L at the Bridge, and ranged from 3 to 12 mg/L at the wetland park sites.

Avian Survey

A total of 28 bird species were observed in April, 22 species in May, and 21 species in June.

Bird species observed at the Sankofa Wetland Park for Q2 2023.

Common Name	Scientific Name	4/25/23	5/23/23	6/6/23
American Crow	*Corvus brachyrhynchos*		X	X
Anhinga	*Anhinga anhinga*	X	X	
Bald Eagle	*Haliaeetus leucocephalus*	X		
Black-Winged Stilt	*Himantopus himantopus*	X	X	X
Black Vulture	*Coragyps atratus*		X	X
Black-Bellied Whistling-Duck	*Dendrocygna autumnalis*			X
Blue Grosbeak	*Passerina caerulea*	X		
Blue Jay	*Cyanocitta cristata*	X	X	X
Carolina Chicadee	*Poecile carolinensis*	X	X	X
Carolina Wren	*Thryothorus ludovicianus*	X		
Common Grackel	*Quiscalus quiscula*		X	
Common Moorhen	*Gallinula chloropus*	X		
Common Tern	*Sterna hirundo*	X		
Eastern Phoebe	*Sayornis phoebe*	X		
European Starling	*Sturnus Vulgaris*	X	X	X
Fish Crow	*Corvus ossifragus*	X		
Great Blue Heron	*Ardea herodias*	X		
Great Erget	*Ardea alba*	X	X	X
Green Heron	*Butorides virescens*	X	X	X
Killdeer	*Charadrius vociferus*	X	X	X
Laughing Gull	*Larus atricilla*	X		
Limpkin	*Aramus guarauna*	X	X	X
Little Blue Heron	*Egretta caerlea*	X		
Mississippi Kite	*Ictinia mississippiensis*		X	X
Mockingbird	*Mimus polyglottos*	X	X	X
Mourning Dove	*Zenaida macroura*	X	X	X
Northern Cardinal	*Cardinalis cardinalis*	X	X	X
Prothonotary Warbler	*Protonotaria citrea*			X
Red-BelliedWoodpecker	*Melanerpes carolinus*	X		
Red Shouldered Hawk	*Buteo lineatus*		X	
Red Tailed Hawk	*Buteo jamaicensis*		X	
Red Winged Blackbird	*Agelaius phoeniceus*	X	X	X
Snowy Egret	*Egretta thula*		X	X
Tree Swallow	*Tachycineta bicolor*	X		
Tuffted Titmouse	*Baeolophus bicolor*	X		
White Ibis	*Eudocimus albus*	X	X	X
Yellow-Billed Cuckoo	*Coccyzus americanus*		X	X
Yellow-Crowned Night-Heron	*Nyctanassa violacea*			X
Yellow-Rumped Warbler	*Setophaga coronata*	X		

Detect Summary

Results and Detection Limits are adjusted for dilution and moisture when applicable

SM 2540 D-2011

Lab ID	Client ID	Parameter	Units	Result	Dil.	%Moist
22306065901	BRIDGE	Total Suspended Solids	mg/L	14	1	NA
22306065902	S1	Total Suspended Solids	mg/L	11	1	NA
22306065903	S2	Total Suspended Solids	mg/L	8	1	NA
22306065904	S3	Total Suspended Solids	mg/L	156	1	NA
22306065905	S4	Total Suspended Solids	mg/L	62	1	NA
22306065906	S5	Total Suspended Solids	mg/L	36	1	NA

SM 4500-P E-2011

Lab ID	Client ID	Parameter	Units	Result	Dil.	%Moist
22306065901	BRIDGE	Ortho Phosphate - P	mg/L-P	0.607	1	NA
22306065902	S1	Ortho Phosphate - P	mg/L-P	0.313	1	NA

SM 5210 B-2016

Lab ID	Client ID	Parameter	Units	Result	Dil.	%Moist
22306065901	BRIDGE	BOD	mg/L	6	1	NA
22306065902	S1	BOD	mg/L	5	1	NA
22306065903	S2	BOD	mg/L	3	1	NA
22306065904	S3	BOD	mg/L	6	1	NA
22306065905	S4	BOD	mg/L	9	1	NA
22306065906	S5	BOD	mg/L	12	1	NA

