Stormwater Retention Ponds in Nassau County: Towards a Mixed-methods Analysis of Pond Impacts on Gullah-Geechee Residents

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1. Introduction

As Nassau County develops at a rapid pace, the construction of new roads, new residential developments, and a flurry of general construction activity is bringing notable changes to the landscape. Among these are the installation of stormwater retention ponds, wide yet shallow ponds that are designed to gather polluted stormwater runoff that results from new construction and to divert it from entering area waterways. However, their presence is cause for ambivalence among community members. First, their safety and efficacy are debated in the water management community: as Gulliver et al (2010), write, "Existing and developing communities are installing a wide variety of urban stormwater treatment practices in order to protect or rehabilitate receiving waters. These efforts incur costs while their environmental effectiveness is still in question, and the many variables involved (e.g., seasons, geology, topography, storm events, etc.) have made it historically difficult to compare results (Weiss et al. 2007)"[1]. Secondly, for many homeowners, their appearance is unsightly, and impacts their quality of life on their family's land. Given these factors, the increased construction of these ponds has caused particular concern among local residents in the Gullah Geechee community, as detailed below.

First is an economic concern: given the aesthetic and environmental concerns, property values may be affected negatively. For a community whose wealth is so concentrated in their property, the significance of this is consisderable. Secondly, the aforementioned health concerns: one community member reported an increase in vermin in their backyard after a pond was installed; and given the (increasing) frequency of extreme weather events in coastal Florida, the possibility of an overflow of concentrated polluted waters poses a further health risk to adjacent homeowners. The third concern is administrative: while regulations require audits of these ponds every 5 years; they are frequently left unexamined by local environmental managers; left to inspection on an as-requested basis. This concern dovetails into the fourth: the bureaucratic governmental context of Nassau County. There is a long history of non-transparent decision making by Nassau county officials, coupled with the over-sized influence of dominant local industries and landowners (most notably, Rayonier) in public decision-making; which has

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[1] Gulliver, J.S., A.J. Erickson, and P.T. Weiss (editors). 2010. "Stormwater Treatment: Assessment and Maintenance." University of Minnesota, St. Anthony Falls Laboratory. Minneapolis, MN. http://stormwaterbook.safl.umn.edu/

facilitated the gradual disadvantaging and displacement of the historic Gullah Geechee community (see story map for detailed account of this context, linked here.) Finally, these ponds are frequently – and disproportionately – being placed alongside Gullah land. Putting all of these factors together leads to serious questions of environmental injustice. This case begs for data collection and analysis concerning property values, pond installation processes (and the levers of change for problematic ponds), community stories, and more.

In the report that follows, we will detail pathways to answering these questions through quantitative and qualitative methods. Before proceeding to that task, a note regarding the format and intended audience of this report: Primarily, it is meant to serve current project collaborators (both in Nassau County and at UMN) as well as those who join the team in the future. This report is future-looking, laying the groundwork for future team members to work from, from data collection and analysis to community education and public advocacy. Over the course of the summer CREATE Scholars externship program; we were able to lay the foundations for future work and discover more research and advocacy possibilities along the way, but unable to gather all the data or produce all of said analyses that could be useful to the project. Fortunately, this collaboration will last into the years ahead. It is our hope that this report illustrates the necessity as well as the great potential for continued analysis, data collection and visualization, advocacy, and community education. And most importantly, we hope we have set future team members up for success, enabling them to hit the ground running where we left off.

Finally, we present this report with thanks to the entire CREATE team, and with utmost gratitude to Representative Glenda Simmons-Jenkins, without whose guidance, collaboration, encouragement, and contagious desire to serve and advocate for her community, none of this work would be possible.

