

Sankofa Wetland Park Monitoring Report

April – June 2024



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Sankofa Wetland Park Monitoring Report

Summary of Activities: April-June 2024

Monitoring Sampling Design

Environmental monitoring at the Sankofa Wetland Park began in January 2022. The sampling design consists of five monitoring locations (S1 through S5) set approximately equidistant along the mile long length of the linear park. The St. Bernard drainage ditch accessed at the bridge to the Viola Water treatment plant is also being monitored (site SB), as well as a site in the Bayou Bienvenue Wetland Triangle (site T1). In 2022, only sites S1 and S2 were monitored. Sites S3-S5, as well as SB and T1 were added as the wetland park was expanded in 2023.



Location of sampling sites at the Sankofa Wetland Park (S1-S5), the St. Bernard drainage ditch (SB), and the Bayou Bienvenue Wetland Triangle (site T1).

Water quality monitoring has been carried out at the sites described above since January 2022. Every month, dissolved oxygen, conductivity, temperature, salinity, pH and total dissolved solids are measured using a handheld probe at each monitoring location. Every three months, water samples are collected for nutrient (NO_2+NO_3 , NH_3 , TN, PO_4 , TP), BOD_5 and suspended sediment (TSS), and more recently fecal coliform analysis. Samples are put on ice and transported to Pace Analytical Services in Baton Rouge for analysis.

Site visits

April 30, 2024: Jason day traveled to the Sankofa wetland park to carry out monthly monitoring. Dissolved oxygen, conductivity, temperature, salinity and pH were measured at monitoring sites S1 through S5, SB, and at boardwalk on the wetland triangle (T2), using a handheld probe. An avian census was carried out by sight and sound. The staff gauge was at 71.0 cm at 2:50pm.



The aerator working at site S1 – it was stolen shortly after this pic was taken on April 30, 2024.

Dissolved oxygen was 1.6 mg/L at the SB site, ranged from 0.9 to 13.8 mg/L at the wetland park sites, with generally increasing oxygen availability going westward. DO was 11.1 mg/L at the wetland triangle site (T2). Conductivity was ~816 mS at the SB site, and ranged from ~825 mS to ~553 mS at the wetland park sites. The wetland triangle site (T2) had a conductivity reading of ~2693 mS. Salinity was 0.40 ppt at the SB site,

ranged from 0.25 to 0.42 ppt at the wetland park sites, and was 1.37 ppt at site T2. Water temperature ranged from 22.2 to 29.5°C and pH ranged from 6.9 to 8.3 at the wetland park sites. Total dissolved solids (TDS) concentrations were not measured due to probe failure.

Discrete water quality data from April 30, 2024.

Site	Date	DO (mg/l)	Cond. (mS)	Salinity (ppt)	Temp. (°C)	pH	TDS (mg/L)
SB	4/30/24	1.6	816.7	0.40	25.8	7.1	.
S1	4/30/24	3.1	811.1	0.42	23.2	6.9	.
S2	4/30/24	0.9	573.4	0.30	22.2	7.2	.
S3	4/30/24	8.4	720.8	0.34	26.8	7.4	.
S4	4/30/24	11.8	825.5	0.37	29.5	8.0	.
S5	4/30/24	13.8	553.4	0.25	26.4	8.3	.
T2	4/30/24	11.1	2693.7	1.37	26.2	7.7	.

May 15, 2024: Dr. Rob Lane collected water samples for nutrient, TSS, and BOD₅ as part of quarterly monitoring. In addition, samples for fecal coliform analysis were also collected. The SB sample was collected in the St. Bernard drainage canal about 30 m west of the usual location at the bridge to Viola Water treatment plant where the first leaking sewage pipe was located. TSS and BOD₅ samples were inadvertently spilled at the laboratory and could not be analyzed. See the report appended to this document that details the septic leak issue and associated data.

Water quality results from May 15, 2024.

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)	Fecal Coliform (CFU/100mL)
SB	5/15/24	<0.100	6.6	11.7	1.5	1.6	373	12.7	340
S1	5/15/24	<0.100	4.2	3.7	0.84	0.93	<10.0	15.4	1670
S2	5/15/24	<0.100	<0.10	<0.10	0.14	0.29	20.4	6.8	910
S3	5/15/24	<0.100	<0.10	<0.10	<0.050	<0.10	<10.0	4.4	30
S4	5/15/24	<0.100	<0.10	<0.10	<0.050	<0.10	10.0	25.4	70
S5	5/15/24	<0.100	<0.10	0.77	<0.050	<0.10	<10.0	36.1	10
T2	5/15/24	<0.100	0.13	5.9	0.22	0.80	.	.	<10

Nitrate+nitrite (NO_x) concentrations were below detection (0.1 mg/L) at all of the monitoring sites. Ammonia (NH₃) concentrations were **6.6 mg/L at site SB, which is very high**, 4.2 mg/L at site S1, below detection (<0.10 mg/L) at the other wetland park sites (S2-S5), and 0.13 mg/L at site T2. Total nitrogen (TN) concentrations were **11.7 mg/L at the bridge site (SB), which is very high**, 3.7 mg/L at site S1, below detection (<0.10 mg/L) at sites S2, S3 and S4, 0.77 mg/L at site S5, and 5.9 mg/L at site T2. Phosphate (PO₄) concentrations were 1.5 mg/L at site SB, 0.84 mg/L at site S1, 0.14 mg/L at site S2, below detection (<0.05 mg/L) at sites S2-S5, and 0.22 mg/L at site T2. Total phosphorus (TP) concentrations were 1.6 mg/L at site SB, 0.93 mg/L at site S1, 0.29 at site S2, below detection (<0.10 mg/L) at sites S2-S5, and 0.80 mg/L at site T2. Total suspended solids (TSS) concentrations were **373 mg/L at site SB, which is relatively high**, and ranged from below detection (<10.0 mg/L) to 20.4 mg/L at the wetland park sites. Five-day biological oxygen demand (BOD₅) was 12.7 mg/L at site SB, 15.4 mg/L at

site S1, 6.8 mg/L at site S2, 4.4 mg/L at site S3, 25.4 mg/L at site S4, and 36.1 mg/L at site S5 - **all of these values are high**. Fecal coliform concentrations were 340 CFU/100mL at the bridge site (SB), **1670 CFU/100mL at site S1, 910 CFU/100mL at site S2**, 20 CFU/100mL at site S3, 70 CFU/100mL at site S4, 70 CFU/100mL at site S5, and below detection (<10 CFU/100mL) at site T2. **For comparison, the limit for fecal coliform exiting a WTP is 300 CFU/100mL.**

May 23, 2024: Jason Day and Rob Lane carried out monthly monitoring at the wetland park. Dissolved oxygen, conductivity, temperature, salinity and pH were measured at monitoring sites S1 through S5, SB and T2, as well as at the leaking raw sewage pipe (SP) to the west site SB, using a handheld probe. An avian census was carried out by sight and sound. The staff gauge was 66.0 cm at 11:00am.



Jason Day taking water quality measurements at the leaking septic pipe on May 23, 2024.

Dissolved oxygen was 1.6 mg/L at the bridge (SB), 2.1 mg/L at the leaking septic pipe (SP), 0.5 mg/L at sites and S2, 8.3 mg/L at site S3, 9.9 mg/L at site S4, 2.3 mg/L at site S5, and 1.4 mg/L at the wetland triangle site (T2). **Note the very low DO concentrations at sites S1 & S2 – this is most likely the result of the septic input. We highly recommend instillation of an air bubbler at this location.** Conductivity was ~1033 mS at the SB site, ~1392 mS at the SP site, and ranged from ~730 mS to ~495 mS at the wetland

park sites, and ~2940 mS at site T2. **Note that conductivity is highest at the pipe (SP) and generally decreases going west through the park, suggesting that the St. Bernard canal is the source of conductivity.** Salinity was 0.53 ppt at the bridge (SB), 0.71 ppt at the pipe (SP), and ranged from 0.24 to 0.36 at the wetland park sites (S1-S5), and 1.50 mg/L at the wetland triangle site (T2). **As with conductivity, the St. Bernard canal is the source of salinity to the park.** Water temperature ranged from 24°C to 27°C, and pH ranged from 6.9 to 8.5. Total dissolved solids (TDS) was 0.67 mg/L at the bridge (SB), 0.91 at the leaking pipe (SP), and ranged from 0.32 to 0.47 mg/L in the wetland park, and was 1.83 mg/L at site T2. **Again, the St. Bernard canal is the source of TDS to the park.**

Discrete water quality data from May 23, 2024.