Sample Results

BRIDGE

Collect Date	06/06/2023 09:45	**Lab ID**	22306065901
Receive Date	06/06/2023 14:24	**Matrix**	Water

SM 2540 D-2011

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
NA	NA	NA	1	06/07/23 10:08	767156	AMH	NA

CAS#	Parameter	Result	LOQ	Units
C-009	**Total Suspended Solids**	**14**	**5**	mg/L

SM 4500-P E-2011

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
NA	NA	NA	1	06/06/23 14:43	767141	RYC	NA

CAS#	Parameter	Result	LOQ	Units
14265-44-2	**Ortho Phosphate - P**	**0.607**	**0.050**	mg/L-P

SM 5210 B-2016

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
06/07/23 11:40	767158	BOD PREP	1	06/07/23 11:40	767618	MLG	NA

CAS#	Parameter	Result	LOQ	Units
C-002	**BOD**	**6**	**3**	mg/L

Subcontract Work

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
NA	NA	Subcontract Work	1	06/21/23 16:05	NA	CW	NA

CAS#	Parameter	Result	LOQ	Units
SHIP-000	Ship Result	*		mg/L

S1

Collect Date	06/06/2023 10:00	**Lab ID**	22306065902
Receive Date	06/06/2023 14:24	**Matrix**	Water

SM 2540 D-2011

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
NA	NA	NA	1	06/07/23 10:08	767156	AMH	NA

CAS#	Parameter	Result	LOQ	Units
C-009	**Total Suspended Solids**	**11**	**5**	mg/L

Sample Results

S1

Collect Date	06/06/2023 10:00	**Lab ID**	22306065902
Receive Date	06/06/2023 14:24	**Matrix**	Water

SM 4500-P E-2011

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
NA	NA	NA	1	06/06/23 14:44	767141	RYC	NA

CAS#	Parameter	Result	LOQ	Units
14265-44-2	**Ortho Phosphate - P**	**0.313**	**0.050**	mg/L-P

SM 5210 B-2016

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
06/07/23 11:40	767158	BOD PREP	1	06/07/23 11:40	767618	MLG	NA

CAS#	Parameter	Result	LOQ	Units
C-002	**BOD**	**5**	**3**	mg/L

Subcontract Work

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
NA	NA	Subcontract Work	1	06/21/23 16:05	NA	CW	NA

CAS#	Parameter	Result	LOQ	Units
SHIP-000	Ship Result	*		mg/L

S2

Collect Date	06/06/2023 10:15	**Lab ID**	22306065903
Receive Date	06/06/2023 14:24	**Matrix**	Water

SM 2540 D-2011

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
NA	NA	NA	1	06/07/23 10:08	767156	AMH	NA

CAS#	Parameter	Result	LOQ	Units
C-009	**Total Suspended Solids**	**8**	**5**	mg/L

SM 4500-P E-2011

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
NA	NA	NA	1	06/06/23 14:44	767141	RYC	NA

CAS#	Parameter	Result	LOQ	Units
14265-44-2	Ortho Phosphate - P	ND	0.050	mg/L-P

Sample Results

S2

Collect Date	06/06/2023 10:15	**Lab ID**	22306065903
Receive Date	06/06/2023 14:24	**Matrix**	Water

SM 5210 B-2016

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
06/07/23 11:40	767158	BOD PREP	1	06/07/23 11:40	767618	MLG	NA

CAS#	Parameter	Result	LOQ	Units
C-002	**BOD**	**3**	**3**	mg/L

Subcontract Work

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
NA	NA	Subcontract Work	1	06/21/23 16:05	NA	CW	NA

CAS#	Parameter	Result	LOQ	Units
SHIP-000	Ship Result	*		mg/L

S3

Collect Date	06/06/2023 10:30	**Lab ID**	22306065904
Receive Date	06/06/2023 14:24	**Matrix**	Water

