

# Ecological Monitoring Data Summary

Gentilly Resilience District & Pontilly Stormwater Network

In collaboration with:



CITY OF NEW ORLEANS MOSQUITO, TERMITE AND RODENT CONTROL BOARD



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Gentilly Resilience District & Pontilly Stormwater Network

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All data reported herein are current as of May, 2023

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# 1. Summary

This report provides a summary of data collection efforts undertaken by the Tulane ByWater Institute in collaboration with the New Orleans Mosquito, Termite, and Rodent Control Board. The report describes efforts between 2017 and May 2023, and outlines additional data collection activities slated for Summer 2023 and beyond. Our agreement stipulates data collection on vegetation, avian communities, rodents, and mosquitos on selected features of the Gentilly Resilience District project, as well as limited data collection on the Pontilly Stormwater Project, and control sites beyond the Gentilly Neighborhood. The research design of this initiative pivots on evaluating pre- and post-construction conditions on GI sites. Therefore the main contributions of the study (metrics, maintenance practices, identification of potential exposure to environmental risk factors) require wider implementation of the GRD project features. Questions or feedback on this summary can be sent to PI Josh Lewis at jlewis9@tulane.edu.

# 2. Project Background

The ecological implications of transforming urban water systems are poorly documented, but are increasingly garnering the attention of municipal governments and scientists. Global change processes such as sea level rise and associated coastal land loss in addition to increased frequency of severe weather events have altered the relationship between water and human populations dramatically (Bender et al 2010; Dale et al 2001; Nicholls and Cazenave 2010). This is especially true in low-lying coastal cities in areas subject to coastal storms. (Grimm et al 2008; Hanson et al 2011). Some major risks for urban areas associated with global change processes and phenomena include changes in plant community structure, increases in established vector-borne diseases and emergence of new infectious diseases, increased exposure to hurricane storm surges, increased vulnerability to extreme precipitation events, and knock-on environmental effects of land abandonment (Dale et al 2001; Sukkop and Wurzel 2003; Patz et al 1996; Rael et al 2018; Lewis et a 2017; Peterson et al., 2020). Green infrastructure (GI) is one of the more common intervention methods used today as it not only addresses flooding issues but can also support numerous ecosystem services and benefits to people (Lewis et al 2017; Demuzere et al 2014).

While multiple GI projects have been implemented in New Orleans over past decade, there are still several unknowns concerning possible tradeoffs and overall effects on the urban environment and population. The Tulane Bywater Institute and New Orleans Mosquito, Termite, and Rodent Control Board (NOMTRCB) are investigating these issues through ecological surveys within the GRD footprint, citywide analyses of landscape patterns, and strategic evaluations of GI projects outside the GRD. Ecological surveys have focused on all strata of urban plant communities (trees, shrubs, herbaceous), land use and surface cover assessments, avian community compositions, and mosquito and rodent presence via trapping efforts.

Taken together, these inventories provide an in-depth view of ecological structure and function in the GRD footprint, alongside the possible environmental and public health risks associated with land use changes. Nevertheless, there are still a wide range of considerations which need to be addressed in order to gain a complete understanding of the ecological and public health ramifications associated with the GRD. This report summarizes data collection efforts as of June 2023, and outlines future data collection efforts moving forward.

# 3. Vegetation

This dataset includes information on community compositions across various vegetation layers (tree, shrub, herbaceous), measurements related to growth rate for trees and shrubs, and site-specific surface cover and land use assessments in addition to data which relates to vegetation-rodent associations. Vegetation surveys for GRD site began in 2017, while reference throughout New Orleans have vegetation inventories date as far back as 2009. In addition to GI sites in Gentilly, the project has also re-assessed a network of survey plots distributed throughout Orleans Parish, to serve as control sites that can reveal the possible novelty of emerging vegetation conditions on GI sites.

A major focus of the vegetation inventories has been to assess the distribution and abundance of invasive species across GRD sites. Specifically, Chinese tallow (*Triadica sebifera*) and golden raintree (*Koelreuteria paniculata*) have been observed on multiple sites in the project area. Both species, originally introduced for ornamental and landscaping purposes, exhibit aggressive growth and dispersal patterns characterized by their seed dispersal abilities and germination rates (USDA; UF-IFAS). As a result, significant areas of the GRD are dominated by these two species resulting in groves of invasive species. The spread of these species and others limits the expansion of native, marquee species such as live oak (Quercus virginiana) and bald cypress (Taxodium distichum) (Lewis et al 2017).

While the spread of invasive trees poses problems to New Orleans' native plant populations, it is also a major land management issue. Since it is necessary to remove these invasive trees, significant efforts would need to be made which would include physical removal and treatment with herbicide, in addition to removing saplings that appear in following years (Bruce et al 1997; UF-IFAS). However, the magnitude of these efforts cannot be understated when considering invasive species eradication in volume. For example, both of these invasive trees are present on one of the larger sites within the GRD to be developed, Mirabeau Water Garden, with over 160 Chinese tallow in sample plots alone. Moreover, three sites already developed as GI (small-scale rain gardens) in the GRD have Chinese tallow and/or golden raintree present within the tree layer. It is our understanding that the Dillard Wetland project plans include a major Chinese tallow remediation component, which is a positive step. Maintenance following this remediation will be critical as total eradication from the project footprint will likely prove challenging and require close monitoring and multiple treatments.

Sites within the GRD should be inventoried again following construction in order to determine the stand dynamics of the forest (Pretzsch 2008, Bechtold 2003), which would provide information on tree growth and mortality rates as well as forest structure and function. Determining urban forest growth rates and mortality provides a crucial understanding about ecological conditions and possible ecosystem services at these sites. Information gleaned from growth rates and mortality could provide insight into soil nutrient content, biomass measurements, and carbon sequestration capabilities (Pretzsch 2008; Nowak and Crane 2002). Increases/decreases in tree canopy cover will also be assessed using both on-site assessments and satellite/aerial imagery and NDVI analysis. An important note on changes in canopy cover: while project metrics identify increased tree canopy cover as an important goal for the GRD project, the high prevalence of invasive trees on large

project sites means that it will be likely that we observe decreases in canopy cover in our post-construction assessments, as invasives will be remediated. Based on data analysis carried out in other areas in the city, it will take at least 7-10 years for overall canopy cover to recover to pre-construction extents. This is a key tradeoff more broadly in the project's implementation. As the figures below show, many of the stormwater benefits currently generated by these sites are provided by invasive trees that will likely be removed. This points toward early reforestation as an important emphasis of implementation work.

## 3.1. Vegetation Dynamics on GRD Sites

The raw datasets covering vegetation on GRD project footprints is included as an appendix to this report. All GRD sites have been surveyed for trees, shrubs, and herbaceous plants. This data is however of little practical utility until project construction commences and changes in site hydrology and vegetation cover are initiated. To demonstrate the type of baseline analyses the team will work from when conducting re-inventories post-construction, some summaries of species compositions and stormwater benefits of vegetation for Mirabeau Water Garden and Dillard Wetlands are provided below. It is important to note that the following figures are based on a plot sample of the sites, not a complete inventory. The species breakdowns are broadly accurate and were validated by stem counts on site.

We assessed 248 individual trees at Mirabeau for diameter, height, and canopy spread, among other measures detailed in the data appendix.



**Figure 1a & 1b.** Species composition and estimated species-level contributions to stormwater interception at Mirabeau Water Garden. Note that two most important species on this site are invasive trees.