2. Retention Ponds – Process, policy, legal information

2.1. Background: Mandated Stormwater Strategies

The Clean Water Act, a federal law, requires every state to implement and enforce strategies to manage storm water runoff. This is due to the pollutants that runoff collects on impermeable as well as permeable surfaces, which without mitigation, would contribute to pollution of area waterways. However, as noted above, strategies for management are still hotly debated (Gulliver et al 2010). For instance, wet ponds (retention ponds; predominant in Nassau County) have proven most effective in studies for capturing runoff, but these studies were limited to certain types of pollutants, and recent research indicates they may not be equally effective - indeed, sometimes ineffective - for certain types of contaminants. To address any issues with ponds, it is necessary to understand the particular political structure of Nassau County: its requirements for stormwater management and pond construction, and its responsibilities for issuing permits and ensuring compliance.

2.2. Projects requiring ponds and their permits

Permits are required for the management of stormwater for three main areas - municipalities, industrial sites, and construction sites (typically of disturbances of > 1 acre of land (or <1 acre if part of a common plan of development or sale; or where they discharge stormwater to surface waters of the state or to surface waters .) Anyone doing construction – whether state agencies such as the Department of Transportation, or local developers, must file a "stormwater pollution prevention plan" (SWPPP). (These permits are revised on a 5 year basis.) The National Pollutant Discharge Elimination Systems (NPDES) stormwater permitting program is the program most directly affiliated with stormwater retention ponds that concern us. It results from the Clean Water Act and is delegated to individual state agencies; which must gain approval from and comply with the federal Environmental Protection Agency (EPA). In Florida, the designated agency to issue permits and uphold compliance is the Florida Department of Environmental Protection (FDEP / DEP)[2]. In Nassau County, NPDES permits for permanent detention basins

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[2] The EPA is responsible for auditing, testing, and following up with the state-appointed agency, in this case, the FDEP - and they can withdraw authority from states if they find states are not complying sufficiently.

(such as wet ponds /stormwater retention ponds), must be filed through the DEP. Nassau County is part of the Northeast District of the DEP and residents would seek compliance through that division. Thus, for any problems, contact the Northeast DEP.*

Environmental Resource Permit are another type of permit in Florida, that pertain to construction that or other activity that will directly impact a water resource (e.g. wetland, lake, stream). This means some retention ponds will require an ERP; whereas others in Nassau County will not. ERP's (info on ERP's) are managed through the Department of Water Resources Management; more specifically for Nassau County, through the St Johns Watershed Management District (SJWMD)*. They require varied sorts of abatements for when construction or other activity will directly impact one of the aforementioned water resources. It is less often used than the NPDES and is a separate permit. In other words, "a construction project will have to apply for coverage under the NPDES construction permit through the Florida Department of Environmental Protection. If the project will fill a wetland, or have some shoreline modification, then it will also need to apply for an ERP through the delegated local government[3]'" that unit is the SJWMD. Thus, a project could have either of these, or both, depending on the construction scope and permit conditions.

*Contact info for the above agencies is listed in Appendix A.

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[3] From email correspondence with Dr. John Chapman, July 12, 2019

3. Quantifying the problem

   3.1. Mapping property values & change over time

   In response to community member concerns around a decrease in their property values due to the installation of stormwater ponds, it would be helpful to do a quantitative economic analysis of change over time.

   Some of this could be accomplished without the spatial data; a simple excel (or other statistical software) could work well. Collecting assessed property values over time, for the properties of interest; to analyze rates of increase or decrease for before and after the pond construction. There is also sales data attached to each parcel, logging the property's sales records (price, owner, etc) reaching back several decades, through the county appraiser. The main work here is thedata collection. See section 4.3 and Appendix B – as of yet this leaves us with manual collection; going in to each parcel and logging the info of assessed data. But with enough GIS savvy; the appraiser data (sales records etc) can be gleaned from the Nassau County Appraiser Maps, through its endpoint site.