Site	Date	DO (mg/l)	Cond. (mS)	Salinity (ppt)	Temp. (°C)	pH	TDS (mg/L)
SB	5/23/24	1.6	1033.8	0.52	25.1	6.9	0.67
SP	5/23/24	2.1	1392.5	0.71	24.8	7.0	0.91
S1	5/23/24	0.5	729.8	0.36	24.4	7.3	0.47
S2	5/23/24	0.5	682.6	0.34	24.0	7.3	0.45
S3	5/23/24	8.3	729.1	0.35	25.7	7.4	0.47
S4	5/23/24	9.9	638.2	0.30	26.8	8.5	0.40
S5	5/23/24	2.3	495.4	0.24	24.5	7.1	0.32
T2	5/23/24	1.4	2940	1.50	27.1	7.1	1.83

Samples were collected on May 23, 2024 for Fecal Coliform, E. Coli and Enterococcus bacteria analysis, as recommended by Kristi Trail of the Pontchartrain Conservancy. The samples were collected at the two leaking pipes described above located east and west of the road to the Veolia wastewater treatment plant, as well as at the Sankofa Wetland Park culvert.



Locations where samples were taken on May 23, 2024.

The additional samples collected on May 23, 2024, for Fecal Coliform, E. Coli, and Enterococcus bacteria analysis provide critical insights into the microbial contamination in the vicinity of the Veolia wastewater treatment plant and Sankofa Wetland Park with significant variations in bacterial concentrations across the three sampling locations. Fecal coliform bacteria were found to be 265 CFU/100 mL at the eastern pipe leak, 110 CFU/100 mL at the western pipe leak, and a notably high 480 CFU/100 mL at the Sankofa culvert. Similarly, E. coli concentrations were 435.2 MPN/100 mL at the eastern pipe leak, 313.0 MPN/100 mL at the western pipe leak, and 694.7 MPN/100 mL at the Sankofa culvert. Enterococcus bacteria levels were 307.6 MPN/100 mL, 64.2 MPN/100 mL, and 119.1 MPN/100 mL at the eastern pipe leak, western pipe leak, and Sankofa culvert, respectively. See the report appended to this document that details the septic leak issue with discussion of the data.

Bacterial analysis results of samples collected May 23, 2024.

Location	Date Collected	Fecal Coliform (CFU/100 mL)	E. coli (MPN/100 mL)	Enterococcus (MPN/100 ml)
Pipe Leak East (P2)	5/23/24	265	435.2	307.6
Pipe Leak East (P1)	5/23/24	110	313.0	64.2
Sankofa Culvert (SC)	5/23/24	480	694.7	119.1

June 12, 2024: Below is a new monitoring design map that will be used for all future water quality monitoring at the wetland park until the septic issue is resolved. It includes new sites P1 at the first leaking septic pipe identified on May 7th, P2 at the second leaking septic pipe identified on May 23rd, and SC at the Sankofa Culvert.



June 17, 2024: Dr. Robert Lane and Mr. Jason Day visited the Sankofa Wetland Park to carry out monthly monitoring. Dissolved oxygen, conductivity, temperature, salinity and pH were measured at all of the

new and old monitoring sites using a handheld probe. The staff gauge was 58.0 cm at 9:58 am.



Recording water quality measurements at the Sankofa Culvert (SC) site.

Dissolved oxygen was 1.0 mg/L at the bridge (SB), 0.6 mg/L at the first leaking septic pipe (P1, formally SP), 0.9 mg/L at the second leaking pipe (P2), and 1.5 mg/L at the Sankofa culvert (SC). Dissolved oxygen ranged from 0.6 to 3.5 mg/L at the wetland park sites (S1-S5), and was 1.1 mg/L at the wetland triangle (T2). Conductivity was ~1400 mS at SB, **~1800 mS at P1**, ~1000 mS at P2, and ~900 mS at SC, while at the wetland park sites conductivity ranged from ~725 mS to ~900 mS, and was ~2500 mS at T2. Salinity was 0.67 ppt at SB, **0.88 ppt at P1**, 0.48 ppt at P2, and 0.43 ppt at SC, while at the wetland park sites conductivity ranged from 0.35 ppt to 0.40 ppt, and was 1.20 ppt at T2. **It appears that site P1 is a significant source of salinity and conductivity.** Water temperature was 27.2°C at SB, 27.0°C at P1, 30.6°C at P2, and 26.9°C at SC, while at the wetland park sites temperature ranged from 26.2°C to 28.0°C, and was 28.2°C at T2. pH was 6.8 at SB, 6.6 at P1, 6.7 at P2, and 7.4 at SC, while at the wetland park sites pH ranged from 7.0 to 7.5, and was 6.9 at T2. **Notice that the lowest pH is at site P1.** Total dissolved solids (TDS) was 0.9 mg/L at SB, 1.1 mg/L at P1, 0.6 mg/L at P2, and 0.6 mg/L at SC, while at the wetland park sites TDS was 7.5 mg/L at all sites, and was 1.5 at T2.

Discrete water quality data from June 17, 2024.

Site	Date	DO (mg/l)	Cond. (mS)	Salinity (ppt)	Temp. (°C)	pH	TDS (mg/L)
SB	6/17/24	1.0	1400.9	0.67	27.2	6.8	0.9
P1	6/17/24	0.6	1797.1	0.88	27.0	6.6	1.1
P2	6/17/24	0.9	1011.9	0.48	30.6	6.7	0.6
SC	6/17/24	1.5	899.3	0.43	26.9	7.4	0.6
S1	6/17/24	1.1	775.4	0.37	26.5	7.1	0.5
S2	6/17/24	0.6	767.1	0.37	26.4	7.0	0.5
S3	6/17/24	3.5	807.3	0.38	28.2	7.4	0.5
S4	6/17/24	2.5	880.1	0.40	28.0	7.0	0.5
S5	6/17/24	1.1	725.2	0.35	26.2	7.5	0.5
T2	6/17/24	1.1	2487.0	1.20	28.2	6.9	1.5



Site P1 on June 17, 2024.



Site P2 on June 17, 2024.

Avian Survey

A total of 29 bird species were observed in April, 40 species in May, and 21 species in June. A total of 47 species were sighted this quarter.

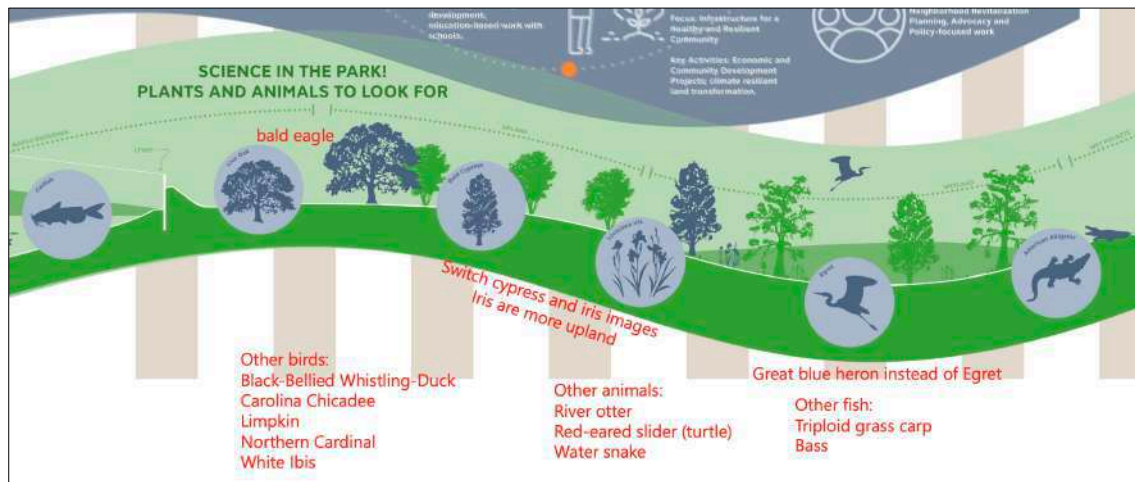
Bird species observed at the Sankofa Wetland Park for Q1 2024.