At the Dillard Wetland site we assessed ~1200 individual trees for diameter, height, and canopy spread, among other measures. The forest at this site is more diverse than Mirabeau,

with a native hackberry (or sugarberry) as the second most important species for stormwater interception (Figure 2a and 2b).



**Figure 2a & 2b.** Forest characteristics at Dillard Wetland site. Note dominance of the invasive Chinese tallow in the forest composition. Interestingly however, the native hackberry tree contributed more to stormwater interception, likely due to broader canopy spreads and more mature individuals.

3.2. Future Vegetation Data Collection and Analysis

Due to major hurricane impacts to New Orleans in 2020 and 2021, it is necessary to conduct additional vegetation data collection at GRD sites. Significant tree mortality was observed at key sites, especially Mirabeau and Dillard Wetland. The vegetation inventories were conducted at these sites in 2017 and 2019 respectively. To capture project construction impacts, the data must be updated to reflect hurricane impacts and not confuse the recent mortality as being associated with project construction. These validation surveys will be carried out in Summer 2023.

# 4. Mosquitos

# 4.1. Background

Mosquito trapping data collected by the NOMTRCB is focused on population dynamics for GRD and satellite sites. This dataset contains information on mosquito community structure for both species and gender by species, changes in population size over time, presence of vector species, and geographic distribution of mosquito. GRD mosquito data dates to January of 2018, and traps are checked on a weekly basis with a focus on the period from March to October. In conjunction with mosquito trapping, avian population surveys have been conducted at GRD sites beginning in 2017 and will and continue as of Spring 2023. Avian surveys provide information on species presence and population sizes, which provides necessary context for assessments of mosquito data.

Mosquitos use a variety of water sources as breeding habitat, ranging from stagnant streams, ponds and canals, to anthropogenic sources like tires, rain gardens and unmaintained swimming pools. Research has shown that some anthropogenic sources, specifically water storage GI and unmaintained swimming pools, can alter the biological filters which regulate vector species density and in turn human exposure to mosquito species which are capable of transmitting disease (Moise et al., 2018, LaDeau et al., 2015, Caillouet et al. 2008). Furthermore, unmaintained vegetation and debris associated with urban land abandonment and green blight result in increased habitat for mosquitoes and other pests (Little et al. 2017; Peterson et al. 2020).

In terms of mosquito-borne pathogens, there are three species which are of primary concern for human health: *Aedes aegypti, Aedes albopictus*, and *Culux quinque*. All these vector species were observed at GRD sites which have been trapped for mosquitoes, which are known vectors for West Nile, Zika, and Dengue. Preliminary results from mosquito trapping data showed that female *C. quinque* were the most abundant species found at GRD sites, with female morphs of *Ae. aegypti and Ae. albopictus* the second and third most abundant respectively. There is also variation in populations over time, with noticeable spikes in in vector populations, though the consequence of the trend is not well understood at this time.

When considering the interaction between avian populations and mosquitoes, several species of birds are known to act as pathogen reservoirs for several infectious diseases, including West Nile virus (Komar et al 2003; Kilpatrick et al 2008). Avian survey data showed that, at GRD sites trapped for mosquitoes thus far, at least one bird species known to have competency for WNV was observed in addition to all three vector species of mosquitoes present.

## 4.2. Mosquito Surveillance on Green Infrastructure Sites in New Orleans

An important aim of the monitoring program is to understand mosquito biodiversity at green infrastructure sites and to provide analysis of post-intervention changes in mosquito community composition, vector species abundances, and vector-borne/zoonotic disease risk. Constructed wetlands often contain higher mosquito larval densities than natural water environments. Poor maintenance of constructed GI sites resulting in dense vegetation overgrowth and accumulation of dead vegetation can alter water quality and nutrient load, potentially increasing habitat suitability for urban vectors (e.g., *Culex* species). Urban water bodies also provide suitable habitat for birds, which are the primary hosts for West Nile virus (WNV), St. Louis encephalitis (SLE), and Eastern equine encephalitis (EEE). Increased contact rates between mosquito vectors and birds, especially in recreational areas with high human traffic, can increase the risk of mosquito-borne disease transmission.

## 4.3. Mosquito Surveillance Methods

Eight GI sites have been continuously monitored since 2019: Dillard Wetlands, Mirabeau Garden, Stormwater Lots 1 and 2 (Pontilly), Dwyer Canal, Oak Park, Filmore Playground, Gatto Playground, and the St. Bernard project site. Mosquitoes are trapped every other week at each site, weather permitting. NOMTRCB deploys CO2-baited CDC light traps, which target host-seeking adult mosquitoes. These traps tend to capture the greatest diversity and are highly suitable for forested and green areas. Collected mosquitoes are taken to the laboratory for identification to species. Species of medical concern are pooled and sent to the Louisiana Disease Diagnostic Laboratory (LADDL) at the LSU Vet School in Baton Rouge for mosquito-borne virus screening.

## 4.4. Preliminary Findings

Species richness in 2022 at large-scale forested sites is highest, with 34 species at Dillard Wetlands and 31 at Mirabeau Water Garden (Figure 3). Differences in site richness and composition could be due to site features or landscape characteristics at greater spatial scales. Across all six continuously monitored sites, 50% or more of species are known or potential vectors of medical or veterinary concern (Figure 3).

Closer examination of large-scale sites in 2022 shows year-round mosquito activity with limited change in species composition in fall and winter (October - March) versus spring and summer (April - September). *Culex nigripalpus* and *Aedes vexans* as the dominant species (Figures 4,5). Summary findings from one year pre- and post-construction on Pontilly Stormwater Lot 1 (2019 and 2021, respectively) show that species richness increased marginally from 13 to 17 species, but that mean species abundances of key vectors *Culex salinarius* and *Cx. coronator* increased 5 to 10-fold. Of note also is the detection of large populations of *Culex erraticus*, a known bridge vector of EEE and previously rarely detected species in Orleans Parish, at surveillance sites across Orleans Parish beginning in 2020.

4.5. Summary of Results and Discussion

Preliminary summary data indicate high probability of habitat suitability for *Culex* species, the primary vectors of WNV, SLE, EEE, and canine heartworm, and well as other known primary and bridge vectors. The presence of chronic surface water combined with dead or decaying vegetation creates conducive conditions for breeding of *Culex* and *Anopheles* species. It is important to note that collection of adult mosquitoes at GI sites does not necessarily indicate that the collected mosquitoes are breeding within the site, but rather that these mosquito species are present in the localized area and thus could use these sites for breeding on and opportunistic basis. We have been informed that a leaking fire hydrant may have been the culprit for the standing water observed at SL-1, and other steps are being taken to better drain the site. Additionally, we did observe chronic wet conditions at a stormwater lot at 4700 Mark Twain Drive, where a broken water line was leaking from the street into the lot. This was

not a problem with stormwater lot per se, but rather a broken drinking water line. It is worth mentioning that reportedly the only two problem sites in the Pontilly Stormwater Network out of dozens of projects were both related to adjacent leaks in the drinking water lines, rather than the performance of the lot itself. This does suggest that monitoring and inspection of the sites for nearby leaks would be worthwhile. Otherwise, as of our most recent inspections, the vast majority of lot-scale sites have not been observed holding water more than a day or two, which minimizes the risk of on-site breeding. In addition to the two sites in Pontilly we have observed continuous surface water at Dillard Wetlands. It should also be noted however that this has likely been the case for decades, and designs for the Dillard Wetland site are intended to produce better drainage of the site by connecting the existing shallow sloughs and depressions into the drainage network. If this is implemented properly it would likely reduce the duration that surface water persists on the site and is thus likely to reduce mosquito breeding habitat while increasing temporary water storage.