   An approach that could be taken through GIS would be to put the tax assessor data in ArcGIS; map the ponds of interest, and analyze the parcels with Assessed values decreasing; parcels with values increasing. Even if most/all parcels are increasing with the market; a spatial analysis like this could reveal if the areas around the ponds are increasing at a higher or lower rate than other properties (it would be especially useful to compare to neighborhoods with similar qualities.) To take this a step further analytically; you could perform a spatial join with the assessed value data surrounding the ponds to evaluate impacts. In one layer, you have the ponds; in another map layer, you have all of the property parcels. You could join the pond to the parcels that fall in a given radius of the pond – e.g. < .1 miles; <.5 miles; and could assess the sensitivity of the impacts of the ponds on surrounding land values that way. To work with the data provided by the County Assessor; if .shp files are not available for the land parcels, geocoding may be required to line up the address values which carry numeric land value data, with the spatial (.shp) file. That said; Nassau County data is accessible here at this GIS server endpoint and provides assessed data 5-10 years back. Opening this data up in ArcGIS (not ArcGIS Online) would allow you to manipulate the data as described above.

In terms of sourcing the data for this; the Nassau Appraiser data is public and available for use (see links in Appendix A.) Further, to expand the scope of rental data, another data set may be of use: in conversations with Kevin Ehrman-Solberg (CREATE / Mapping Prejudice), he shared that there is a company which compiles a wide-ranging set of rental data – i.e. from Zillow, Craig's list, etc. – which may be useful to purchase for Nassau County. (CURA purchases it for Minneapolis; if of interest, contact Kevin and/or Jeff Matson at CURA to consider further.) Some limitations here include that renting is less common than home ownership in Nassau County; particularly in historic black-majority neighborhoods; as such, it may not be as useful for a project like this.

3.2. Land use: visualizing change over time

This method is rather simple, and relies on satellite imagery. Our recommendation is to map this in a format such as story map, in which users might toggle back and forth between pond construction, before-and after. The website to draw from is [ArcGIS Wayback](). Before-and-after comparisons are visually effective for communicating the dramatic change a pond brings. For instance; see these three aerial images (Figures 1-3), extracted from the ArcGIS Wayback viewer, of the parcel outlined in Figure 4, below. They demonstrate the before (May 2016), after (June 2016), and current state (Aug 2019) of pond construction.
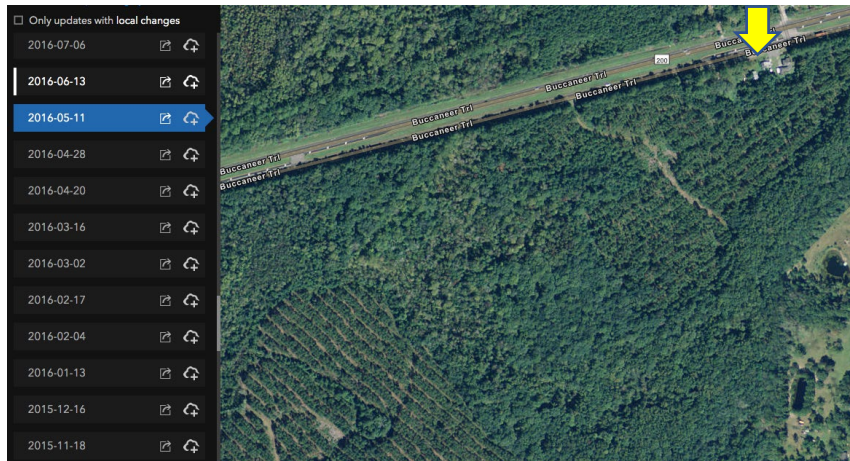
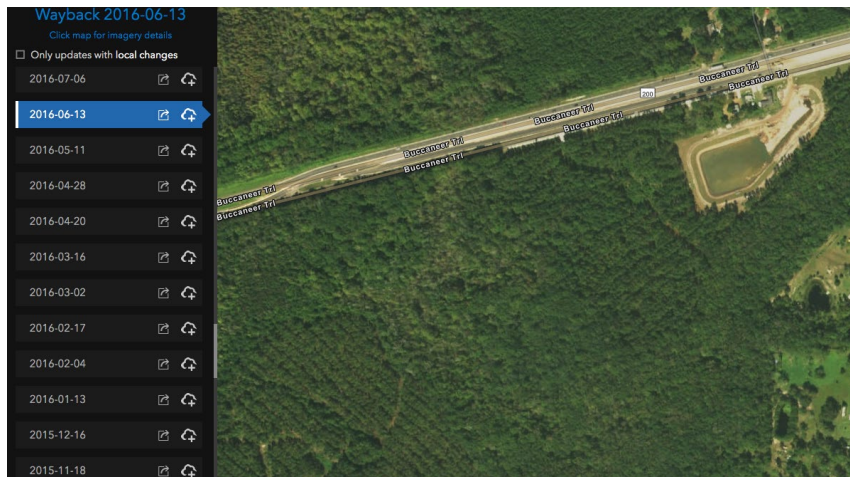**FIGURE 1 - MAY 2016, WALTERS-MACK COMMUNITY (MARKED BY YELLOW ARROW)**