Common Name	Scientific Name	4/30/24	5/23/24	6/17/24
American Crow	<i>Corvus brachyrhynchos</i>	X	X	X
Anhinga	<i>Anhinga anhinga</i>	X	X	
Bald Eagle	<i>Haliaeetus leucocephalus</i>		X	
Barn Swallow	<i>Hirundo rustica</i>	X		X
Belted Kingfisher	<i>Megaceryle alcyon</i>	X		
Black Vulture	<i>Coragyps atratus</i>	X	X	
Black-Bellied Whistling-Duck	<i>Dendrocygna autumnalis</i>	X	X	X
Black-Crowned Night Heron	<i>Nycticorax nycticorax</i>		X	X
Blue Jay	<i>Cyanocitta cristata</i>	X	X	X
Blue-Grey Gnatcatcher	<i>Poliopitila caerulea</i>			X
Carolina Chickadee	<i>Parus carolinensis</i>	X	X	X
Carolina Wren	<i>Thryothorus ludovicianus</i>	X	X	X
Common Grackle	<i>Quiscalus quiscula</i>	X	X	
Common Moorhen	<i>Gallinula chloropus</i>	X	X	
Common Tern	<i>Sterna hirundo</i>		X	
Common Yellowthroat	<i>Geothlypis trichas</i>	X	X	
Coopers Hawk	<i>Accipiter cooperii</i>		X	
Downy Woodpecker	<i>Dryobates pubescens</i>		X	
Eastern Kingbird	<i>Tyrannus tyrannus</i>	X		
Eastern Phoebe	<i>Sayornis phoebe</i>		X	X
Eurasian Collared Dove	<i>Streptopelia decaocto</i>		X	
European Starling	<i>Sturnus Vulgaris</i>	X	X	X
Fish Crow	<i>Corvus ossifragus</i>	X		
Glossy Ibis	<i>Plegadis falcinellus</i>	X		
Great Blue Heron	<i>Ardea herodias</i>		X	
Great Egret	<i>Ardea alba</i>	X	X	X
Green Heron	<i>Butorides virescens</i>	X	X	X
Gull-Billed Tern	<i>Gelochelidon nilotica</i>		X	
Killdeer	<i>Charadrius vociferus</i>	X	X	X
Laughing Gull	<i>Larus atricilla</i>	X	X	X
Limpkin	<i>Aramus guarauna</i>	X	X	
Little Blue Heron	<i>Egretta caerulea</i>		X	
Mockingbird	<i>Mimus polyglottos</i>	X	X	X
Mourning Dove	<i>Zenaidura macroura</i>	X	X	
Northern Cardinal	<i>Cardinalis cardinalis</i>	X	X	X
Northern Parula Warbler	<i>Setophaga americana</i>	X	X	
Osprey	<i>Pandion Haliaeetus</i>		X	
Purple Martin	<i>Progne subis</i>		X	
Red Shouldered Hawk	<i>Buteo lineatus</i>	X	X	X
Red Winged Blackbird	<i>Agelaius phoeniceus</i>		X	X
Red-Bellied Woodpecker	<i>Melanerpes carolinus</i>	X		
Snowy Egret	<i>Egretta thula</i>		X	X
Tricolor Egret	<i>Egretta tricolor</i>		X	
Tufted Titmouse	<i>Baeolophus bicolor</i>		X	X
Turkey Vulture	<i>Cathartes aura</i>		X	
White Ibis	<i>Eudocimus albus</i>	X	X	
Yellow-Crowned Night-Heron	<i>Nyctanassa violacea</i>	X	X	X

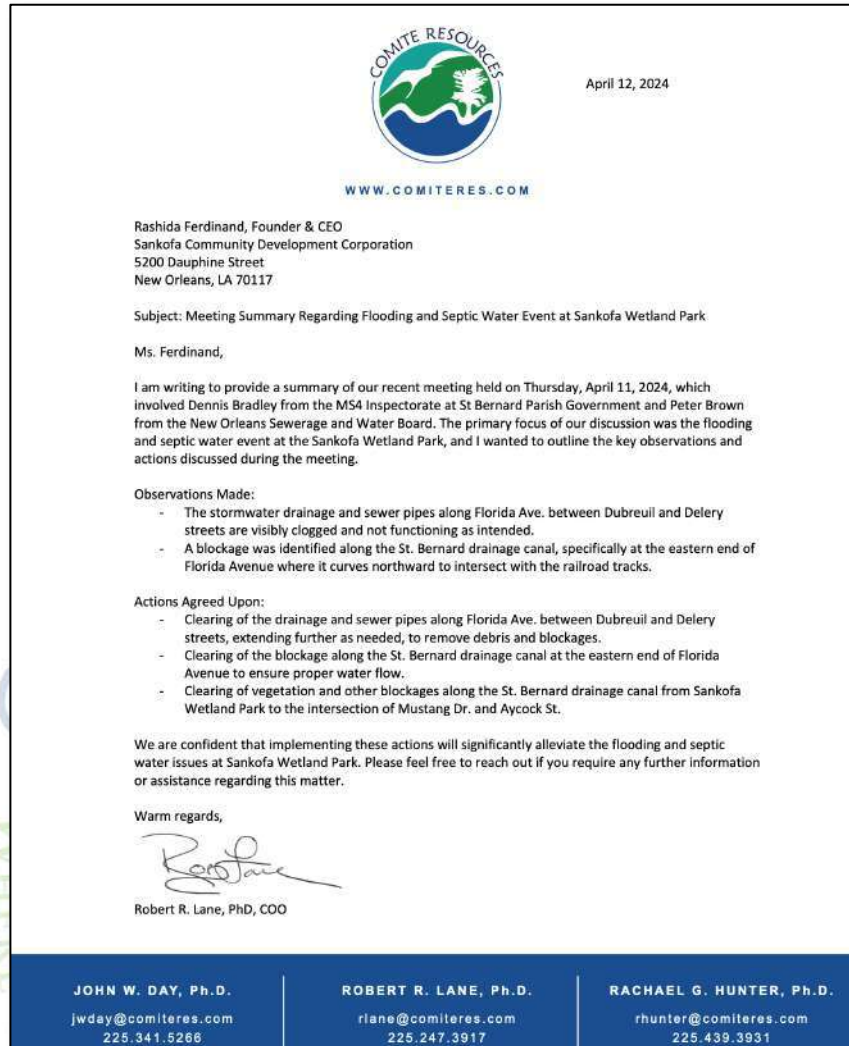
Miscellaneous Activities

April 10, 2024: Alex Miller sent the following message and below is graphical format of our response:

Attached are the initial templates for the Wetland Park welcome and wayfinding signage. We need your help with one important item for review. Would you please examine the "science" panel of the initial park welcome sign and suggest any changes in species or content that you think are essential? This would include recommending the most critical, interesting, or numerous species to include. (We do have more signs planned to dive into detail on various species and habitat elements elsewhere in the park, so this welcome sign should just include some important and representative plants and animals.)



April 12, 2024: Rob Lane met with Dennis Bradley from the MS4 Inspectorate at St Bernard Parish Government and Peter Brown from the New Orleans Sewerage and Water Board to discuss and explore the flooding and septic water situation at the park. Dr. Lane wrote the following memo regarding the meeting.



April 13, 2024: Rob Lane developed the following guidelines for carrying out drainage and sewer inspections.

Drainage and sewer inspections are crucial for ensuring the proper functioning of plumbing systems and identifying any potential issues or blockages. The following are steps on how to carry out these inspections:

1. Gather Equipment:

- Flashlight: For illuminating dark areas.
- Camera: A waterproof inspection camera or a smartphone with a camera attachment for capturing visuals.
- Gloves and protective gear to protect yourself from dirt and contaminants.

2. Inspect Access Points:

- Locate access points to the drainage and sewer systems, such as cleanout openings or inspection chambers.
- Open these access points carefully and ensure proper ventilation if working in confined spaces.

3. Visual Inspection:

- Begin with a visual inspection using the flashlight. Look for signs of blockages, leaks, or structural damage.
- Check for any visible debris, roots intrusion, or corrosion along the pipes.

4. Camera Inspection:

- If available, use a camera specifically designed for sewer and drainage inspections.
- Insert the camera into the pipes through the access point and navigate it through the system.
- Record videos or take pictures to document the condition of the pipes, joints, and connections.
- Pay attention to any obstructions, cracks, or areas of concern.
- Here is camera from Home Depot for \$308: <https://www.homedepot.com/p/VEVOR-Sewer-Pipe-Camera-4-3-in-LCD-Monitor-Screen-Inspection-Camera-98-4-ft-Cable-Duct-IP68-with-Battery-DVR-Function-GDKSYCM-4-330C2R9V0/325075292>

5. Check Flow and Water Levels:

- Test the flow of water through the drainage system during or shortly after significant rainfall events.
- Monitor water levels in inspection chambers to ensure proper drainage and no backups.

6. Inspect Manholes and Sewer Lines:

- If inspecting sewer lines, open manholes carefully and descend into them using appropriate safety precautions.
- Examine the interior of sewer lines for blockages, sediment buildup, or structural issues.
- Use the camera to capture images or footage of the sewer lines for detailed inspection.

7. Note Findings:

- Keep detailed notes of your inspection findings, including any defects, damages, or areas requiring immediate attention.
- Record measurements, such as pipe diameters and depths, to assess the scale of potential repairs.

8. Evaluate and Report:

- Evaluate the overall condition of the drainage and sewer systems based on your inspection results.
- Prepare a comprehensive report detailing your observations, recommendations for repairs or maintenance, and any safety concerns.
- Share the report with relevant stakeholders, such as property owners, city maintenance officials, or plumbing professionals.