The designs for both Mirabeau and Dillard Wetland seem appropriate and in line with best practices for minimizing potential mosquito breeding habitat. Proper maintenance and monitoring of these sites will be important, as ecological uncertainties exist in any project that alters habitat conditions. Site changes related to altered vegetation, opening of the forest canopy, manipulation of the main water body, altered hydrology, and increased human traffic could act as ecological filters that reduce site diversity and favor the proliferation of vector species. Many vector species already commonly occupy these spaces but are likely kept in check currently by ecological processes (e.g., competition, predation, food web dynamics) occurring within these highly diverse species communities. These risks are difficult to predict ahead of project implementation, again underscoring the importance of ongoing monitoring, especially at larger sites that are already acting as reservoirs for mosquitos.

Summary data show mean species abundances per season (e.g., Dillard and Mirabeau) or year (e.g., all other sites) and cannot parse out finer variation in species composition or abundance over time. As an example, mean values suggest *Culex nigripalpus* and *Aedes vexans* as the dominant species at many sites. However, these two species are known for explosive increases in adult population density after heavy rains, to the extent that one or two trapping events after flooding could bias annual mean values. The monitoring program would benefit from extensive data analysis that can account for differences due to sample week, season, rainfall, temperature, and other climate factors. Species data from other traps nearby and West Nile positive pool data from the NOMTRCB core surveillance program should also be included in more in-depth analysis. Comparison of pre- and post-construction mosquito data, particularly for large scale sites or those that routinely hold water, will elucidate changes in mosquito communities and allow modeling of changes mosquito-borne disease risk.

Site	Species	Med/Vet Concern
Dillard Wetlands	34	21
Mirabeau	31	19
Dwyer Canal	24	16
Lot 2	22	14
Lot 1	16	9
Gatto Playground	11	10
St. Bernard	11	9
Filmore Playground	8	8

**Figure 3.** Green infrastructure site richness and abundance for species of medical or veterinary concern (2019-2023).



Figure 4. Mean seasonal species abundances for Dillard Wetlands in 2022.







**Figures 6a & 6b.** Annual mean species abundances for Pontilly Stormwater Lot 1 in the year pre- and post-construction (2019 and 2021, respectively).









# 5. Rodents

Rodent trapping has been carried out jointly between staff at the Bywater Institute and the NOMTRCB during summer months beginning in 2017. Data collected on rodents includes species distributions, trapping rates per site, and tissue samples for rodents, which were collected in order to determine pathogen or parasite prevalence within rodent populations. Questions about rodent trapping data or methodology should be directed to Claudia Riegel at the NOMTRCB.

One of the main interests in monitoring rodent populations within the GRD is to determine what pathogens are being carried by individuals and therefore pose a public health risk. It is known that rodents may become a problem in highly vegetated and unmaintained green space, in addition to carrying a host of infectious diseases such as leptospirosis and bartonellosis (Langton et al 2001; Himsworth et al 2013). However, more recent studies have

focused on the prevalence of pathogens which cause illnesses known as emerging infectious diseases (EID). EID are characterized by their prevalence in areas in which their pathogens or infection has not been recorded historically but has appeared in recent years (NIAID 2018). In New Orleans, there are two main EIDs and their pathogens being tracked by researchers. Parasites such as rat lungworm (*Angiostrongylus cantonensis*) and Chagas-inducing *Trynasoma cruzi* have both been found in rodent populations in Gentilly and throughout New Orleans (Rael et al 2018; Dorn et al 2007).

Future directions for rodent-related research should include a deeper look into population dynamics of rodents in the GRD, as preliminary data has only been able to establish baseline population estimates. A greater understanding of how rodents are distributed across the GRD footprint would allow for NOMTRCB staff to develop adequate response actions to deal with the pests. Additionally, it would allow for city officials to understand which human populations are at greater risk to diseases carried by rodents. Pre- and post-intervention surveys should also be carried out to determine if GI is more likely to attract rodents due to increases in resource and habitat availability. Overall, trapping numbers at GRD do not show a higher abundance of rodent presence than may reference sites across the city, and in many cases, trapping numbers deviate below average rates city-wide. Rodent data are included in the accompanying data appendix.

# 6. Non-rodent Mammals

Several mammal species common in the New Orleans region are reservoirs for *Trypanosoma cruzi* (*T. cruzi*), the parasite responsible for causing Chagas, a neglected zoonotic disease. These species include coyotes (*Canis latrans*), dogs (*Canis familiaris*), raccoons (*Procyon lotor*), and nine-banded armadillos (*Dasypus novemcinctus*). New Orleans is one of the areas in the Gulf South with confirmed human infections from local transmission of *T. cruzi*, via the insect vector *Triatoma sanguisuga* (Triatomine or "kissing bugs). A recent analysis showed that raccoons in New Orleans have a high prevalence of *T. cruzi* infection (Majeau et al., 2023). The study showed that:

"...raccoons in the US are confirmed as an important reservoir species for *T. cruzi* and harbor a greater diversity of parasite than previously identified. Geographic differences in parasite diversity infecting these raccoons argue against host-specific differences in susceptibility to *T. cruzi* DTUs, and rather suggest that ecological niches play a significant role in shaping the distribution of parasite diversity, highlighting the existence of punctuated, local transmission cycles. Given both this finding and the evidence that some haplotypes may have tissue-specific tropisms, which may contribute to differences in infection outcomes, widespread *T. cruzi* surveillance in reservoir species with next-generation sequencing approaches remains an important component of assessing risk to human health in the US." (p. 379-380).

It is important to note that Chagas disease in humans is exceedingly rare in the United States. It is much more common in Latin America, where it is estimated that up to 18 million people are infected with the *T. Cruzi* parasite, including 3 million people in Mexico alone. Risk factors associated with Chagas include "…living in geographic areas with warm and humid weather, poor hygiene, living conditions related to poverty, and the presence of animals living inside the houses" (Medina-Torres et al., 2010). Research thus indicates that substandard or informal housing conditions are risk factors for human exposure to *T. cruzi*.

We are not aware of any active surveillance programs in Orleans Parish assessing the abundance and/or species diversity of non-rodent mammals, including on GRD project sites or other GI sites. To our knowledge this has never been systemically assessed in urban neighborhoods in New Orleans generally. It is not known whether increased water availability, soil moisture, or changes in vegetation resulting from GI projects alter habitat factors for these non-rodent mammals. While trapping of racoons, stray dogs, and other mammals is not currently feasible within our project scope, we will deploy an array of camera traps at the Mirabeau Water Garden and Dillard Wetland sites in the summer of 2023, to assess the utility of these devices to identify the presence of non-rodent mammals. This is a tentative step towards a more comprehensive assessment in the future. If camera traps are effective in identifying non-rodent mammals visiting project sites prior to construction, we will deploy them following GI construction to assess whether habitat alterations triggered by the projects may influence resident populations.

# 7. Termites

There has been little research concerning ecological aspects of termite populations within the GRD, and the Bywater Institute/NOMTRCB has not collected monitoring data as this is not within our project scope.