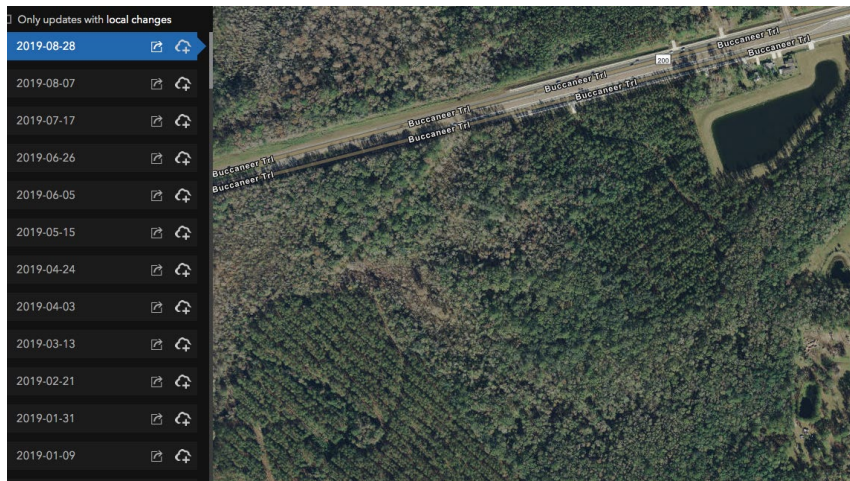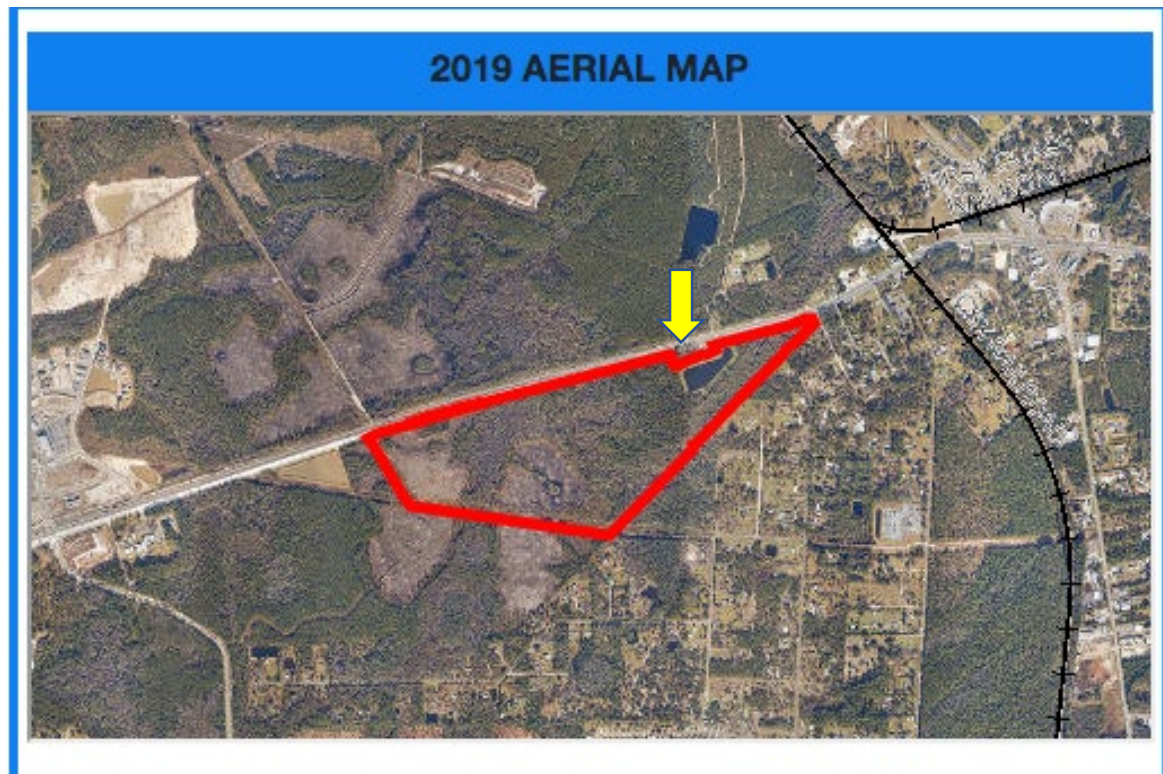**FIGURE 2 - JUNE 2016, WALTERS-MACK COMMUNITY**