SM 2540 D-2011

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
NA	NA	NA	1	06/07/23 10:08	767156	AMH	NA

CAS#	Parameter	Result	LOQ	Units
C-009	**Total Suspended Solids**	**156**	**5**	mg/L

SM 4500-P E-2011

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
NA	NA	NA	1	06/06/23 14:45	767141	RYC	NA

CAS#	Parameter	Result	LOQ	Units
14265-44-2	Ortho Phosphate - P	ND	0.050	mg/L-P

SM 5210 B-2016

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
06/07/23 11:40	767158	BOD PREP	1	06/07/23 11:40	767618	MLG	NA

CAS#	Parameter	Result	LOQ	Units
C-002	**BOD**	**6**	**3**	mg/L

Sample Results

S3

Collect Date	06/06/2023 10:30	**Lab ID**	22306065904
Receive Date	06/06/2023 14:24	**Matrix**	Water

Subcontract Work

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
NA	NA	Subcontract Work	1	06/21/23 16:05	NA	CW	NA

CAS#	Parameter	Result	LOQ	Units
SHIP-000	Ship Result	*		mg/L

S4

Collect Date	06/06/2023 10:45	**Lab ID**	22306065905
Receive Date	06/06/2023 14:24	**Matrix**	Water

SM 2540 D-2011

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
NA	NA	NA	1	06/07/23 16:21	767176	AMH	NA

CAS#	Parameter	Result	LOQ	Units
C-009	**Total Suspended Solids**	**62**	**5**	mg/L

SM 4500-P E-2011

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
NA	NA	NA	1	06/06/23 14:46	767141	RYC	NA

CAS#	Parameter	Result	LOQ	Units
14265-44-2	Ortho Phosphate - P	ND	0.050	mg/L-P

SM 5210 B-2016

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
06/07/23 11:40	767158	BOD PREP	1	06/07/23 11:40	767618	MLG	NA

CAS#	Parameter	Result	LOQ	Units
C-002	**BOD**	**9**	**3**	mg/L

Subcontract Work

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
NA	NA	Subcontract Work	1	06/21/23 16:05	NA	CW	NA

CAS#	Parameter	Result	LOQ	Units
SHIP-000	Ship Result	*		mg/L

Sample Results

S5				
	Collect Date	06/06/2023 11:00	Lab ID	22306065906
	Receive Date	06/06/2023 14:24	Matrix	Water

SM 2540 D-2011

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
NA	NA	NA	1	06/07/23 16:21	767176	AMH	NA

CAS#	Parameter	Result	LOQ	Units
C-009	**Total Suspended Solids**	**36**	**5**	mg/L

SM 4500-P E-2011

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
NA	NA	NA	1	06/06/23 14:46	767141	RYC	NA

CAS#	Parameter	Result	LOQ	Units
14265-44-2	Ortho Phosphate - P	ND	0.050	mg/L-P

SM 5210 B-2016

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
06/07/23 11:40	767158	BOD PREP	1	06/07/23 11:40	767618	MLG	NA

CAS#	Parameter	Result	LOQ	Units
C-002	**BOD**	**12**	**3**	mg/L

Subcontract Work

Prep Date	Prep Batch	Prep Method	Dilution	Run Date	Run Batch	Analyst	%Moisture
NA	NA	Subcontract Work	1	06/21/23 16:05	NA	CW	NA

CAS#	Parameter	Result	LOQ	Units
SHIP-000	Ship Result	*		mg/L

Pace Analytical Services, LLC
1000 Riverbend Blvd - Suite F
St. Rose, LA 70087
(504)469-0333