Outside research has demonstrated, however, that some species of termites exhibit higher survival rates in a positive correlation with relative humidity (Zukowski and Su 2017), increased material consumption along moisture gradients (Green, Scharf, and Bennett 2005), and that drier conditions tended to inhibit colony growth and differentiation of termites (Esenther 1969). Additionally, a study in Mississippi Delta Experimental Forest found a combination of soil moisture and elevation contributed to variation in termite species distribution and termite activity (Wang and Powell 2001). The Delta Experimental Forest habitat shares some similarities with certain GRD project features. Generally speaking, higher moisture and resources availability on sites may contribute to Formosan termite abundance, though this is not part of the GRD ecological monitoring scope and our team is not collecting termite data on GI sites.

# 8. Birds

Avian surveys have been conducted on GRD project sites and the Pontilly Stormwater Network since 2017. All project sites have been visited and avian survey data is available on individual sites by request. Avian datasets are included as an appendix to this report.

The completion of the Pontilly Stormwater Network provided an opportunity to assess changes in avian abundance and diversity both before and after project construction. The remainder of this section focuses on change observed on these sites since the project's completion.

# 8.1. Methods

During the summers of 2017 and 2018, the ByWater Institute conducted a series of avian surveys at sites in the Pontilly neighborhood that were slated to be redeveloped into green infrastructure sites. Construction on those stormwater lots (SLs) finished in 2021. Those same sites were re-visited in the summer of 2022 with another series of avian surveys conducted the same way as they were in the previous years.

All sites were surveyed three times over the summer between the hours of 8 AM and 12 PM. All birds seen and heard at each site were recorded. For all sites except for Pontchartrain Park (PTP), area searches were conducted for thirty minutes, where the surveyor would patrol the lot to observe individuals. PTP is a longer site, so transects were used. The transects took the surveyor down and back the area starting at the parking lot playground to the west, with each survey taking twenty minutes. Care was taken to spread out which sites were surveyed on any given day so the same individuals would not be counted twice.

Shannon's Diversity (H') was used to calculate diversity at each site over all three surveys via the formula  $H' = -\sum (p_i * \ln(p_i))$ . The metric considers for the number of species (species richness) and the individual count for each species (evenness/dominance).

8.2. Survey Results

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#### <u>SL-1 - 5037 Columbia St - 30.029895 °N, 90.037856 °W</u>



## Change in Diversity from 2017: -0.006081333998 $\rightarrow$ negligible decrease

Description: SL-1 represents possibly the most unique and "natural" ecosystem out of all the stormwater lots. The presence of cattails, tall grasses, and standing water reflects fresh/intermediate marsh conditions. Coinciding with that appearance is the presence of some species that prefer that habitat, namely red-winged blackbirds and a common yellowthroat, species that were not recorded at any of the other twenty-five sites. The site was also unique in that individuals were more concentrated in the lot itself rather than on surrounding artificial structures, unlike every other site. A water leak causing the lot to fill with water was reportedly repaired in May 2023.

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Info	Survey 1	Survey 2	Survey 3
Date	6/14/2022	6/29/2022	7/12/2022
Sky	1	1	1-2
Wind (Beaufort)	2	3	1-2
Temperature (°F)	84	83	85
Water Level	Low	Low	Low-Moderate
Species	Survey 1	Survey 2	Survey 3
Mourning Dove	3	3	11
Black-crowned Night-Heron	1		
Great Crested Flycatcher	1		
American Crow	4	2	
Fish Crow	1	2	
Purple Martin	1	1	2
European Starling	14	3	7
Northern Mockingbird	4	2	1
Red-winged Blackbird	11	4	3
Rock Pigeon (Feral Pigeon)		1	
Laughing Gull		1	3
Great Blue Heron		1	
Great Egret		3	
Snowy Egret		1	
White Ibis		5	1
Blue Jay		1	
House Finch		2	
Mississippi Kite			3
Common Yellowthroat			1
Species Richness	9	15	9
Total Individuals	40	32	32

#### <u>SL-2b - 6400 Pauline Dr - 30.025732 °N, 90.036864 °W</u>



## Change in Diversity from 2017: -0.06174097985 → slight decrease

Description: SL-2b is an example of the more common design of the stormwater lots: positioned between two homes, calf to knee-high grass on the outskirts, with a small number of new trees on the site. The site was notable for the birds' prevalent use of artificial structures (wires, roofs, telephone poles, etc.) for perches. SL-2b was one of two sites where a loggerhead shrike was observed and the only site where one was observed on more than one survey.

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Info	Survey 1	Survey 2	Survey 3
Date	6/21/2022	7/14/2022	7/26/2022
Sky	1	2	1
Wind (Beaufort)	1	2-3	0
Temperature (°F)	87	84	83
Water Level	None	None	None
Species	Survey 1	Survey 2	Survey 3
Mourning Dove	3	2	1
Forster's Tern	1		
Great Egret	1		
Black-crowned Night-Heron	1		
Mississippi Kite	1	2	
Downy Woodpecker	1	1	
Loggerhead Shrike	1		1
American Crow	1		4
European Starling	16	18	7
Northern Mockingbird	2	3	3
House Sparrow	3	2	4
House Finch	2	2	
Northern Cardinal	1		
Laughing Gull		1	1
Monk Parakeet		2	2
Blue Jay		2	3
Fish Crow		2	3
Carolina Wren			1
Species Richness	13	11	11
Total Individuals	34	37	30

#### <u>SL-2d - 6421 Debore Dr - 30.025717 °N, 90.037476 °W</u>



#### Change in Diversity from 2017: +0.6022884883 → substantial increase

Description: SL-2d is fairly different in layout and composition than other sites due to a higher amount of dense vegetation from small trees and shrubs. The increased cover likely contributed to this site being the only site where a nest was confirmed in a short flowering tree and tracked over time. The nest contained eggs during the first survey and young hatchlings during the second survey. At the third visit, the young had fledged and were hiding in the unmaintained grass below. SL-2d is the only site where a gull-billed tern was observed flying overhead, though that is likely incidental. The lot is also longer than most other lots, but most individuals were observed on the street surrounding the site and on the near side of the lot.

SI	2d
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Info	Survey 1	Survey 2	Survey 3
Date	6/17/2022	6/30/2022	7/14/2022
Sky	1	1	2
Wind (Beaufort)	2	2	2-3
Temperature (°F)	84	82	84
Water Level	None	None	None
Species	Survey 1	Survey 2	Survey 3
Mourning Dove	4	3	2
Gull-billed Tern	1		
Great Blue Heron	1		
Great Egret	1		
Black-crowned Night-Heron	1		
Downy Woodpecker	1		1
Blue Jay	2	3	2
Carolina Wren	1		
European Starling	2	16	18
Northern Mockingbird	1	3	3
House Sparrow	2	2	2
House Finch	1	2	2
Laughing Gull		1	1
Mississippi Kite		2	2
Monk Parakeet		3	2
Great Crested Flycatcher		1	
Fish Crow		1	2
Carolina Chickadee		1	
Species Richness	12	12	11
Total Individuals	18	38	37

#### <u>SL-6 - 5445 St Ferdinand Dr - 30.015556 °N, 90.043398 °W</u>



#### Change in Diversity from 2017: 0.3066237118 → modest increase

This site was notable for its consistent concentration of blue jays on the far side in the larger trees. Activity strongly suggested breeding activity. Nearer to the lot, monk parakeets and European starlings were observed on nearby wires on the street while house sparrows used the roof of the house to the north. Kites were observed on wires on neighboring Mithra St. The final day featured flyovers of a white ibis and cattle egret, though they did not interact with the site.