FIGURE 3 - AUGUST 2019, WALTERS-MACK COMMUNITY

Another striking use of aerial imagery is in highlighting the pond location in relation to the broader land parcel. For instance, see the figure below[4], of the pond after construction behind the Walters/Mack community. The vast, entire parcel (marked in red) is owned by Raydient (Rayonier); and yet the pond was placed immediately behind the Walters/Mack family's community land (marked by yellow arrow.)

FIGURE 4 - LAND PARCEL (RED) OWNED BY RAYDIENT; ADJACENT TO WALTERS/MACK COMMUNITY (YELLOW ARROW)

3.3. Health & Safety impacts

As of yet, data has not been collected regarding the specific health and safety impacts of ponds near Gullah Geechee properties. That said, if it were collected; this is something else that could make for an excellent map; denoting particular types of concerns and where they occurred: vermin; bad smells; flood/runoff of pond water, etc, in relation to the pond locations.

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[4] https://maps.nassauflpa.com/NassauDetails/ParcelSearchResults.html?PIN=44-2N-27-0000-0001-0320

4. Data-gathering: How-to Guide

4.1. Pond history

Data regarding ponds' construction history is hard to come by. However, two main methods can be used.

Remotely-Sensed Data

One is simply to discern the (approximate) date(s) of construction through historic aerial imagery, typically available at a month frequency. This is available at the [ArcGIS World Imagery Wayback portal](). Simply search the desired address, and use the menu on the left to see that site across the past several years. This can be helpful to pinpoint times when ponds may have been dug; but not yet filled; or to see the gap between when a permit was issued, and when the pond was actually constructed/ filled; which may be a gap of years. This is important for discerning land value changes with greater accuracy.

Permitting process – Public Data

Another way to determine the timelines is to find the permits granted for the pond's construction. See 4.2 for how to gain access to data about pond permits, construction permits, etc.