9. Follow-Up Actions:

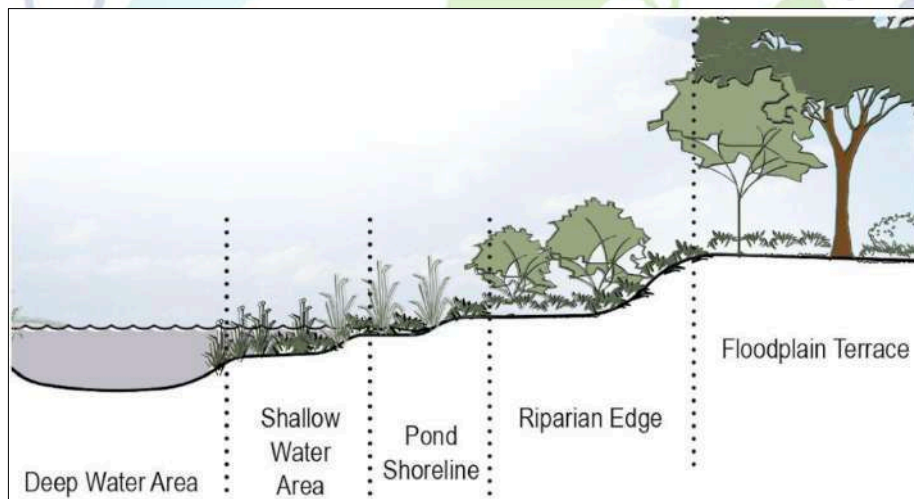
- Based on findings, implement necessary repairs, replacements, or preventive maintenance measures.
- Schedule periodic inspections to monitor the condition of drainage and sewer systems and address issues promptly.

April 18, 2024: Rob Lane traveled to the park and met with Rashida and Devin. They inspected the ditch work occurring along Florida Ave., scoped out where trees are going to be planted in the park for Earth Day, and then visited the nursery. At the nursery it was discovered that many of the cypress seedling were infected with something. Further research suggests that there in a rust mite outbreak.



Potential rust mite infection of cypress seedlings.

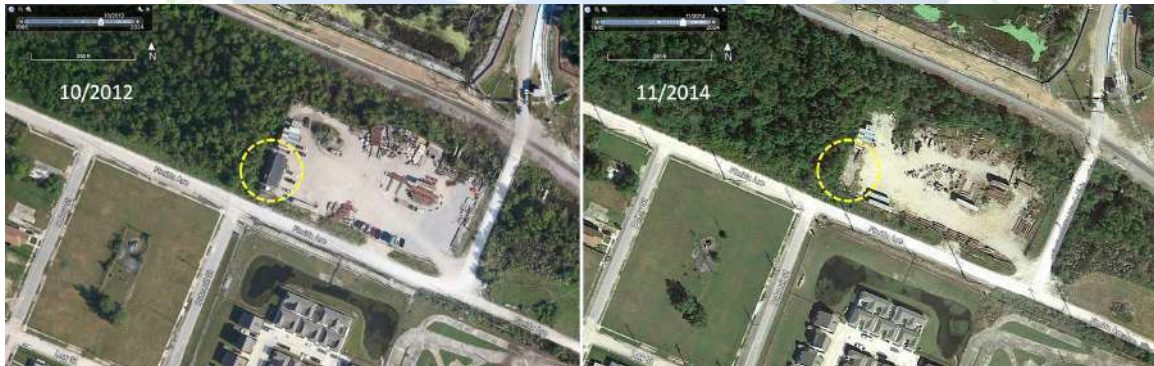
Rashida requested an ideal shoreline schematic that she could show the operator of earth moving equipment working at the park. Below is what was sent.



April 22, 2024: Rob Lane met with Mr. Freddie to give a tour of the park to a large group of attendees to a conference in New Orleans. Before the tour, Mr. Freddie and Dr. Lane looked around for the source of the septic water. The septic water very much seems to be localized to the area along the fence line. Beyond the fence going towards St. Bernard there is no septic smell in the channel, and it is definitely not coming in from the park.



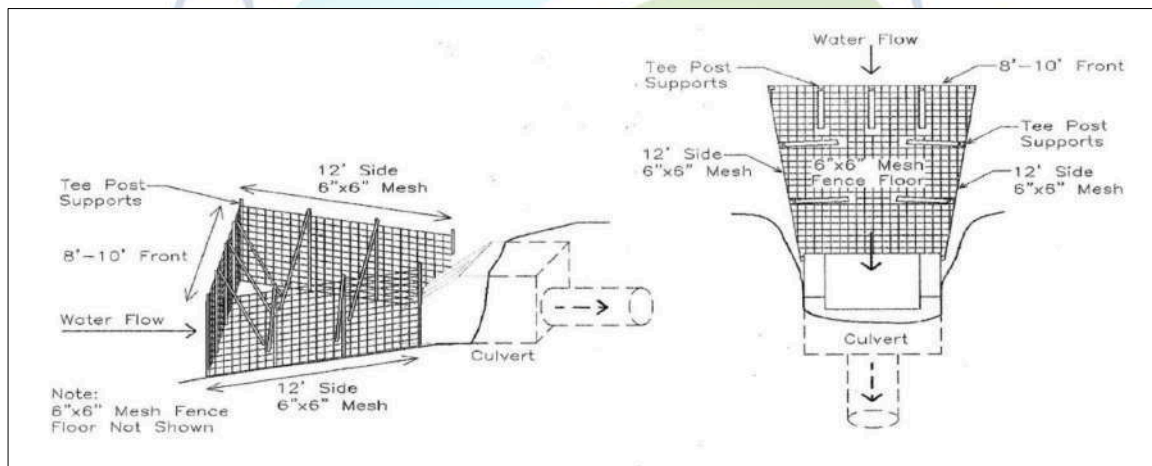
April 22, 2024: Rob Lane suspected that there is an abandoned septic leach field drainage outlet to the St. B drainage canal that became flooded when water levels increased, and then began releasing septic water from the connected septic tank. He examined Google Earth and the only structure along the St. B canal existed from sometime before October 2012 and was removed sometime before November 2014. It looks like it was an office, which had to have a bathroom. Key questions now are: Is there any evidence of a septic tank in the area? Is there a pipe along the fence line that could be a drainage outlet for a small leach field? **See the report appended to this document that details the septic leak issue with discussion of the data.**



June 6, 2024: Rashida Ferdinand sent a tree list asking which trees should be planted at the Sankofa Wetland Park. Below is what will survive at the park with those in red being preferred species.

Ash, Green	Hickory, Water/Bitter Pecan	Oak, Nuttall
Bay, Loblolly	Holly, Dahoon	Oak, Swamp Chestnut
Blackgum, Swamp	Locust, Black	Oak, Willow
Buttonbush	Magnolia, Southern	Palmetto, Dwarf
Cypress, Bald	Maple, Red	Rosemallow, Crimson-eyed
Cypress, Pond	Mulberry, Red	Sugarberry
Dogwood	Oak, Laurel	Waxmyrtle
Elm, American	Oak, Live	

June 10, 2024: Devin Theobald contacted Comite Resources regarding a beaver dam being built near the Sankofa culvert near the fence line. Several beaver management documents were sent, both suggesting that a Keystone fence be built in front of the culvert. Below is a diagram.



A keystone fence enclosure protecting a culvert from beaver dams.

June 17, 2024: Rob Lane returned to the Sankofa Wetland Park for a meeting with CPRA. See the attached report that details the meeting.



Septic Water Intrusion at the Sankofa Wetland Park

Robert R. Lane PhD, COO
Comite Resources
June 23, 2024

Starting in the beginning of March 2024, a distinct odor of septic water could be detected where the St. Bernard stormwater drainage canal connects with the park. In addition, the water passing through the culvert connecting the St. Bernard and L9W stormwater drainage systems was black with suspended material (Figure 1). In an effort to mitigate this, the Sewage and Water Board of New Orleans and Veolia Wastewater Treatment Plant were contacted. Despite their site visits, they were been unable to determine the cause or provide a solution.



Figure 1. Photo taken on April 4, 2024 where the St. Bernard drainage canal feeds into the wetland park and exits through a culvert. The location is indicated by the blue dot in the upper right panel.

On May 7, 2024, Dr. Robert Lane of Comite Resources, an environmental advisor for Sankofa CDC, investigated the easternmost section of the St. Bernard drainage canal and identified a potential cause of concern. He discovered a large septic pipe, over 40 inches in diameter, which is part of the infrastructure leading to the Veolia Wastewater Treatment Plant, visibly leaking (Figure 2). Septic odors and effluent were emerging from the substrate around the pipe. This pipe was identified as the intake pipe transporting raw sewage to the Veolia wastewater treatment plant. However, the Sewage and Water Board of New Orleans conducted water quality tests and concluded that septic water was not leaking from the pipe, despite visible evidence of water surging from the ground at the base of the sewerage pipe.