ANALYTICAL RESULTS

Project: 223060659 / Comite
Pace Project No.: 20279711

Sample: Bridge **Lab ID: 20279711001** Collected: 06/06/23 09:45 Received: 06/08/23 14:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Total Nitrogen Calculation	Analytical Method: 40CFR PART 432.2 Pace Analytical Services - New Orleans							
Nitrogen	**7.9**	mg/L	0.15	1		06/19/23 17:20	7727-37-9	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2 Pace Analytical Services - New Orleans							
Nitrogen, Kjeldahl, Total	**7.8**	mg/L	0.10	1	06/12/23 11:12	06/17/23 15:24	7727-37-9	D4,M1
365.4 Total Phosphorus	Analytical Method: EPA 365.4 Preparation Method: EPA 365.4 Pace Analytical Services - New Orleans							
Phosphorus	**0.81**	mg/L	0.10	1	06/12/23 11:12	06/20/23 12:49	7723-14-0	
4500 Ammonia Water	Analytical Method: SM 4500-NH3 G Pace Analytical Services - New Orleans							
Nitrogen, Ammonia	**7.0**	mg/L	1.0	10		06/15/23 15:18	7664-41-7	D4
4500NO3-F, NO3-NO2	Analytical Method: SM 4500-NO3 F Pace Analytical Services - New Orleans							
Nitrogen, NO2 plus NO3	**0.074**	mg/L	0.050	1		06/16/23 13:08		

Sample: S1 **Lab ID: 20279711002** Collected: 06/06/23 10:00 Received: 06/08/23 14:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Total Nitrogen Calculation	Analytical Method: 40CFR PART 432.2 Pace Analytical Services - New Orleans							
Nitrogen	**1.7**	mg/L	0.15	1		06/19/23 17:20	7727-37-9	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2 Pace Analytical Services - New Orleans							
Nitrogen, Kjeldahl, Total	**1.7**	mg/L	0.10	1	06/12/23 11:12	06/17/23 15:26	7727-37-9	
365.4 Total Phosphorus	Analytical Method: EPA 365.4 Preparation Method: EPA 365.4 Pace Analytical Services - New Orleans							
Phosphorus	**0.36**	mg/L	0.10	1	06/12/23 11:12	06/20/23 12:49	7723-14-0	
4500 Ammonia Water	Analytical Method: SM 4500-NH3 G Pace Analytical Services - New Orleans							
Nitrogen, Ammonia	**0.12**	mg/L	0.10	1		06/15/23 15:19	7664-41-7	
4500NO3-F, NO3-NO2	Analytical Method: SM 4500-NO3 F Pace Analytical Services - New Orleans							
Nitrogen, NO2 plus NO3	ND	mg/L	0.050	1		06/16/23 13:10		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1000 Riverbend Blvd - Suite F
St. Rose, LA 70087
(504)469-0333

ANALYTICAL RESULTS

Project: 223060659 / Comite
Pace Project No.: 20279711

Sample: S2 **Lab ID: 20279711003** Collected: 06/06/23 10:15 Received: 06/08/23 14:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Total Nitrogen Calculation	Analytical Method: 40CFR PART 432.2 Pace Analytical Services - New Orleans							
Nitrogen	**0.98**	mg/L	0.15	1		06/19/23 17:20	7727-37-9	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2 Pace Analytical Services - New Orleans							
Nitrogen, Kjeldahl, Total	**0.98**	mg/L	0.10	1	06/12/23 11:12	06/17/23 15:28	7727-37-9	
365.4 Total Phosphorus	Analytical Method: EPA 365.4 Preparation Method: EPA 365.4 Pace Analytical Services - New Orleans							
Phosphorus	ND	mg/L	0.10	1	06/12/23 11:12	06/20/23 12:50	7723-14-0	
4500 Ammonia Water	Analytical Method: SM 4500-NH3 G Pace Analytical Services - New Orleans							
Nitrogen, Ammonia	ND	mg/L	0.10	1		06/15/23 15:21	7664-41-7	
4500NO3-F, NO3-NO2	Analytical Method: SM 4500-NO3 F Pace Analytical Services - New Orleans							
Nitrogen, NO2 plus NO3	ND	mg/L	0.050	1		06/16/23 13:11		