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Info	Survey 1	Survey 2	Survey 3
Date	6/21/2022	7/7/2022	7/26/2022
Sky	1	0-1	0-1
Wind (Beaufort)	2	1	0
Temperature (°F)	87	86	86
Water Level	None	None	None
Species	Survey 1	Survey 2	Survey 3
Downy Woodpecker	1	1	1
Blue Jay	7	5	2
American Crow	1	2	1
Fish Crow	1	1	
European Starling	6	3	
Northern Mockingbird	2	5	
Mourning Dove		1	2
Mississippi Kite		1	2
House Sparrow		2	3
Cattle Egret			1
White Ibis			1
Monk Parakeet			3
Species Richness	6	9	9
Total Individuals	18	21	16

#### SL-14 - 4662 Dreux Ave - 30.014336 °N, 90.037073 °W



## Change in Diversity from 2017: -0.09893888576 → slight decrease

Nearly all the bird activity at this site came from the Dreux ditch to the north. Multiple wading birds flew over from that area, and doves, starlings, and mockingbirds used the bordering wires as perches. A red-shouldered hawk was observed hunting on more than one occasion, inciting defensive behavior from mockingbirds.

S	L-1	4

Info	Survey 1	Survey 2	Survey 3
Date	6/17/2022	6/30/2022	7/14/2022
Sky	1	1	2
Wind (Beaufort)	2	2	2
Temperature (°F)	85	84	85
Water Level	None	None	None
Species	Survey 1	Survey 2	Survey 3
Mourning Dove	1		1
Great Egret	1		1
Cattle Egret	1	1	1
Red-shouldered Hawk	1	1	
Great Crested Flycatcher	1		
Fish Crow	1		2
European Starling	6	6	3
Northern Mockingbird	3	2	5
Snowy Egret		1	
Monk Parakeet		2	
Blue Jay		3	
House Sparrow		7	
Mississippi Kite			1
American Crow			2
Species Richness	8	8	8
Total Individuals	15	23	16

#### <u>SL-15a - 4900 Dreux Ave - 30.01457 °N, 90.035941 °W</u>



## Change in Diversity from 2017: -0.2537908935 → modest decrease

SL-15a had the largest decrease in diversity out of all the re-surveyed sites. Its trends were similar to those of SL-14. Most of the activity took place in the canal to the north and the wires surrounding it. There was decently high predator activity, as they likely took advantage of the larger, high-visibility space to patrol from the air. Despite higher tree cover compared to other sites, the lot did not appear to attract much avian activity.

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Info	Survey 1	Survey 2	Survey 3
Date	6/21/2022	7/7/2022	7/26/2022
Sky	1	1	0-1
Wind (Beaufort)	3	2-3	1
Temperature (°F)	89	88	88
Water Level	None	None	None
Species	Survey 1	Survey 2	Survey 3
Mourning Dove	2		
Mississippi Kite	1		3
Downy Woodpecker	1		
Blue Jay	2	1	5
European Starling	5		
Northern Mockingbird	3	2	
House Sparrow	2	1	2
American Crow		3	
Red-shouldered Hawk			1
Fish Crow			1
Carolina Chickadee			3
Northern Cardinal			1
Species Richness	7	4	7
Total Individuals	16	7	16

#### <u>SL-15b - 4953 Desire Dr - 30.012389 °N, 90.035385 °W</u>



## Change in Diversity from 2017: +0.2662453753 → modest increase

The site and surrounding area lacked as many wires and telephone poles as other sites, and that potentially translated to fewer starlings and parakeets perching in the area. House sparrows were most frequently seen on rooftops of neighboring houses. There was a raucous population of blue jays across the street that reacted to the kites aggressively each time they were observed.

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Info	Survey 1	Survey 2	Survey 3
Date	6/22/2022	7/8/2022	8/3/2022
Sky	0	0	1
Wind (Beaufort)	4	2	2
Temperature (°F)	84	86	81
Water Level	None	None	Minimal
Species	Survey 1	Survey 2	Survey 3
Mourning Dove	1		1
Mississippi Kite	1	1	1
Monk Parakeet	2		
Blue Jay	1	12	5
Carolina Chickadee	2		
European Starling	4		
Northern Mockingbird	2	2	2
House Sparrow	5	2	6
Snowy Egret		1	
White Ibis		1	2
Fish Crow		3	1
Purple Martin		3	
Laughing Gull			1
Downy Woodpecker			1
American Crow			3
Species Richness	8	8	10
Total Individuals	18	25	23



## Change from Diversity in 2017: +0.1997682155 → modest increase

The diverse surrounding vegetation and larger size of the lot likely contributed to its high activity. There was a potential pair of nesting Carolina wrens near the brick wall on the northern border of the lot. A downy woodpecker was seen in the same holly tree in front of one of the east-facing houses each survey. Most of the activity came from the telephone poles and wires on lining Press Dr on the east side of the site.

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Info	Survey 1	Survey 2	Survey 3
Date	6/14/2022	6/29/2022	7/12/2022
Sky	1	2	1-2
Wind (Beaufort)	2	2	2
Temperature (°F)	86	85	88
Water Level	None	None	None
Species	Survey 1	Survey 2	Survey 3
Mourning Dove	2		1
Little Blue Heron	1		
Mississippi Kite	2	1	
Downy Woodpecker	1	1	1
Great Crested Flycatcher	1		
Blue Jay	9	6	5
American Crow	4	2	2
Carolina Chickadee	2	2	1
Carolina Wren	2		1
European Starling	6	11	8
Northern Mockingbird	3	1	3
House Sparrow	2		2
Chimney Swift		1	
Black-crowned Night-Heron			1
Monk Parakeet			2
Fish Crow			1
House Finch			1
Species Richness	12	8	13
Total Individuals	35	25	29
#### <u>SL-20 - 4900 Feliciana Dr - 30.009948 °N, 90.040595 °W</u>



## Change in Diversity from 2017: +0.375201051 → substantial increase

A rather unremarkable site, SL-20 is perhaps the best example of what you expect from a site in the neighborhood. Mourning doves, starlings, and mockingbirds utilize the nearby wires on Feliciana Dr for perches. On the last day, there was an agitated group of blue jays at the house to the north. A great crested flycatcher and downy woodpeckers were sometimes heard but never seen.

Info	Survey 1	Survey 2	Survey 3
Date	6/17/2022	6/30/2022	7/14/2022
Sky	1	1-2,5	2
Wind (Beaufort)	2	2	1-2
Temperature (°F)	86	87	87
Water Level	None	None	None
Species	Survey 1	Survey 2	Survey 3
Great Crested Flycatcher	1		1
Blue Jay	1	1	3
American Crow	4	1	2
Carolina Chickadee	2		
European Starling	3	5	1
Northern Mockingbird	2	3	1
Mourning Dove		2	2
Downy Woodpecker		1	1
House Sparrow		1	1
House Finch			1
Species Richness	6	7	9
Total Individuals	13	14	13



## Change in Diversity from 2017: -0.2230186021 → modest decrease

SL-21 is directly across the intersection of Feliciana and Mirabeau from SL-20. Almost exactly the same trends were observed, though the site had lower diversity due to larger groups of starlings present on the survey days – diversity is lowered if individuals of one species make up a larger percentage of the total individuals. Like with SL-20, most of the activity took place on the wires along Feliciana, though on the south side of Mirabeau now instead.