Figure 2. Septic water leakage at the base of the forced main septic pipe leading to the Veolia WTP. The location is indicated by the blue dot in the lower right panel.

A much more substantial leak was later discovered on May 23, 2024, near a second pipe leading from the Veolia wastewater treatment plant. This area resembles a wetland but is characterized by dead trees and a flocculent mud layer (Figure 3), which was later found to contain millions of small red worms. There is a distinct septic smell and a continuous flow of water from the area directly into the St. Bernard stormwater canal. The volume of flow from the site is comparable to the flow observed through the culvert pipe at the park during dry weather conditions. This pipe was identified as carrying treated effluent from the Veolia wastewater treatment plant to be discharged into the Mississippi River. The Sewage and Water Board of New Orleans, the Veolia Wastewater Treatment Plant, and the Louisiana Department of Environmental Quality were contacted, and representatives visited the site.



Figure 3. Septic water upwelling from a buried pipe that connects to the Veolia WTP. The location is indicated by the blue dot in the upper left panel.

The causes of the two issues outlined above are very likely related. Normally, water in the St. Bernard stormwater canal flows eastward to the pumping stations located in that direction and is then discharged into the Central Wetland Unit, a vast expanse of wetlands to the north that drains into Bayou Bienvenue and then into Lake Borgne. However, a blockage in this canal in January 2024 caused water to be forced westward into the Sankofa Wetland Park. This resulted in higher water levels in the park due to a combination of septic water inflow, heavy rains, and an overly restrictive and clogged culvert connecting the St. Bernard stormwater canal to the L9W stormwater system. Consequently, the Sankofa Wetland Park has received a significant amount of septic effluent and has deteriorated significantly due to elevated nutrient levels, which have induced an overgrowth of aquatic vegetation and subsequent low dissolved oxygen concentrations. Activities and events at the park have mostly been suspended due to septic odors and negative aesthetic conditions.

Environmental Monitoring

Environmental monitoring at the Sankofa Wetland Park began in January 2022. The sampling design consists of five monitoring locations (S1 through S5) set approximately equidistant along the mile long length of the linear park (Figure 4). The St. Bernard drainage ditch accessed at the bridge to the Viola Water treatment plant is also being monitored (site SB), as well as a site in the Bayou Bienvenue Wetland Triangle (site T1). In 2022, only sites S1 and S2 were monitored. Sites S3-S5, as well as SB and T1 were added as the wetland park was expanded in 2023.



Figure 4. Location of sampling sites at the Sankofa Wetland Park (S1-S5), the St. Bernard drainage ditch (SB), and the Bayou Bienvenue Wetland Triangle (site T1).

May 15, 2024

Water samples were collected on May 15, 2024 for nutrient (NO_2+NO_3 , NH_3 , TN, PO_4 , TP), BOD_5 and suspended sediment (TSS) analysis at the monitoring sites described above. In addition, samples for fecal coliform analysis were also collected. The SB sample was collected in the St. Bernard drainage canal about 30 m west of the usual location where the first leaking sewage pipe was located. Samples were put on ice and transported to Pace Analytical Services in Baton Rouge for analysis. TSS and BOD_5 samples were inadvertently spilled at the laboratory and could not be analyzed.

Nitrate+nitrite (NO_x) concentrations were below detection (0.1 mg/L) at all of the monitoring sites. Ammonia (NH₃) concentrations were 6.6 mg/L at site SB, 4.2 mg/L at site S1, below detection (<0.10 mg/L) at the other wetland park sites (S2-S5), and 0.13 mg/L at site T2 (Table 1). Total nitrogen (TN) concentrations were 11.7 mg/L at the bridge site (SB), 3.7 mg/L at site S1, below detection (<0.10 mg/L) at sites S2, S3 and S4, 0.77 mg/L at site S5, and 5.9 mg/L at site T2. Phosphate (PO₄) concentrations were 1.5 mg/L at site SB, 0.84 mg/L at site S1, 0.14 mg/L at site S2, below detection (<0.05 mg/L) at sites S2-S5, and 0.22 mg/L at site T2. Total phosphorus (TP) concentrations were 1.6 mg/L at site SB, 0.93 mg/L at site S1, 0.29 at site S2, below detection (<0.10 mg/L) at sites S2-S5, and 0.80 mg/L at site T2. Total suspended solids (TSS) concentrations were 373 mg/L at site SB, and ranged from below detection (<10.0 mg/L) to 20.4 mg/L at the wetland park sites. Five-day biological oxygen demand (BOD₅) was 12.7 mg/L at site SB, 15.4 mg/L at site S1, 6.8 mg/L at site S2, 4.4 mg/L at site S3, 25.4 mg/L at site S4, and 36.1 mg/L at site S5. Fecal coliform concentrations were 340 CFU/100mL at the bridge site (SB), 1670 CFU/100mL at site S1, 910 CFU/100mL at site S2, 20 CFU/100mL at site S3, 70 CFU/100mL at site S4, 70 CFU/100mL at site S5, and below detection (<10 CFU/100mL) at site T2 (Table 1).

Table 1. Water quality results from May 15, 2024.

Site	Date Collected	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)	Fecal Coliform (CFU/100mL)
SB	5/15/24	<0.100	6.6	11.7	1.5	1.6	373	12.7	340
S1	5/15/24	<0.100	4.2	3.7	0.84	0.93	<10.0	15.4	1670
S2	5/15/24	<0.100	<0.10	<0.10	0.14	0.29	20.4	6.8	910
S3	5/15/24	<0.100	<0.10	<0.10	<0.050	<0.10	<10.0	4.4	30
S4	5/15/24	<0.100	<0.10	<0.10	<0.050	<0.10	10.0	25.4	70
S5	5/15/24	<0.100	<0.10	0.77	<0.050	<0.10	<10.0	36.1	10
T2	5/15/24	<0.100	0.13	5.9	0.22	0.80	.	.	<10

The water quality monitoring data reveals significant localized pollution issues, particularly in the St. Bernard drainage canal and in the Sankofa Wetland Park near the drainage canal. Elevated levels of ammonia, total nitrogen, phosphate, and total phosphorus at these locations suggest significant nutrient inputs, likely from anthropogenic sources such as sewage leaks. High total suspended solids (TSS) and biological oxygen demand (BOD₅) further indicate substantial sediment load and organic pollution, contributing to decreased water quality. The presence of high fecal coliform counts at certain sites highlights significant fecal contamination, pointing to potential sewage sources.

Dissolved oxygen was 1.6 mg/L at the bridge (SB), 2.1 mg/L at the leaking septic pipe (SP), 0.5 mg/L at sites and S2, 8.3 mg/L at site S3, 9.9 mg/L at site S4, 2.3 mg/L at site S5, and 1.4 mg/L at the wetland triangle site (T2; Table 2). Note the very low DO concentrations at sites S1 & S2 – this is most likely the result of the septic input. We highly recommend instillation of an air bubbler at this location. Conductivity was ~1033 mS at the SB site, ~1392 mS at the SP site, and ranged from ~730 mS to ~495 mS at the wetland park sites, and ~2940 mS at site T2. Note that conductivity is highest at the pipe (SP) and generally decreases going west through the park, suggesting that the St. Bernard canal is the source of conductivity. Salinity was 0.53 ppt at the bridge (SB), 0.71 ppt at the pipe (SP), and ranged from 0.24 to 0.36 at the wetland park sites

(S1-S5), and 1.50 mg/L at the wetland triangle site (T2). As with conductivity, the St. Bernard canal is the source of salinity to the park. Water temperature ranged from 24°C to 27°C, and pH ranged from 6.9 to 8.5. Total dissolved solids (TDS) was 0.67 mg/L at the bridge (SB), 0.91 at the leaking pipe (SP), and ranged from 0.32 to 0.47 mg/L in the wetland park, and was 1.83 mg/L at site T2. Again, the St. Bernard canal is the source of TDS to the park.

Table 2. Discrete water quality data from May 23, 2024.

