

# St. Charles Wetland Assimilation Monitoring Report

*April 2019*



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**For:** Sam Scholle, Director  
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April 22, 2019

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# St. Charles Wetland Assimilation Monitoring Report

## *Summary of Activities: April 2019*

### Site visits

**April 11, 2019:** Comite Resources personnel Jason Day and Joel Mancuso traveled to the Luling assimilation wetland to conduct monthly monitoring. Dissolved oxygen, conductivity, temperature, salinity and pH were measured at the Treatment, Mid, Out and Reference sites as well as the discharge Pipe (see data below). Leaf litter biomass and water levels were also collected at these sites.



*Jason Day taking probe measurements at the Reference site on April 11, 2019.*

*Discrete water quality probe data from the Luling assimilation wetlands on April 11, 2019.*

Site	Date	DO (mg/L)	Cond (mS)	Temp. (°C)	Sal (PSU)	pH	Water Level (cm)
Pipe	4/11/19	2.4	728.0	24.0	0.4	7.4	
Tmt	4/11/19	2.1	730.1	23.3	0.4	7.0	58.4
Mid	4/11/19	1.0	660.5	21.5	0.3	7.4	42.5
Out	4/11/19	1.9	251.0	22.2	0.1	7.1	8.6
Ref	4/11/19	1.1	168.8	20.5	0.1	7.5	63.2

Dissolved Oxygen was 2.4 mg/L coming out of the Pipe, 2.1 at the Treatment site, 1.0 mg/L at the Mid site, and 1.9 mg/L at the Out site, with 1.1 mg/L at the Reference site. These are relatively low concentrations, but are normal for wetland systems.

Conductivity ranged from ~170 mS at the Reference site to ~700 mS at the Pipe and Treatment site. Water temperature increased from last month, ranging from 20.5 °C at the Reference site to 24.0 °C at the Pipe site. Salinity ranged from 0.1 to 0.4 PSU, with the highest level at and nearest the Pipe. pH ranged from 7.0 to 7.5. Water level was 58.4 cm at the Treatment site, 42.5 cm at the Mid site, 8.6 cm at the Out site, and 63.2 cm at the Reference site. All these parameters are within expected normal ranges and there are no issues of concern.



*Joel Mancuso collecting leaf litter at the Treatment site on April 11, 2019.*

## Annual Report

The 2018 Annual Report was submitted to Nora S. Laiche of St. Charles Parish Wastewater on April 2, 2019. Ms. Laiche told Dr. Lane of Comite Resources that she would submit the report, which was due April 15<sup>th</sup>, to LDEQ. Ms. Angela Troxler of St. Charles Parish Wastewater also contacted Dr. Lane for a copy of the report. An abbreviated version of the report has been appended to this report.



# LOUISIANA POLLUTANT DISCHARGE ELIMINATION SYSTEM (LPDES)

## Annual Wetland System Monitoring Report for Cycle Years 1, 2, 3, and 5

*Due each year by **April 15<sup>th</sup>***

### FACILITY INFORMATION

<b>Facility Name:</b> St. Charles Parish  <b>Facility Mailing Address:</b> St Charles Parish Dept of Wastewater 100 River Oaks Drive, Destrahan, LA 70047  <b>Cycle Year:</b> X1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 5	<b>Wetland Name:</b> Luling Oxidation Pond  <b>Permit Number:</b> LA0032131 <b>Agency Interest (AI) Number:</b> 43356 <b>Activity Number:</b> PER20120001  <b>Report Date:</b> 03/25/2019
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\*\*\*\*NOTE: Extra rows and columns have been added to the tables throughout this report for facilities that have more than four sites. Fill in additional site names as appropriate.\*\*\*\*

### ABOVE-GROUND PRODUCTIVITY

Wetland Area	Ephemeral Production <sup>1</sup> (g/m <sup>2</sup> /yr)	Perennial Production <sup>2</sup> (g/m <sup>2</sup> /yr)	End-of-Season Live Biomass <sup>3</sup> (g/m <sup>2</sup> /yr)	Aboveground NPP <sup>4</sup> (g/m <sup>2</sup> /yr)
<b>Near</b>	945.3	629.1		1574.4
<b>Mid</b>	709.3	186.8		896.1
<b>Out</b>			872.0	
<b>Reference</b>	616.0	318.6		934.6
<b>Marsh Reference</b>			<b>736.0</b>	

<sup>1</sup> Ephemeral Productivity = litter (leaf and fruit) fall, *only applies to forested wetlands.*

<sup>2</sup> Perennial Productivity = stem growth, *only applies to forested wetlands.*

<sup>3</sup> End-of-Season Live Biomass (EOSL), *only applies to marshes.*

<sup>4</sup> Aboveground Net Primary Production (NPP) = the sum of ephemeral and perennial production in forested wetlands and EOSL for marshes.

#### Statistical Analysis:

- 1) Show the results of the statistical test comparing the Wetland Areas for ephemeral, perennial, EOSL, and aboveground NPP (as applicable). Describe the statistical test performed and reasoning for choosing the test. The results should include the sample size and P value obtained.