4.2. Permits

Public Data re: Permits is available in a couple of primary formats. One, if the pond requires an NPDES, you can learn about the permitting process (dates, granting office, etc) here: ([geospatial]() and [excel doc]() format). This is a good place to start; since it is a wider pool than ERP's. Environmental resource permits can be accessed [here](). The limits to these data sets are their time-frame: they cover permits issued in the last five years. (See section 2 for more on the varied types of permits.) If you know of a pond's existence but do not find either an NPDES or ERP through these databases; at the bare minimum you can figure out who owns the property through the Nassau Appraiser website – see 4.3 and Appendix B. From there, contact the Northeast DEP for information regarding the permits that the pond would have required.

4.3. Economic data around ponds

This can be accessed through the county appraiser website GIS portal (see appendix B). You can visually select parcels – of the ponds; of the land surrounding the ponds – and access economic data there. You can access assessed data over time – dating 5-10 years back, through the parcel's page on the Tax Collector website. Further, Zillow will contain data on current for sale properties; and see also the discussion in 3.1 re: further options for accessing property value data.

4.4. Surveys & Interviewing

It is worth noting here that further data could be gathered around health and safety, for instance, through further surveys and interviewing. See section 5, below, for more.

5. Qualitative approach: Cultural & ecological impacts

5.1. Summary and motivations

Family land is of deep cultural and spiritual importance to the Gullah Geechee community. It serves as a place of historic family ties and connection with ancestors, as well as connection with nature, and for some, a space to garden, fish, and more. Thus, the risks of stormwater pond construction adjacent and/or on their land are not solely economic or health-related – disruptions to their land have consequences reaching into the spiritual and cultural relationships between families and their historic land. It would be helpful for future researchers to interview community members to hear about their stories with these ponds. This could help us gain an understanding of folks' concerns; catalog their observations and experiences with the pond and its construction, and also build awareness around safety and possible action steps. These questions, as a starting point, cover health and ecological questions, as well as hinting at the more familial/cultural/spiritual dynamics of the ponds' impact on community members' land.

5.2. Suggested interview questions

- Tell me the story of this pond – when did you first come to know it was being constructed? Were any buildings, forests, or otherwise cleared to create it? What did you notice in the process?
- Were you contacted by the local authorities in advance of the construction; and given opportunity to comment? Do you know why this pond was built in this particular place? Have you interacted with the developers or public officials at all with regards to the pond? If so, how have you been received?
- How has your property changed since the pond was built? (Visual appearance, smells, access to nearby lands, etc)
- How have you acclimated to the pond's presence?
- How does the pond look and smell during / after storms?
- How has the plant and animal life around your property been since the pond's construction? How does this compare to before the pond?

- Have you had any concerns about this pond at any point – anything about its appearance, smell, runoff, its impact on the neighborhood, etc?
- Do you feel you've lost, and/or gained anything by this stormwater pond being built? Has its presence displaced or otherwise impacted any particular places that are of special value to you and your family, historically? If so, in what way?
- If this pond were to disappear, and things go back to how they were on the property before the pond, what would be different for you?
- Do you have any questions or concerns about this pond, stormwater management/ ponds in general, etc?

6. Points of Intervention: Pond Management

6.1. Pond Inspections – "Citizen science" & Maintenance requests

Scientists at the University of Minnesota have compiled a thorough guide on best practices for stormwater maintenance. One tool available to community members is the visual inspection guides for dry ponds. Visual inspection, write Gulliver et al (2010), is "a rapid assessment procedure for qualitatively evaluating the functionality of a stormwater treatment practice. Visual inspections use a set of criteria that can be used to determine if the stormwater treatment practice is malfunctioning." Performing a visual inspection may be of use to community members living near ponds; to take account of the conditions surrounding the ponds and note concerns in a format that will be legible and deemed credible by local environmental managers. (The agency issuing permits for and thus responsible for most ponds is the Department of Environmental Protection; others have permits affiliated with the St Johns Water Management District; see section 2 for more detail). Gulliver et al (2010) suggest that visual inspections should occur at least annually; yet they rarely do, due to budgetary constraints and such in environmental management agencies. However, it is an important method that can help keep ponds operating safely: "Visual inspection should be included in all stormwater assessment programs, including those for sedimentation practices. Visual inspection of sedimentation practices should include inspection and documentation of the amount and distribution of retained solids. For example, a large deposit of solids at the inflow location of a dry pond may alter the inflow conditions or increase re-suspension of solids. Visual inspection of sedimentation practices should be conducted at least annually." As such, by conducting the visual inspections, community members can gain knowledge as well as leverage to access maintenance for nearby ponds.