Site	Date	DO (mg/l)	Cond. (mS)	Salinity (ppt)	Temp. (°C)	pH	TDS (mg/L)
SB	5/23/24	1.6	1033.8	0.52	25.1	6.9	0.67
SP	5/23/24	2.1	1392.5	0.71	24.8	7.0	0.91
S1	5/23/24	0.5	729.8	0.36	24.4	7.3	0.47
S2	5/23/24	0.5	682.6	0.34	24.0	7.3	0.45
S3	5/23/24	8.3	729.1	0.35	25.7	7.4	0.47
S4	5/23/24	9.9	638.2	0.30	26.8	8.5	0.40
S5	5/23/24	2.3	495.4	0.24	24.5	7.1	0.32
T2	5/23/24	1.4	2940	1.50	27.1	7.1	1.83

May 23, 2024

Additional samples were collected on May 23, 2024 for Fecal Coliform, E. Coli and Enterococcus bacteria analysis, as recommended by Kristi Trail of the Pontchartrain Conservancy. The samples were collected at the two leaking pipes described above located east and west of the road to the Veolia wastewater treatment plant, as well as at the Sankofa Wetland Park culvert (Figure 5).



Figure 5. Locations where samples were taken on May 23, 2024.

The additional samples collected on May 23, 2024, for Fecal Coliform, E. Coli, and Enterococcus bacteria analysis provide critical insights into the microbial contamination in the vicinity of the Veolia wastewater treatment plant and Sankofa Wetland Park with significant variations in bacterial concentrations across the three sampling locations. Fecal coliform bacteria were found to be 265 CFU/100 mL at the eastern pipe leak, 110 CFU/100 mL at the western pipe leak, and a notably high 480 CFU/100 mL at the Sankofa culvert (Table 3). Similarly, E. coli concentrations were 435.2 MPN/100 mL at the eastern pipe leak, 313.0 MPN/100 mL at the western pipe leak, and 694.7 MPN/100 mL at the Sankofa culvert. Enterococcus bacteria levels were 307.6 MPN/100 mL, 64.2 MPN/100 mL, and 119.1 MPN/100 mL at the eastern pipe leak, western pipe leak, and Sankofa culvert, respectively (Table 3).

Table 3. Bacterial analysis results of samples collected May 23, 2024.

Location	Date Collected	Fecal Coliform (CFU/100 mL)	E. coli (MPN/100 mL)	Enterococcus (MPN/100 ml)
Pipe Leak East	5/23/24	265	435.2	307.6
Pipe Leak East	5/23/24	110	313.0	64.2
Sankofa Culvert	5/23/24	480	694.7	119.1

These findings indicate that the Sankofa Wetland Park culvert has the highest contamination levels among the three locations, particularly concerning Fecal Coliform and E. Coli, which are commonly associated with fecal contamination and can pose significant public health risks. The elevated bacterial levels suggest potential sources of pollution, such as sewage leaks, necessitating immediate attention and remediation efforts. Fecal Coliform, E. Coli, and Enterococcus are indicator bacteria used to assess water quality and the presence of fecal contamination, which can have significant implications for both human and animal health.

Fecal coliform bacteria, originating from the intestines of warm-blooded animals including humans, significantly impact both aquatic systems and human health. Their presence in water suggests contamination by fecal material, which may carry a variety of harmful pathogens. In aquatic environments, fecal coliforms degrade water quality, making it unsuitable for recreational activities and increasing biological oxygen demand through the decomposition of associated organic matter. This can lead to oxygen depletion, potential hypoxic conditions, and harm or death to fish and other aquatic organisms, disrupting the balance of aquatic ecosystems and potentially causing a decline in biodiversity. For humans, exposure to fecal coliform-contaminated water can result in various illnesses, including gastrointestinal infections, hepatitis, ear infections, skin rashes, and other severe diseases, particularly affecting those engaging in recreational activities or those who are immunocompromised. Similarly, animals relying on natural water sources can suffer from gastrointestinal distress and infections, impacting their overall health and survival.

Escherichia coli (E. Coli) is a specific species within the fecal coliform group and serves as a more precise indicator of fecal contamination. While most strains of E. Coli are harmless and part of the normal intestinal flora, certain strains, such as E. Coli O157, can cause severe illness. In humans, pathogenic E. Coli strains can lead to symptoms ranging from mild diarrhea to

severe abdominal cramps, vomiting, and even life-threatening conditions like hemolytic uremic syndrome. Animals exposed to contaminated water can suffer from similar digestive issues, leading to dehydration, malnutrition, and in severe cases, death.

Enterococcus bacteria are typically found in the intestines of humans and animals and are more resilient in water environments than coliforms, making them reliable indicators of recent fecal contamination. High levels of Enterococcus in water are linked to an increased risk of infections, including urinary tract infections, bacteremia, and endocarditis in humans. For animals, exposure to water with high Enterococcus levels can cause infections and impact their immune systems, leading to increased vulnerability to other diseases.

The presence of these bacteria in water bodies highlights the risk of fecal contamination, which can introduce a variety of pathogens capable of causing serious health issues. For humans, this can result in outbreaks of waterborne diseases, particularly in communities with inadequate water treatment facilities. For animals, contaminated water sources can lead to widespread illness, affecting wildlife populations and pets.

June 17, 2024: Monthly monitoring was carried out that included new sites P1 at the first leaking septic pipe identified on May 7th, P2 at the second leaking septic pipe identified on May 23rd, and SC at the Sankofa culvert (Figure 6). Dissolved oxygen, conductivity, temperature, salinity and pH were measured at all of the new and old monitoring sites using a handheld probe. There was no flow from either of the leaking pipes. Site P2 had little to no standing water, except the hole where water was observed welling up from the pipe on May 23.



Figure 6. Map of revised monitoring design.

Dissolved oxygen was 1.0 mg/L at the bridge (SB), 0.6 mg/L at the first leaking septic pipe (P1, formally SP), 0.9 mg/L at the second leaking pipe (P2), and 1.5 mg/L at the Sankofa culvert (SC; Table 4; Figure 6). Dissolved oxygen ranged from 0.6 to 3.5 mg/L at the wetland park sites (S1-S5), and was 1.1 mg/L at the wetland triangle (T2). Conductivity was ~1400 mS at SB, ~1800

mS at P1, ~1000 mS at P2, and ~900 mS at SC, while at the wetland park sites conductivity ranged from ~725 mS to ~900 mS, and was ~2500 mS at T2. Salinity was 0.67 ppt at SB, 0.88 ppt at P1, 0.48 ppt at P2, and 0.43 ppt at SC, while at the wetland park sites conductivity ranged from 0.35 ppt to 0.40 ppt, and was 1.20 ppt at T2. Water temperature was 27.2°C at SB, 27.0°C at P1, 30.6°C at P2, and 26.9°C at SC, while at the wetland park sites temperature ranged from 26.2°C to 28.0°C, and was 28.2°C at T2. pH was 6.8 at SB, 6.6 at P1, 6.7 at P2, and 7.4 at SC, while at the wetland park sites pH ranged from 7.0 to 7.5, and was 6.9 at T2. Total dissolved solids (TDS) was 0.9 mg/L at SB, 1.1 mg/L at P1, 0.6 mg/L at P2, and 0.6 mg/L at SC, while at the wetland park sites TDS was 7.5 mg/L at all sites, and was 1.5 at T2.

Table 4. Discrete water quality data from June 17, 2024.

Site	Date	DO (mg/l)	Cond. (mS)	Salinity (ppt)	Temp. (°C)	pH	TDS (mg/L)
SB	6/17/24	1.0	1400.9	0.67	27.2	6.8	0.9
P1	6/17/24	0.6	1797.1	0.88	27.0	6.6	1.1
P2	6/17/24	0.9	1011.9	0.48	30.6	6.7	0.6
SC	6/17/24	1.5	899.3	0.43	26.9	7.4	0.6
S1	6/17/24	1.1	775.4	0.37	26.5	7.1	0.5
S2	6/17/24	0.6	767.1	0.37	26.4	7.0	0.5
S3	6/17/24	3.5	807.3	0.38	28.2	7.4	0.5
S4	6/17/24	2.5	880.1	0.40	28.0	7.0	0.5
S5	6/17/24	1.1	725.2	0.35	26.2	7.5	0.5
T2	6/17/24	1.1	2487.0	1.20	28.2	6.9	1.5



Figure 7. Site P2 on June 17th, 2024.

June 17, 2024: Dr. Rob Lane returned to the Sankofa Wetland Park for a meeting with CPRA. He was surprised to find water welling up from the pipe at P1, which CPRA representatives Brandon Champagne and Skylar Liner also observed. There was significant standing water at site P2, however, there was no movement, but there was fluorescent green dye present in the water that had collected in footprints left from earlier visits (Figure 8). Water samples were collected from all sites for fecal coliform, ammonia and total nitrogen analysis.



Figure 8. Site P2 on June 20th, 2024. Notice standing water and green dye.