Summary statistics were calculated using JMP (Version 12) produced by SAS Institute, Inc. (Sall et al. 2017). Analysis of Variance (ANOVA) was carried out to detect differences between means. Comparisons of means with significant ANOVA tests were made using the Tukey-Kramer Honestly Significant Difference (HSD) test (Sall et al. 2018). All analyses were carried out using a p value of 0.05 to determine significance. This analyses were chosen because they are widely accepted methods to determine differences among means. Results of statistical analyses are included at the end of this report.

### Annual Wetland Monitoring Report

**Facility and Wetland Name:** St. Charles Parish  
Luling Oxidation Pond  
**Cycle Year:** 1

**AI Number:** 43356

**Year Date Range:** 2018

#### Productivity Statistical Analysis (con'd):

- 1) Has there been a significant difference ( $p < 0.05$ ) between any of the wetland areas for:  
Ephemeral Production (*forested only*)     Yes    No  
Perennial Production (*forested only*)     Yes    No  
EOSL (*marshes only*)     Yes    No  
Aboveground NPP     Yes    No
  
- 2) If yes, please explain the significant differences observed and outline any corrective actions taken, if needed.



Mean ephemeral productivity was greater at the Near site (945.3 g/m<sup>2</sup>/yr) than at the Mid (709.3) or Reference site (616.0). Mean perennial productivity was greater at the Near site (629.1 g/m<sup>2</sup>/yr) than at the Mid (186.8 g/m<sup>2</sup>/yr) or Reference (318.6 g/m<sup>2</sup>/yr) sites. Mean net primary productivity (ephemeral + perennial) was greater at the Near site (1574.4 g/m<sup>2</sup>/yr) than at the Mid (896.1 g/m<sup>2</sup>/yr) or Reference (934.6 g/m<sup>2</sup>/yr) sites.

Literature Cited:

Sall, J., M. Stephens, A. Lehman, and S. Loring. 2017. JMP Start Statistics: A guide to statistical and data analysis using JMP, sixth edition. Cary, NC: SAS Institute Inc. 660 p.

**Annual Wetland Monitoring Report**

**Facility and Wetland Name:** St. Charles Parish  
 Luling Oxidation Pond  
**Cycle Year:** 1

**AI Number:** 43356

**Year Date Range:** 2018

**WATER LEVEL MEASUREMENTS (surface water)**

Month/Year	Monthly Surface Water Level (cm)					
	Near	Mid	Out	Reference	Marsh Ref	
JAN/2018	52.7	41.8	9.2	62.2	9.5	
FEB	62.4	48.0	10.4	61.3	5.5	
MAR	51.3	44.8	8.1	57.7	0.0	
APR	58.4	39.3	15.8	57.3	0.0	
MAY	47.8	28.2	5.1	37.4	0.0	
JUNE	41.1	41.2	11.1	52.9	0.0	
JULY	47.4	41.4	13.6	40.2	0.0	
AUG	41.7	45.3	8.0	44.9	0.0	
SEPT	53.5	31.8	15.7	51.8	7.0	
OCT	42.3	25.9	22.9	42.9	15.8	
NOV	55.6	57.8	35.9	47.5	0.0	
DEC	49.2	35.7	1.8	58.5	0.0	

Provide a summary of the overall water depth for one year.

Mean surface water depth at the Near, Mid, and Forested Reference sites were very similar, fluctuating throughout the year but always above 25 cm in depth. The Out site had no standing water for much of the year and mean water depths at the Marsh Reference site ranged between 0 and 35 cm.

## Annual Wetland Monitoring Report

**Facility and Wetland Name:** St. Charles Parish  
 Luling Oxidation Pond  
**Cycle Year:** 1

**AI Number:** 43356

**Year Date Range:** 2018

### NUTRIENTS I and II (surface water)

Parameter	Assimilation Area Loading Rate (g/m <sup>2</sup> /yr)						
Total Nitrogen (TN) Loading Rate	6.68						
Total Phosphorus (TP) Loading Rate	1.11						
	Nutrient Species Annual Mean (mg/L)						
	Near	Mid	Out	Reference	Marsh Ref		
<b>NUTRIENTS I</b>							
Total Kjeldahl Nitrogen <sup>a</sup> (TKN)	9.00	7.46	0.87	1.13	0.20		
Total Phosphorus <sup>a</sup> (TP)	0.45	0.32	0.21	0.27	0.23		
<b>NUTRIENTS II</b>							
Ammonia Nitrogen <sup>a</sup> (NH <sub>3</sub> -N)	5.37	5.25	0.03	0.59	0.03		
Nitrate-Nitrite Nitrogen <sup>a</sup> (NO <sub>3</sub> +NO <sub>2</sub> -N)	0.11	0.02	0.02	0.03	0.02		
Phosphate Phosphorus <sup>a</sup> (PO <sub>4</sub> -P)	1.70	1.93	0.24	0.13	0.02		

<sup>a</sup> If the analytical result is below the laboratory detection level, include the detection level in the results (e.g., <0.5 mg/L).