6.2. Visual pond inspections: How-To

The visual inspection handout to use with wet ponds (the standard type of pond installed in NE Florida) is linked here. Questions 1, 2, 3, 5, 7, and 9 are particularly useful for community members; requiring no specialist knowledge. For instance, they ask members to evaluate the appearance of the surface of the pond, as pictured below:

5. a) Does the water in the pond have:
   □ Surface sheen (from oils or gasoline)
   □ Murky color (from suspended solids)
   □ Green color (from algae or other biological activity)
   □ Other (describe In comment box)

FIGURE 5 – SAMPLE QUESTION FROM VISUAL INSPECTION

However, with the guidance of the detailed, step-by-step instructions (here), community members can fill out the complete inspections, as well as discern, based on their results, whether a pond needs maintenance, and how soon. The criteria in this guide designate whether a pond needs maintenance A) before the next rainfall; B) before the next "rainy season," or C) within a year or two. The detailed instructions for visual pond inspections can be found here. These instructions contain commentary on each of the questions on the visual inspection handouts, and then a guide to assessing the timeline required for maintenance.

Hopefully, this data-gathering "citizen science" process can empower community members to advocate for maintenance on any pond presenting a concern; and receive the corrective services they ought to have access to on the ponds in their vicinity. A simple but excellent resource to build, once more data has been gathered, would be an interactive map where users could select the pond of interest, and access (in a pop-up format or something like that) the agency responsible for permitting / managing that pond; and the relevant contact information to report any questions, concerns, and information gathered from a visual inspection.

7. Appendix A – Links & Contacts: Agencies, Geospatial Data, etc.

Aerial Imagery

ArcGIS Wayback Viewer (Aerial Imagery): http://livingatlas.arcgis.com/wayback/

Stormwater Management & Permitting Info: Maps, Contacts, Etc

Overview – FDEP, NPDES stormwater program: https://floridadep.gov/Water/Stormwater

DEP Geospatial database: https://geodata.dep.state.fl.us/

NPDES Permitting Info - Map:
https://www.arcgis.com/home/webmap/viewer.html?webmap=9b7d4bdb68d84bd0b890e4ab83b29550

Map Layer – NPDES Stormwater Facilities: https://geodata.dep.state.fl.us/datasets/npdes-stormwater-facilities-and-activities

ERP - Map: https://www.arcgis.com/home/item.html?id=42f4869ef578485195c88de5a4fcb4af

Excel chart of all NPDES permits in FL:
https://floridadep.gov/water/stormwater/content/sthttp://publicfiles.dep.state.fl.us/dwrm/Reports/wafr/npdessw.xlsrmwater-facility-information

Florida DEP– Permit policies: https://floridadep.gov/water/stormwater/content/construction-activity-cgp

Contacts, Northeast District of DEP (see Sub-heading: Compliance Staff):
https://floridadep.gov/northeast/northeast/content/northeast-district-contacts

NPDES – "Links & Guidance" - https://floridadep.gov/water/stormwater/content/guidance-and-web-links

About Public Participation in SJWMD Permitting Process (ERPs) -
https://www.sjrwmd.com/permitting/public/

Contacts, Permitting (SJWMD): https://www.sjrwmd.com/contact/#permitting-contact

- Jacksonville Service Center (Regulatory Coordinator — David Miracle) (as of 9/2019)
    - Customer Service: 386-329-4570
    - Main switchboard: 904‑730‑6270
    - Any email correspondence regarding the submittal of compliance data:
      compliancesupport@sjrwmd.com