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Info	Survey 1	Survey 2	Survey 3
Date	6/14/2022	6/29/2022	7/12/2022
Sky	1	1	1-2
Wind (Beaufort)	2	2	2
Temperature (°F)	87	83	87
Water Level	None	None	None
Species	Survey 1	Survey 2	Survey 3
Mourning Dove	3	2	2
Great Egret	1		
Great Crested Flycatcher	1		
Blue Jay	1	3	4
European Starling	13	3	7
Northern Mockingbird	3	2	3
Mississippi Kite		1	
Downy Woodpecker		1	1
American Crow		1	2
Carolina Chickadee		3	
House Finch			1
Species Richness	6	8	7
Total Individuals	22	16	20



## Change in Diversity from 2017: -0.02550967906 $\rightarrow$ negligible decrease

More arboreal species were present at SL-22, unlike most other sites which are dominated by the birds on artificial structures. Even the starlings and doves habituated the trees at this location rather than using wires or poles. Great crested flycatchers, our most common neighborhood summer migrants, were present and active at this site more than once.

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Info	Survey 1	Survey 2	Survey 3
Date	6/21/2022	7/7/2022	7/26/2022
Sky	1	1	1
Wind (Beaufort)	3	1	1-2
Temperature (°F)	90	86	88
Water Level	None	None	None
Species	Survey 1	Survey 2	Survey 3
Mourning Dove	2	2	1
Mississippi Kite	3		1
Downy Woodpecker	1	1	
Great Crested Flycatcher	1	3	
Blue Jay	4	2	3
Fish Crow	1		
Carolina Chickadee	2		
European Starling	3	5	5
Northern Mockingbird	2	1	1
House Finch	1		
Great Egret		1	
American Crow			1
Northern Cardinal			1
Species Richness	10	7	7
Total Individuals	20	15	13

#### <u>SL-23 - 4929/4937 Kendall Dr - 30.010789 °N, 90.039481 °W</u>



## Change in Diversity from 2017: +1.038162602 → major increase

SL-23 had the largest change in diversity from the previous surveys. The site had a reasonably lower proportion of invasive species compared to other sites in the neighborhood. Since those invasives tend to be species with the largest individual counts, their absence led to a markedly higher diversity value this year.

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Info	Survey 1	Survey 2	Survey 3
Date	6/28/2022	7/8/2022	8/3/2022
Sky	1-2	1	1-2
Wind (Beaufort)	3	2	2
Temperature (°F)	85	89	83
Water Level	None	None	None
Species	Survey 1	Survey 2	Survey 3
Mourning Dove	1	3	3
Mississippi Kite	4	1	
Great Crested Flycatcher	1		
Blue Jay	2	1	
American Crow	2	2	3
Fish Crow	1		
European Starling	1		5
Northern Mockingbird	3	3	2
House Sparrow	1	1	1
White Ibis		1	
Carolina Chickadee		2	3
Downy Woodpecker			1
House Finch			6
Species Richness	9	8	8
Total Individuals	16	14	24

## <u>SL-24 - 5101 Feliciana Dr - 30.011874 °N, 90.040502 °W</u>



### Change in Diversity from 2017: +0.7424669458 → major increase

This site also had a major increase in diversity, largely for the same reasons as SL-23 – lower numbers of invasive species yield higher diversity values, as they are not able to dominate the individual counts. SL-24 had a higher number of aerial feeding species (kites, swifts, swallows) than other sites, which is unexpected due to the sites closed-off appearance.

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Info	Survey 1	Survey 2	Survey 3
Date	6/22/2022	7/8/2022	8/3/2022
Sky	0	0-1	1-2
Wind (Beaufort)	3	2	2
Temperature (°F)	85	87	84
Water Level	None	None	None
Species	Survey 1	Survey 2	Survey 3
Chimney Swift	3		
Tricolored Heron	1		
Mississippi Kite	1	1	2
Monk Parakeet	2		1
Blue Jay	3	2	7
American Crow	1	3	
European Starling	3	2	
Northern Mockingbird	1	2	2
Fish Crow		1	
Carolina Chickadee		1	
Purple Martin		2	
Mourning Dove			1
White Ibis			8
Species Richness	8	8	6
Total Individuals	15	14	21

# <u>SL-25 - 4816 Kendall Dr - 30.008598 °N, 90.039567 °W</u>



# Change in Diversity from 2017: -0.02197320601 → negligible decrease

SL-25 followed typical trends found at other sites. No notable findings or changes.

Info	Survey 1	Survey 2	Survey 3
Date	6/22/2022	7/8/2022	8/3/2022
Sky	0	1	1
Wind (Beaufort)	3	2	2-3
Temperature (°F)	87	88	86
Water Level	None	None	None
Species	Survey 1	Survey 2	Survey 3
Mourning Dove	3	3	
Cattle Egret	1		
Downy Woodpecker	1		
Blue Jay	1	2	5
American Crow	5		1
Carolina Wren	1		
European Starling	7	1	2
Northern Mockingbird	1		1
House Finch	1		
Mississippi Kite		1	2
Monk Parakeet		2	
Carolina Chickadee		1	
White Ibis			3
Fish Crow			3
Species Richness	9	6	7
Total Individuals	21	10	17

## <u>SL-26 - 4968 Louisa Dr - 30.011771 °N, 90.038526 °W</u>



# Change in Diversity from 2017: -0.1550896588 → modest decrease

Observations at this site were very similar between surveys. Due to the relative openness of the site and surrounding area, the vast majority of individuals seen were on artificial structures. Overall, the site in general did not have much bird activity.

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Info	Survey 1	Survey 2	Survey 3
Date	6/17/2022	6/30/2022	7/14/2022
Sky	1	1-2	1-2
Wind (Beaufort)	3	2	2
Temperature (°F)	88	87	86
Water Level	None	None	None
Species	Survey 1	Survey 2	Survey 3
Mississippi Kite	1	1	1
Blue Jay	1	2	
American Crow	1		3
Fish Crow	1		1
European Starling	3	2	3
Northern Mockingbird	1	2	2
House Sparrow	1		3
Rock Pigeon (Feral Pigeon)		1	
Little Blue Heron		1	
Downy Woodpecker		1	
Northern Cardinal			1
Species Richness	7	7	7
Total Individuals	9	10	14

### <u>SL-27 - 4516 Mirabeau Ave - 30.009926 °N, 90.038198 °W</u>



## Change in Diversity from 2017: +0.6549023044 → substantial increase

SL-27 differed the most from the other corner lots. Activity was high in the sense that individuals tended to stay in the area rather than pass through. A flock of six chickadees was observed foraging on the first survey, kites foraged exclusively over the site and nearby houses, and crows foraged on the ground in the site or nearby. Invasive species used wires on the eastern side of the intersection as common perches.