Sample: S3 **Lab ID: 20279711004** Collected: 06/06/23 10:30 Received: 06/08/23 14:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Total Nitrogen Calculation	Analytical Method: 40CFR PART 432.2 Pace Analytical Services - New Orleans							
Nitrogen	**2.3**	mg/L	0.15	1		06/19/23 17:20	7727-37-9	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2 Pace Analytical Services - New Orleans							
Nitrogen, Kjeldahl, Total	**2.3**	mg/L	0.10	1	06/12/23 11:12	06/17/23 15:29	7727-37-9	
365.4 Total Phosphorus	Analytical Method: EPA 365.4 Preparation Method: EPA 365.4 Pace Analytical Services - New Orleans							
Phosphorus	**0.26**	mg/L	0.10	1	06/12/23 11:12	06/20/23 12:50	7723-14-0	
4500 Ammonia Water	Analytical Method: SM 4500-NH3 G Pace Analytical Services - New Orleans							
Nitrogen, Ammonia	ND	mg/L	0.10	1		06/15/23 15:22	7664-41-7	
4500NO3-F, NO3-NO2	Analytical Method: SM 4500-NO3 F Pace Analytical Services - New Orleans							
Nitrogen, NO2 plus NO3	ND	mg/L	0.050	1		06/16/23 13:12		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1000 Riverbend Blvd - Suite F
St. Rose, LA 70087
(504)469-0333

ANALYTICAL RESULTS

Project: 223060659 / Comite
Pace Project No.: 20279711

Sample: S4 **Lab ID: 20279711005** Collected: 06/06/23 10:45 Received: 06/08/23 14:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Total Nitrogen Calculation	Analytical Method: 40CFR PART 432.2 Pace Analytical Services - New Orleans							
Nitrogen	**2.6**	mg/L	0.15	1		06/19/23 17:20	7727-37-9	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2 Pace Analytical Services - New Orleans							
Nitrogen, Kjeldahl, Total	**2.6**	mg/L	0.10	1	06/12/23 11:12	06/17/23 15:31	7727-37-9	
365.4 Total Phosphorus	Analytical Method: EPA 365.4 Preparation Method: EPA 365.4 Pace Analytical Services - New Orleans							
Phosphorus	**0.21**	mg/L	0.10	1	06/12/23 11:12	06/20/23 12:51	7723-14-0	
4500 Ammonia Water	Analytical Method: SM 4500-NH3 G Pace Analytical Services - New Orleans							
Nitrogen, Ammonia	ND	mg/L	0.10	1		06/15/23 15:26	7664-41-7	
4500NO3-F, NO3-NO2	Analytical Method: SM 4500-NO3 F Pace Analytical Services - New Orleans							
Nitrogen, NO2 plus NO3	ND	mg/L	0.050	1		06/16/23 13:13		

Sample: S5 **Lab ID: 20279711006** Collected: 06/06/23 11:00 Received: 06/08/23 14:00 Matrix: Water

Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Total Nitrogen Calculation	Analytical Method: 40CFR PART 432.2 Pace Analytical Services - New Orleans							
Nitrogen	**2.2**	mg/L	0.15	1		06/19/23 17:20	7727-37-9	
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2 Pace Analytical Services - New Orleans							
Nitrogen, Kjeldahl, Total	**2.2**	mg/L	0.10	1	06/12/23 11:12	06/17/23 15:31	7727-37-9	
365.4 Total Phosphorus	Analytical Method: EPA 365.4 Preparation Method: EPA 365.4 Pace Analytical Services - New Orleans							
Phosphorus	**0.23**	mg/L	0.10	1	06/12/23 11:12	06/20/23 12:52	7723-14-0	
4500 Ammonia Water	Analytical Method: SM 4500-NH3 G Pace Analytical Services - New Orleans							
Nitrogen, Ammonia	ND	mg/L	0.10	1		06/15/23 15:28	7664-41-7	
4500NO3-F, NO3-NO2	Analytical Method: SM 4500-NO3 F Pace Analytical Services - New Orleans							
Nitrogen, NO2 plus NO3	ND	mg/L	0.050	1		06/16/23 13:14		

REPORT OF LABORATORY ANALYSIS