Nassau County Property Info: Parcels, Assessed values

Nassau County Property Appraiser: https://www.nassauflpa.com/

Nassau County Property Appraiser GIS: https://maps.nassauflpa.com/NassauTaxMap/

Nassau County Tax Collector: https://nassau.county-taxes.com/public

Nassau County Data Server – Endpoint:
https://maps.nassauflpa.com/ncflpa_arcgis/rest/services/nassau

Visual Inspection of Stormwater Ponds

Stormwater Management Guidebook (Launch page): http://stormwaterbook.dl.umn.edu/

Stormwater Management Guideboook – How-to on Visual Inspection:
http://stormwaterbook.dl.umn.edu/visual-inspection/scheduling-maintenance-sedimentation-practices#WP

Visual Inspection Handout – Wet Ponds:
http://stormwaterbook.dl.umn.edu/sites/stormwaterbook.dl.umn.edu/files/media/wet_ponds_visual_inspection_0.pdf

Visual Inspection Handout – Dry Ponds:
http://stormwaterbook.dl.umn.edu/sites/stormwaterbook.dl.umn.edu/files/media/dry_ponds_visual_inspection_0.pdf

8. Appendix B – Visual Walk-through of Property Data gathering processes

Navigating the Appraiser Page

To find information on a certain land parcel, go to [Nassau county appraiser website](#) > Property Search. This will get you to the website for each parcel – see figure 7.

To find it from the map, see Nassau Appraiser > [GIS Portal](#) > Search (by name, address, etc.).

   And/or

Nassau County Appraiser Website > GIS Portal. Then, select parcel with cursor. (Under map layers (on top menu), be sure to select "Land Records > Parcels…" to be able to click parcels at will.)

The "Results" contain data on the property; and the parcel ID (in blue font) is a link to the parcel web page.

FIGURE 6

Once you've reached the specific parcel website, there are several key links, as noted:

Link to Current Tax Bill →

For direct → *link to Tax / Land Value website*

FIGURE 7

"Map this Parcel," in the upper right, links back to the mapping portal, which allows you to click on neighboring parcels, too.

If you scroll down, you'll find the record of the property's sales.

Finding Property Values

See above; alternatively – search address or parcel data on Tax Collector website.

9. Appendix C – Index of Impacted Gullah Landowners

Adjacent Community / Land Owners	Address of Pond	Link to County property assessor parcel
Waye/Deleslie community	Old Nassau Rd & SR 200, Yulee, 32097	https://maps.nassauflpa.com/NassauDetails/ParcelSearchResults.html?PIN=27-2N-28-0000-0003-0040
Mount Zion Community	464106 SR 200, Yulee, FL 32097	https://maps.nassauflpa.com/NassauDetails/ParcelSearchResults.html?PIN=24-2N-28-0000-0029-0000
Davis Estate	86168 Rubin Ln, Yulee, FL 32097	https://maps.nassauflpa.com/NassauDetails/ParcelSearchResults.html?PIN=51-3N-27-0000-0030-0110
Behind black settlement / new subdivision	86124 Sand Hickory Trail, Yulee, FL 32097	https://maps.nassauflpa.com/NassauDetails/ParcelSearchResults.html?PIN=42-2N-27-0000-0001-0120
Walters & Mack families	462974 FL-200, Yulee, FL 32097	https://maps.nassauflpa.com/NassauDetails/ParcelSearchResults.html?PIN=44-2N-27-0000-0001-0320
Mobleys (before sale to DOT)	75966 Mentoria Rd, Yulee, FL 32097	https://maps.nassauflpa.com/NassauDetails/ParcelSearchResults.html?PIN=06-2N-27-0000-0005-0050

A non-exhaustive, initial list as of July 2019.