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Info	Survey 1	Survey 2	Survey 3
Date	6/21/2022	7/7/2022	7/26/2022
Sky	1	0-1	1
Wind (Beaufort)	3	2-3	2
Temperature (°F)	90	87	90
Water Level	None	None	None
Species	Survey 1	Survey 2	Survey 3
Mourning Dove	2		1
Mississippi Kite	1	1	3
Downy Woodpecker	1		
Monk Parakeet	1		
Blue Jay	4	1	3
Carolina Chickadee	6		
Northern Mockingbird	1	1	1
House Sparrow	4	4	
American Crow		3	5
Fish Crow		1	
European Starling		2	
Rock Pigeon (Feral Pigeon)			2
White Ibis			1
Species Richness	8	7	7
Total Individuals	20	13	16

#### <u>SL-28 - 4739 Louisa St - 30.009334 °N, 90.037563 °W</u>



#### Change in Diversity from 2017: -0.0067277491 → negligible decrease

Potentially the most shaded of the sites, SL-28 consequently featured a lot of arboreal species. The first two surveys were nearly identical, with the presence of flycatchers and chickadees. The final survey identified the more common species of the neighborhood. The native species tended to stay closer to vegetation while invasives favored artificial structure across the street.

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Info	Survey 1	Survey 2	Survey 3
Date	6/14/2022	6/29/2022	7/12/2022
Sky	1	2	1
Wind (Beaufort)	2	2	2-3
Temperature (°F)	89	86	89
Water Level	Minimal	None	None
Species	Survey 1	Survey 2	Survey 3
Little Blue Heron	1		
Great Crested Flycatcher	2	2	
Blue Jay	1	3	6
American Crow	2	1	2
Carolina Chickadee	1	2	
Northern Mockingbird	3	2	2
House Sparrow	2	6	3
Mourning Dove		1	1
Mississippi Kite			1
Downy Woodpecker			1
European Starling			9
House Finch			1
Species Richness	7	7	9
Total Individuals	12	17	26

#### <u>SL-29 - 4700 Mark Twain Dr - 30.008918 °N, 90.036201 °W</u>



## Change in Diversity from 2017: -0.0445027215 $\rightarrow$ negligible decrease

SL-29 was the only site besides SL-1 to have consistent standing water. In this case, it was due to a leak in the street that then flowed into the site. Flycatchers were more common at this site than any other. Blue jays and chickadees, other arboreal species, were consistent across all three surveys. Invasives were mostly absent from the site, with a lone house sparrow in the third survey representing the only non-native individual.

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Info	Survey 1	Survey 2	Survey 3
Date	6/17/2022	6/30/2022	7/14/2022
Sky	1	1	1-2
Wind (Beaufort)	2-3	2	2
Temperature (°F)	89	85	86
Water Level	Low	Low	Low
Species	Survey 1	Survey 2	Survey 3
Great Crested Flycatcher	5		4
Blue Jay	3	3	6
American Crow	1		1
Carolina Chickadee	1	6	2
Northern Mockingbird	1	1	1
Chimney Swift		8	
Mississippi Kite		2	
Downy Woodpecker		2	2
House Finch		2	1
Great Egret			1
House Sparrow			1
Northern Cardinal			1
Species Richness	5	7	10
Total Individuals	11	24	20

#### <u>SL-31 - 4810 Desire Dr - 30.009650 °N, 90.035400 °W</u>



Change in Diversity from 2017: +0.188813277 → modest increase

SL-31 featured two sightings of individuals not seen anywhere else over the summer. A redbellied woodpecker and a cliff swallow were both observed on the first survey. Blue jays were communal on the site and in larger numbers compared to surrounding areas. Other arboreal species like downy woodpeckers and chickadees were later observed at the site.

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Info	Survey 1	Survey 2	Survey 3
Date	6/22/2022	7/8/2022	8/3/2022
Sky	0	1	1
Wind (Beaufort)	3	2	2
Temperature (°F)	88	88	86
Water Level	None	None	None
Species	Survey 1	Survey 2	Survey 3
Mourning Dove	1	3	1
Snowy Egret	1		
Mississippi Kite	1	1	1
Red-bellied Woodpecker	1		
Blue Jay	4	6	2
American Crow	1		
Cliff Swallow	1		
European Starling	7	1	
Northern Mockingbird	1	2	
House Sparrow	6		3
Downy Woodpecker		1	
Carolina Chickadee			4
Species Richness	10	6	5
Total Individuals	24	14	11

#### <u>SL-33 - 4900 Congress Dr - 30.01186 °N, 90.033861 °W</u>



#### Change in Diversity from 2017: +0.5447444655 → substantial increase

Site SL-33 had starkly different survey results over time, with each ensuing survey yielding fewer species and individuals than the one prior despite near-identical conditions. The first survey was one of the more diverse individual surveys all summer and contained every species seen in the later surveys except for a laughing gull. It also had higher individual counts for nearly all species. The first survey diversity defied the apparent trend of corner lots being largely invasives due to more presence of artificial structure, though starlings and house sparrows were still present and in high numbers at that survey.

# <u>SL-33</u>

Info	Survey 1	Survey 2	Survey 3
Date	6/28/2022	7/8/2022	8/3/2022
Sky	1-2	1	1
Wind (Beaufort)	3	2-3	2
Temperature (°F)	87	89	88
Water Level	None	None	None
Species	Survey 1	Survey 2	Survey 3
Mourning Dove	2		
Anhinga	1		
Cattle Egret	2		1
Mississippi Kite	1	1	1
Downy Woodpecker	1	1	
Great Crested Flycatcher	2		
Blue Jay	6	5	6
American Crow	1	1	
Fish Crow	1		
European Starling	8	1	
Northern Mockingbird	2	3	
House Sparrow	6	4	2
Laughing Gull		1	1
Species Richness	12	8	5
Total Individuals	33	17	11

### <u>SL-34 - 4955 Stephen Girard Ave - 30.009 °N, 90.032816 °W</u>



### Change in Diversity from 2017: -0.06875496659 → slight decrease

The diversity in SL-34 was primarily hampered by the large numbers of house sparrows on each survey. The third survey featured a large flock of house sparrows that passed through. The sparrows were mostly located across the street to the south and the house to the west, either occupying the roofs or the ground in the street where there was often standing water.

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Info	Survey 1	Survey 2	Survey 3
Date	6/14/2022	6/29/2022	7/12/2022
Sky	1 2		1
Wind (Beaufort)	2 3		2-3
Temperature (°F)	90	87	90
Water Level	None None		None
Species	Survey 1	Survey 2	Survey 3
Mourning Dove	1		2
Mississippi Kite	1		
Great Crested Flycatcher	1		
Blue Jay	2	5	7
Fish Crow	2		
Carolina Chickadee	5		
European Starling	1	2	13
Northern Mockingbird	1	2	2
House Sparrow	4 12		35
Rock Pigeon (Feral Pigeon)		1	
Laughing Gull		2	
Cattle Egret			1
Species Richness	9	6	6
Total Individuals	18	24	60

## SL-35 - 4739 Plauche Cir - 30.010942 N, 90.032187 W



Change in Diversity from 2017: +0.07954285663 → slight increase

SL-35 was almost an even split between the use of vegetative habitat and artificial structures. The arboreal species were almost all seen exclusively on the back of the lot in trees neighboring the lot. The invasives, mockingbirds, and crows, were mostly seen farther north on Plauche on rooftops and wires.