ANALYTICAL RESULTS

Project: SANKOFA

Pace Project No.: 20317441

Sample: BRIDGE	Lab ID: 20317441001	Collected: 05/15/24 10:00	Received: 05/15/24 13:15	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Wet Chemistry 353.2								
Analytical Method: EPA 353.2 Preparation Method: 353.2								
Pace National - Mt. Juliet								
Nitrate-Nitrite (as N)	ND	mg/L	0.100	1	05/28/24 20:04	05/28/24 20:04	7727-37-9	
2540D Total Suspended Solids								
Analytical Method: SM 2540D 2011								
Pace Analytical Services - New Orleans								
Total Suspended Solids	373	mg/L	25.0	1		05/20/24 15:25		P1
5210B BOD, 5 day								
Analytical Method: SM 5210B Preparation Method: SM 5210B								
Pace Analytical Services - New Orleans								
BOD, 5 day	12.7	mg/L	4.0	4	05/16/24 00:05	05/21/24 05:34		
MBIO 9222D Fecal Coli (Water)								
Analytical Method: SM 9222D Preparation Method: SM 9222D								
Pace Analytical Services - New Orleans								
Fecal Coliforms	340	CFU/100 mL	10.0	10	05/15/24 16:58	05/16/24 15:13		
351.2 Total Kjeldahl Nitrogen								
Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Pace Analytical Services - New Orleans								
Nitrogen, Kjeldahl, Total	11.7	mg/L	1.0	10	05/17/24 12:14	05/22/24 11:52	7727-37-9	D4
365.4 Total Phosphorus								
Analytical Method: EPA 365.4 Preparation Method: EPA 365.4								
Pace Analytical Services - New Orleans								
Phosphorus	1.6	mg/L	0.10	1	05/17/24 12:16	05/19/24 15:08	7723-14-0	
4500 Ammonia Water								
Analytical Method: SM 4500-NH3 G								
Pace Analytical Services - New Orleans								
Nitrogen, Ammonia	6.6	mg/L	0.10	1		05/24/24 12:34	7664-41-7	
SM4500P-E, Phosphate, Ortho								
Analytical Method: SM 4500-P E								
Pace Analytical Services - New Orleans								
Orthophosphate as P	1.5	mg/L	0.50	10		05/16/24 17:52		D4

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ANALYTICAL RESULTS

Project: SANKOFA

Pace Project No.: 20317441

Sample: ONE		Lab ID: 20317441002		Collected: 05/15/24 10:20	Received: 05/15/24 13:15	Matrix: Water		
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Wet Chemistry 353.2		Analytical Method: EPA 353.2 Preparation Method: 353.2 Pace National - Mt. Juliet						
Nitrate-Nitrite (as N)	ND	mg/L	0.100	1	05/28/24 20:05	05/28/24 20:05	7727-37-9	
2540D Total Suspended Solids		Analytical Method: SM 2540D 2011 Pace Analytical Services - New Orleans						
Total Suspended Solids	ND	mg/L	10.0	1		05/20/24 15:25		P1,PK,PP
5210B BOD, 5 day		Analytical Method: SM 5210B Preparation Method: SM 5210B Pace Analytical Services - New Orleans						
BOD, 5 day	15.4	mg/L	4.0	4	05/16/24 00:06	05/21/24 05:46		
MBIO 9222D Fecal Coli (Water)		Analytical Method: SM 9222D Preparation Method: SM 9222D Pace Analytical Services - New Orleans						
Fecal Coliforms	1670	CFU/100 mL	10.0	10	05/15/24 16:58	05/16/24 15:13		
351.2 Total Kjeldahl Nitrogen		Analytical Method: EPA 351.2 Preparation Method: EPA 351.2 Pace Analytical Services - New Orleans						
Nitrogen, Kjeldahl, Total	3.7	mg/L	0.10	1	05/17/24 12:14	05/22/24 11:52	7727-37-9	
365.4 Total Phosphorus		Analytical Method: EPA 365.4 Preparation Method: EPA 365.4 Pace Analytical Services - New Orleans						
Phosphorus	0.93	mg/L	0.10	1	05/17/24 12:16	05/19/24 15:09	7723-14-0	
4500 Ammonia Water		Analytical Method: SM 4500-NH3 G Pace Analytical Services - New Orleans						
Nitrogen, Ammonia	4.2	mg/L	0.10	1		05/24/24 12:35	7664-41-7	
SM4500P-E, Phosphate, Ortho		Analytical Method: SM 4500-P E Pace Analytical Services - New Orleans						
Orthophosphate as P	0.84	mg/L	0.50	10		05/16/24 17:52		D4

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ANALYTICAL RESULTS

Project: SANKOFA

Pace Project No.: 20317441

Sample: TWO	Lab ID: 20317441003	Collected: 05/15/24 10:30	Received: 05/15/24 13:15	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Wet Chemistry 353.2								
Analytical Method: EPA 353.2 Preparation Method: 353.2								
Pace National - Mt. Juliet								
Nitrate-Nitrite (as N)	ND	mg/L	0.100	1	05/28/24 20:06	05/28/24 20:06	7727-37-9	
2540D Total Suspended Solids								
Analytical Method: SM 2540D 2011								
Pace Analytical Services - New Orleans								
Total Suspended Solids	20.4	mg/L	10.0	1		05/20/24 15:25		P1
5210B BOD, 5 day								
Analytical Method: SM 5210B Preparation Method: SM 5210B								
Pace Analytical Services - New Orleans								
BOD, 5 day	6.8	mg/L	4.0	4	05/16/24 00:06	05/21/24 05:54		
MBIO 9222D Fecal Coli (Water)								
Analytical Method: SM 9222D Preparation Method: SM 9222D								
Pace Analytical Services - New Orleans								
Fecal Coliforms	910	CFU/100 mL	10.0	10	05/15/24 16:58	05/16/24 15:13		
351.2 Total Kjeldahl Nitrogen								
Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Pace Analytical Services - New Orleans								
Nitrogen, Kjeldahl, Total	ND	mg/L	0.10	1	05/17/24 12:14	05/22/24 11:54	7727-37-9	
365.4 Total Phosphorus								
Analytical Method: EPA 365.4 Preparation Method: EPA 365.4								
Pace Analytical Services - New Orleans								
Phosphorus	0.29	mg/L	0.10	1	05/17/24 12:16	05/19/24 15:09	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		05/24/24 12:37	7664-41-7	
SM4500P-E, Phosphate, Ortho								
Analytical Method: SM 4500-P E								
Pace Analytical Services - New Orleans								
Orthophosphate as P	0.14	mg/L	0.050	1		05/16/24 17:52		

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ANALYTICAL RESULTS

Project: SANKOFA

Pace Project No.: 20317441

Sample: THREE	Lab ID: 20317441004	Collected: 05/15/24 10:40	Received: 05/15/24 13:15	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Wet Chemistry 353.2	Analytical Method: EPA 353.2 Preparation Method: 353.2 Pace National - Mt. Juliet							
Nitrate-Nitrite (as N)	ND	mg/L	0.100	1	05/28/24 20:09	05/28/24 20:09	7727-37-9	
2540D Total Suspended Solids	Analytical Method: SM 2540D 2011 Pace Analytical Services - New Orleans							
Total Suspended Solids	ND	mg/L	10.0	1		05/20/24 15:25		P1,PK,PP
5210B BOD, 5 day	Analytical Method: SM 5210B Preparation Method: SM 5210B Pace Analytical Services - New Orleans							
BOD, 5 day	4.4	mg/L	1.5	1.5	05/16/24 00:06	05/21/24 06:01		
MBIO 9222D Fecal Coli (Water)	Analytical Method: SM 9222D Preparation Method: SM 9222D Pace Analytical Services - New Orleans							
Fecal Coliforms	30	CFU/100 mL	10.0	10	05/15/24 16:58	05/16/24 15:13		
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2 Pace Analytical Services - New Orleans							
Nitrogen, Kjeldahl, Total	ND	mg/L	0.10	1	05/17/24 12:14	05/22/24 11:57	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	05/17/24 12:16	05/19/24 15:11	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		05/24/24 12:41	7664-41-7	
SM4500P-E, Phosphate, Ortho	Analytical Method: SM 4500-P E Pace Analytical Services - New Orleans							
Orthophosphate as P	ND	mg/L	0.050	1		05/16/24 17:52		