**Loading Rates:**

If the value for TN is greater than 15 g/m<sup>2</sup>/yr or the value for TP is greater than 4 g/m<sup>2</sup>/yr, provide an explanation of the reason that it occurred and how it will be addressed (refer to Other Conditions Paragraph of permit).

Click here to enter text.

**Statistical Analysis:**

- 1) Show the results of the statistical test comparing the wetland sites for each parameter above (excluding the loading rates). Describe the statistical test performed and reasoning for choosing the test. The results should include the sample size and P value obtained.

Summary statistics were calculated using JMP (Version 12) produced by SAS Institute, Inc. (Sall et al. 2017). Analysis of variance (ANOVA) was carried out to detect differences between means. Comparisons of means with significant ANOVA tests were made using the Tukey-Kramer Honestly Significant Difference (HSD) test (Sall et al. 2017). These analyses were chosen because they are widely accepted methods to determine differences among means. All analyses were carried out using a p value of 0,05 to determine significance. Marsh and forested wetland sites were analyzed separately and compared to their respective reference (marsh or forested).

Results of the statistical analyses are included at the end of the report.



**Annual Wetland Monitoring Report**

**Facility and Wetland Name:** St. Charles Parish  
Luling Oxidation Pond  
**Cycle Year:** 1

**AI Number:** 43356

**Year Date Range:** 2018

**NUTRIENTS I and II (surface water)**

2) **Has there been a significant difference ( $p < 0.05$ ) between any of the wetland areas for:**

TKN	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	PO <sub>4</sub> -P	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
NH <sub>3</sub> -N	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	TP	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
NO <sub>3</sub> +NO <sub>2</sub> -N	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		

3) **If yes, please explain the significant differences observed and outline any corrective actions taken, if needed.**

Mean orthophosphate concentrations in surface water at the Near (1.70 mg/L) and Mid (1.93 mg/L) sites were greater than mean concentration at the Forested Reference site (0.13 mg/L). No differences were measured between orthophosphate concentrations in surface water at the Out and Marsh Reference sites.

## Annual Wetland Monitoring Report

**Facility and Wetland Name:** St. Charles Parish  
 Luling Oxidation Pond  
**Cycle Year:** 1

**AI Number:** 43356

**Year Date Range:** 2018

### OTHER PARAMETERS (surface water)

PARAMETER	In Situ Parameter Annual Mean					
	Near	Mid	Out	Reference	Marsh Ref	
Biochemical Oxygen Demand (BOD <sub>5</sub> ) (mg/L)						
Total Suspended Solids (TSS) (mg/L)	5.00	10.00	6.80	9.20	6.50	
pH (s.u.)	7.15	7.12	7.14	7.13	7.11	
Dissolved Oxygen (DO) (mg/L)	1.72	1.56	1.43	1.61	2.94	
Salinity (ppt)	0.38	0.32	0.17	0.13	0.14	
Temperature (°C)	21.1	20.7	21.1	20.1	21.0	

\* If the analytical result is below the detection level, include the detection level in the results (example: <0.5 mg/L).

**Statistical Analysis:**

- 2) Show the results of the statistical test comparing the wetland sites for each parameter above. Describe the statistical test performed and reasoning for choosing the test. The results should include the sample size and P value obtained.

Summary statistics were calculated using JMP (Version 12) produced by SAS Institute, Inc. (Sall et al. 2017). Analysis of variance (ANOVA) was carried out to detect differences among means. Comparisons of means with significant ANOVA tests were made using the Tukey-Kramer HSD test (Sall et al. 2017). These analyses were chosen because they are a widely accepted method to determine differences between means.

Results of statistical tests are included at the end of this report.

Mean BOD (mg/L):

Near – 6.00

Mid – 7.00

Out - 2.75

Forested Reference – 3.00

Marsh Reference – 3.23

- 3) Has there been a significant difference ( $p < 0.05$ ) between any of the wetland areas for:

BOD <sub>5</sub>	X Yes <input type="checkbox"/> No	DO	<input type="checkbox"/> Yes <input type="checkbox"/> No
TSS	<input type="checkbox"/> Yes <input type="checkbox"/> No	Salinity	X Yes <input type="checkbox"/> No
pH	<input type="checkbox"/> Yes <input type="checkbox"/> No	Temperature	<input type="checkbox"/> Yes <input type="checkbox"/> No

- 4) If yes, please explain the significant differences observed and outline any corrective actions taken, if needed.

Mean BOD concentration at the Mid site (7.0 mg/L) was higher than that at the Forested Reference site (3.0 mg/L). Mean salinity at the Near site (0.38 ppt) was higher than that at the Mid (0.32 ppt) and Forested Reference (0.13 ppt) sites.

Mean dissolved oxygen concentration at the Marsh Reference site (2.94 mg/L) was higher than that at the Out site (1.43 mg/L).