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Info	Survey 1	Survey 2	Survey 3
Date	6/21/2022	7/7/2022	7/26/2022
Sky	1	1	1
Wind (Beaufort)	3	2-3	2-3
Temperature (°F)	91 89		90
Water Level	None	None	None
Species	Survey 1	Survey 2	Survey 3
Rock Pigeon (Feral Pigeon)	1	2	
Mourning Dove	1	1	
Mississippi Kite	1		3
Great Crested Flycatcher	2		
Blue Jay	4	2	3
American Crow	1	1	
European Starling	6		3
Northern Mockingbird	2	2	2
Carolina Chickadee		3	
Fish Crow		1	
Species Richness	8	7	4
Total Individuals	18	12	11

#### <u>SL-36 - 4974 Congress Dr - 30.013261 °N, 90.034297 °W</u>



Change in Diversity from 2017: +0.06242513337 → slight increase

SL-36 is located across the street from the much larger SL-37. Congress Dr is a larger and wider street compared to other streets in the neighborhood, resulting in more open habitat and more exposed artificial structure. Starlings were the most common bird sighted here, with a large flock of around forty observed at the first survey. Pigeons, which were surprisingly rare overall, were observed in two out of the three surveys.

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Info	Survey 1	Survey 2	Survey 3
Date	6/17/2022	6/30/2022	7/14/2022
Sky	1	1	2
Wind (Beaufort)	2	2	2
Temperature (°F)	90	83	84
Water Level	None	None	None
Species	Survey 1	Survey 2	Survey 3
Rock Pigeon (Feral Pigeon)	1	1	
Mourning Dove	2		2
ississippi Kite 3			1
Downy Woodpecker 1		1	
Blue Jay	3	4	7
American Crow	2	2	1
Fish Crow	1	1	2
Purple Martin	2		
European Starling	41	11	5
Northern Mockingbird	ern Mockingbird 1 3		3
Carolina Chickadee		2	1
House Sparrow		2	3
Species Richness	10	9	9
Total Individuals	57	27	25

## <u>SL-37 - 4963 Congress Dr - 30.013169 °N, 90.033737 °W</u>



## Change in Diversity from 2017: +0.4319635309 → substantial increase

Though SL-37 was across from SL-36, it differed in makeup, primarily in the dense, unmaintained shrubs and trees on the north side of the site. Carolina wrens were observed twice and prefer denser, shrubby habitat. Kites were seen twice patrolling over the site, but the majority of the bird activity was in the dense vegetation and artificial structures on the street.

<u>JL-J/</u>
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Info	Survey 1	Survey 2	Survey 3
Date	6/14/2022	6/29/2022	7/12/2022
Sky	1	1 2	
Wind (Beaufort)	2 3		2
Temperature (°F)	91 89		89
Water Level	None	None	None
Species	Survey 1	Survey 2	Survey 3
Rock Pigeon (Feral Pigeon)	3		
Downy Woodpecker	1		
Blue Jay	1	4	3
European Starling	7	2	6
House Sparrow	2		
Mourning Dove		1	1
Mississippi Kite		1	1
Fish Crow		2	
Carolina Wren		1	2
Species Richness	5	6	5
Total Individuals	14	11	13

Pontchartrain Park (PTP) - N of Prentiss Ave @ Piety Dr - 30.019263 °N, 90.042527 °W



## Change in Diversity from 2018: +0.4584041331 → substantial increase

Pontchartrain Park was the most diverse of all the sites, though this is unsurprising since it is the largest site in the Pontilly project. A significant degree of the increased diversity can be attributed to the rookery in the middle of the gold course to the north. Whereas the neighborhood sites would usually have wading birds fly over the site, this site is the source of high numbers of a variety of species. Egrets, herons, ibises, anhingas, and night-herons were all observed at the rookery, often in high quantities. Perhaps the most unusual individual of the entire summer, a herring gull was observed flying above the rookery during the final survey. The usual expected species like starlings, jays, mockingbirds, and crows were still present above and to the south of the retention area where the neighborhood form/structure was represented. The large size and diversity in habitat contributed to the diverse bird community at this location

Pontchartrain Park (	PTP)

Info	Survey 1	Survey 2	Survey 3
Date	6/28/2022	7/8/2022	8/3/2022
Sky	2	1	1-2
Wind (Beaufort)	3	2-3	2
Temperature (°F)	84	90	88
Water Level	None	None	Low/Minimal
Species	Survey 1	Survey 2	Survey 3
Duck sp.	4		
Mourning Dove	1	2	1
Laughing Gull	11		
Anhinga	13	4	6
Great Blue Heron	6		2
Great Egret	18	8	2
Snowy Egret	1		
Little Blue Heron	1	2	
Cattle Egret	4	1	6
Black-crowned Night-Heron	5		
White Ibis	40	16	12
Blue Jay	6	9	9
American Crow	2	1	3
Fish Crow	5	3	5
Carolina Chickadee	1	3	
European Starling	33	1	
Northern Mockingbird	5		
House Sparrow	4	3	2
Mississippi Kite		1	4
Downy Woodpecker		1	
Monk Parakeet		1	
Loggerhead Shrike		1	
Chimney Swift			4
Herring Gull			1
Purple Martin			2
Species Richness	18	16	14
Total Individuals	160	54	59

# 8.3. Diversity Data

Year-to Year Change

Measure	H'
Average Decrease	-0.0921626
Average Increase	0.399736985
Average Change	0.202977153

Site	H' (2017, 2018)	H' (2022)	Change
SL-1	2.385433972	2.37935264	-0.00608133
SL-2b	2.438804756	2.37706378	-0.06174098
SL-2d	1.639553074	2.24184156	0.602288488
SL-6	1.90970577	2.21632948	0.306623712
SL-14	2.345571869	2.24663298	-0.09893889
SL-15a	2.525038525	2.27124763	-0.25379089
SL-15b	2.036224889	2.30247026	0.266245375
SL-19	2.018415721	2.21818394	0.199768216
SL-20	1.73723572	2.11243674	0.375201015
SL-21	2.09403453	1.87101593	-0.2230186
SL-22	2.21807166	2.19256198	-0.02550968
SL-23	1.319979946	2.35814255	1.038162602
SL-24	1.537213775	2.27968072	0.742466946
SL-25	2.355203462	2.33323026	-0.02197321
SL-26	2.325807982	2.17071832	-0.15508966
SL-27	1.64368114	2.29858344	0.654902304
SL-28	2.176359309	2.16963156	-0.00672775
SL-29	2.128032383	2.17253511	0.044502722
SL-33	1.609918531	2.154663	0.544744466
SL-34	1.713393131	1.64463817	-0.06875497
SL-35	2.022915482	2.10245834	0.079542857
SL-36	1.682072039	1.74449717	0.062425133
SL-37	1.624286829	2.05625036	0.431963531
PTP	2.171963889	2.63036802	0.458404133

# 9. Looking Ahead

The research team led by Tulane and NOMTRCB has collected extensive data on the GRD footprint over past several years. The study design was created with the expectation that project features would begin construction in 2019. As the project timeline has been extended, we are prepared to begin post-construction assessments as soon as possible. These pre- and post-intervention data will permit analysis of ecological trajectories on project sites, identifying emerging problems with invasive vegetation and potential disease vectors like rodents and mosquitos. The research team is always available for consultation with project partners, residents, contractors, and other stakeholders. Our mission is to provide scientific data that can inform the development of maintenance strategies and improve ecological outcomes on the GRD and future GI projects in the region. Please reach out to PI Josh Lewis at jlewis9@tulane.edu with any questions or comments.
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