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS

Project: SANKOFA

Pace Project No.: 20317441

Sample: FOUR	Lab ID: 20317441005	Collected: 05/15/24 11:00	Received: 05/15/24 13:15	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Wet Chemistry 353.2								
Analytical Method: EPA 353.2 Preparation Method: 353.2								
Pace National - Mt. Juliet								
Nitrate-Nitrite (as N)	ND	mg/L	0.100	1	05/28/24 20:14	05/28/24 20:14	7727-37-9	
2540D Total Suspended Solids								
Analytical Method: SM 2540D 2011								
Pace Analytical Services - New Orleans								
Total Suspended Solids	10.0	mg/L	10.0	1		05/20/24 15:25		P1
5210B BOD, 5 day								
Analytical Method: SM 5210B Preparation Method: SM 5210B								
Pace Analytical Services - New Orleans								
BOD, 5 day	25.4	mg/L	12.0	12	05/16/24 00:09	05/21/24 06:14		
MBIO 9222D Fecal Coli (Water)								
Analytical Method: SM 9222D Preparation Method: SM 9222D								
Pace Analytical Services - New Orleans								
Fecal Coliforms	70	CFU/100 mL	10.0	10	05/15/24 16:58	05/16/24 15:13		
351.2 Total Kjeldahl Nitrogen								
Analytical Method: EPA 351.2 Preparation Method: EPA 351.2								
Pace Analytical Services - New Orleans								
Nitrogen, Kjeldahl, Total	ND	mg/L	0.10	1	05/17/24 12:14	05/22/24 11:59	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	05/17/24 12:16	05/19/24 15:11	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		05/24/24 12:42	7664-41-7	
SM4500P-E, Phosphate, Ortho								
Analytical Method: SM 4500-P E								
Pace Analytical Services - New Orleans								
Orthophosphate as P	ND	mg/L	0.050	1		05/16/24 17:52		

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ANALYTICAL RESULTS

Project: SANKOFA

Pace Project No.: 20317441

Sample: FIVE	Lab ID: 20317441006	Collected: 05/15/24 11:15	Received: 05/15/24 13:15	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Wet Chemistry 353.2	Analytical Method: EPA 353.2 Preparation Method: 353.2 Pace National - Mt. Juliet							
Nitrate-Nitrite (as N)	ND	mg/L	0.100	1	05/28/24 20:15	05/28/24 20:15	7727-37-9	
2540D Total Suspended Solids	Analytical Method: SM 2540D 2011 Pace Analytical Services - New Orleans							
Total Suspended Solids	ND	mg/L	10.0	1		05/20/24 15:25		P1,PK,PP
5210B BOD, 5 day	Analytical Method: SM 5210B Preparation Method: SM 5210B Pace Analytical Services - New Orleans							
BOD, 5 day	36.1	mg/L	4.0	4	05/16/24 00:14	05/21/24 06:29		R6
MBIO 9222D Fecal Coli (Water)	Analytical Method: SM 9222D Preparation Method: SM 9222D Pace Analytical Services - New Orleans							
Fecal Coliforms	10	CFU/100 mL	10.0	10	05/15/24 16:58	05/16/24 15:13		
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2 Pace Analytical Services - New Orleans							
Nitrogen, Kjeldahl, Total	0.77	mg/L	0.10	1	05/17/24 12:14	05/22/24 11:59	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	05/17/24 12:16	05/19/24 15:12	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		05/24/24 12:44	7664-41-7	
SM4500P-E, Phosphate, Ortho	Analytical Method: SM 4500-P E Pace Analytical Services - New Orleans							
Orthophosphate as P	ND	mg/L	0.050	1		05/16/24 17:52		

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ANALYTICAL RESULTS

Project: SANKOFA

Pace Project No.: 20317441

Sample: TRIANGLE	Lab ID: 20317441007	Collected: 05/15/24 10:50	Received: 05/15/24 13:15	Matrix: Water				
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
Wet Chemistry 353.2	Analytical Method: EPA 353.2 Preparation Method: 353.2 Pace National - Mt. Juliet							
Nitrate-Nitrite (as N)	ND	mg/L	0.100	1	05/28/24 20:16	05/28/24 20:16	7727-37-9	
MBIO 9222D Fecal Coli (Water)	Analytical Method: SM 9222D Preparation Method: SM 9222D Pace Analytical Services - New Orleans							
Fecal Coliforms	<10	CFU/100 mL	10.0	10	05/15/24 17:45	05/16/24 16:29		
351.2 Total Kjeldahl Nitrogen	Analytical Method: EPA 351.2 Preparation Method: EPA 351.2 Pace Analytical Services - New Orleans							
Nitrogen, Kjeldahl, Total	5.9	mg/L	0.10	1	05/17/24 12:14	05/22/24 12:02	7727-37-9	
365.4 Total Phosphorus	Analytical Method: EPA 365.4 Preparation Method: EPA 365.4 Pace Analytical Services - New Orleans							
Phosphorus	0.80	mg/L	0.10	1	05/17/24 12:16	05/19/24 15:13	7723-14-0	
4500 Ammonia Water	Analytical Method: SM 4500-NH3 G Pace Analytical Services - New Orleans							
Nitrogen, Ammonia	0.13	mg/L	0.10	1		05/24/24 12:45	7664-41-7	
SM4500P-E, Phosphate, Ortho	Analytical Method: SM 4500-P E Pace Analytical Services - New Orleans							
Orthophosphate as P	0.22	mg/L	0.050	1		05/16/24 17:52		

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ANALYTICAL RESULTS

Project: Fecal Coliform

Pace Project No.: 20318397

Sample: Culvert		Lab ID: 20318397001	Collected: 05/23/24 09:00	Received: 05/23/24 11:57	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
MBIO 9222D Fecal Coli (Water)								
Analytical Method: SM 9222D Preparation Method: SM 9222D								
Pace Analytical Services - New Orleans								
Fecal Coliforms	480	CFU/100 mL	5.0	5	05/23/24 15:11	05/24/24 14:11		

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ANALYTICAL RESULTS

Project: Fecal Coliform
 Pace Project No.: 20318397

Sample: Pipe		Lab ID: 20318397002	Collected: 05/23/24 09:15	Received: 05/23/24 11:57	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
MBIO 9222D Fecal Coli (Water)								
Analytical Method: SM 9222D Preparation Method: SM 9222D								
Pace Analytical Services - New Orleans								
Fecal Coliforms	110	CFU/100 mL	5.0	5	05/23/24 15:11	05/24/24 14:11		

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ANALYTICAL RESULTS

Project: Fecal Coliform
 Pace Project No.: 20318397

Sample: Swamp		Lab ID: 20318397003	Collected: 05/23/24 10:00	Received: 05/23/24 11:57	Matrix: Water			
Parameters	Results	Units	Report Limit	DF	Prepared	Analyzed	CAS No.	Qual
MBIO 9222D Fecal Coli (Water)								
Analytical Method: SM 9222D Preparation Method: SM 9222D								
Pace Analytical Services - New Orleans								
Fecal Coliforms	265	CFU/100 mL	5.0	5	05/23/24 15:11	05/24/24 14:11		

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ANALYSIS LABORATORIES, INC.

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May 29, 2024

ALI PROJECT NO.: 24A-1362
PACE Work Order: 20318397
PACE Work Order Name:

PACE ANALYTICAL NEW ORLEANS
1000 Riverbend Blvd., Suite F
St. Rose, LA 70087

EXAMINATION OF WATER SAMPLES

Three (3) samples of water submitted for testing on May 23, 2024, were analyzed for (Escherichia coli (E. coli), and Enterococci.

The results were:

<u>Sample ID</u>	<u>Test Parameter and Units</u>	<u>Result</u>	<u>Sample Detection Level</u>	<u>Analyzed, Date/Time/Analyst</u>
Pace ID: 1362-01/ Culvert-01	ECOLI, MPN/100 mL	694.7	1	5-23-24/1550/BR
	Enterococcus, MPN/ 100 mL	119.1	1	5-23-24/1515/BR
1362-02/ Pipe-02	ECOLI, MPN/100 mL	313.0	1	5-23-24/1555/BR
	Enterococcus, MPN/ 100 mL	64.2	1	5-23-24/1520/BR
1362-03/ Swamp-03	ECOLI, MPN/100 mL	435.2	1	5-23-24/1600/BR
	Enterococcus, MPN/ 100 mL	307.6	1	5-23-24/1525/BR

ANALYSIS LABORATORIES, INC.



PRESIDENT



ANALYSIS LABORATORIES, INC.

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PACE Work Order: 20318397
PACE Work Order Name:

PACE ANALYTICAL NEW ORLEANS
1000 Riverbend Blvd., Suite F
St. Rose, LA 70087

PROJECT QUALITY CONTROL SUMMARY

Date Analyzed	Analytical Batch	Parameter	Units	Method	"Standard" D.L.	Positive Control	Negative Control
5-23-24	144A	E. Coli	MPN/100 mL	SM 9223 B	1	Positive	Negative
5-23-24	144A	Enterococcus	MPN/100 mL	SM 9230 D	1	Positive	Negative

Notes: MPN- Most Probable Number. D.L.-Detection Level.
 (<)-Indicates the actual result is less than the value stated.
 Sampled, Date/Time:1362-01 - 5-23-24/0900
 1362-02 - 5-23-24/0915 1362-03-5-23-24/1000

ANALYSIS LABORATORIES, INC.

PRESIDENT