

Adaptation Plans and Guidelines to Mitigate Flooding in a Suburban Area



The Court Theophelia Site

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University of Florida Sea Level Rise Field Course Court Theophelia Group
University of Florida
Gainesville, FL 32611

04/27/2018

City of St. Augustine
Mayor Nancy Shaver
P.O. Box 210 (75 King Street)
St. Augustine, FL 32085-0210

Dear Mayor Shaver,

Please take this letter as correspondence for the formal report, based on the field work and research conducted during the University of Florida Sea Level Rise field course, in March of this year.

During the extensive research, meetings with yourself, your staff, and member of your community, this report serves as our findings and suggestions for the Court Theophelia site location.

Please feel free to reach out should there be any additional questions regarding the report attached.

Sincerely,

The Court Theophelia UF Student Group

I. Introduction and Background

Over the last several decades the global climate change effects have become more evident. The increase in the Sea Level Rise rate and stronger and more frequent storms are some examples of the climate change adverse effects. Sea Level Rise (SLR) rate has been increasing from 1-2 mm (0.04 to 0.08 inches) per year for the 20th century to 3.3 mm (0.13 inches) per year for the last ten years. One significant SLR impact on coastal cities is through the nuisance flooding or flooding due to storm surge. The nuisance flooding is defined by the National Oceanic and Atmospheric Administration (NOAA) as the flooding due to a high tide that leads to structural damages. The storm surge is the water level change due to atmospheric forcing. The east coast and gulf coast in the United States has been affected in recent years more frequently by flooding. The flooding on the Atlantic Floridian coasts has impacted large cities as Miami or Jacksonville and historically relevant cities as St. Augustine.

Location:

The area of study lies about two miles north of the historic downtown of St. Augustine and the neighborhood is known as 'Fullerwood Park'. The study area abuts the San Marco Avenue on the west side, one of the three main entrance corridors to St. Augustine. The west end and most of the north end of the study area overlooks the salt marsh which drains the streams from Robinson Creek that comes from the Tolomato River. The south of the study area is marked by the Hildreth Drive. The west side possesses most of the residential parcels of the study area; totaling to 21. The other are three commercial parcels on the east side and one large public parcel in the south that is owned by the St Johns County Media Center (school). A large vacant lot of about 3.57 acres, that lies to the north end of the site, is commercial land use.

The study area has three thoroughfares that go east-west namely Court Edna, Court Theophelia, Court Louise, and two that go north-south namely Bannan Avenue and Colony Street.

Context:

Understanding the history of the city of St. Augustine, it is imperative to mention where the study area lies in relevance to the architecturally historic and archaeologically important areas of the city.

The study area abuts one of the National Register Historic Districts of the city, namely the Fullerwood Park Residential Historic District. The district was put on the National Register in 2010 and has 211 contributing structures and 28 non-contributing structures. The study area borders the Historic District on its south-east edge, which is the north-west end of the Historic District. In terms of significance, the Fullerwood Park Residential Historic District is primarily of 20th century heritage era that includes revivalist structures and as well as mid-century modern buildings (Melissa Dezendorf 2010). The neighborhood's built fabric was developed in early to mid-20th century as a residential area for middle-class Americans, with development chiefly belonging to the two Boom periods: the Florida Land Boom of the 1920s and the Postwar Boom

starting 1945. The reflection of this architectural context is also seen the study area which has 11 properties that are beyond 50 years old with one mid-century modern residential property that appears to have much of its elevational integrity intact (4 Court Louise, built in 1954) (St. Johns County Property Appraiser's Office n.d.).

The study area does not lie in any archaeological zone that have been demarcated by the City of St. Augustine. As can be seen in Figure 1, the site lies just above the Fullerwood Park neighborhood.

The flooding in this site has continued to increase, significantly in the prior few years. In this proposal, a series of suggestions are made to reduce the flooding affecting on the residential area in the site. The suggestions are broken into actions on a city level and a community level. The project area is located in the northern limit of the St Augustine City in the St. Johns County of the state of Florida (Figure 2). The area is limited by a salt marsh eastward and northward, San Marco Avenue on the west, and a parking lot owned by a public school on the south. There is a total of 28 parcels on the site with mixed zoning classifications. The project area is constituted by a residential neighborhood with a total of 21 houses, 3 commercial, and public buildings such as the public-school parking lot at the south. There is a vacant lot in the north section that abuts up next to the marsh.

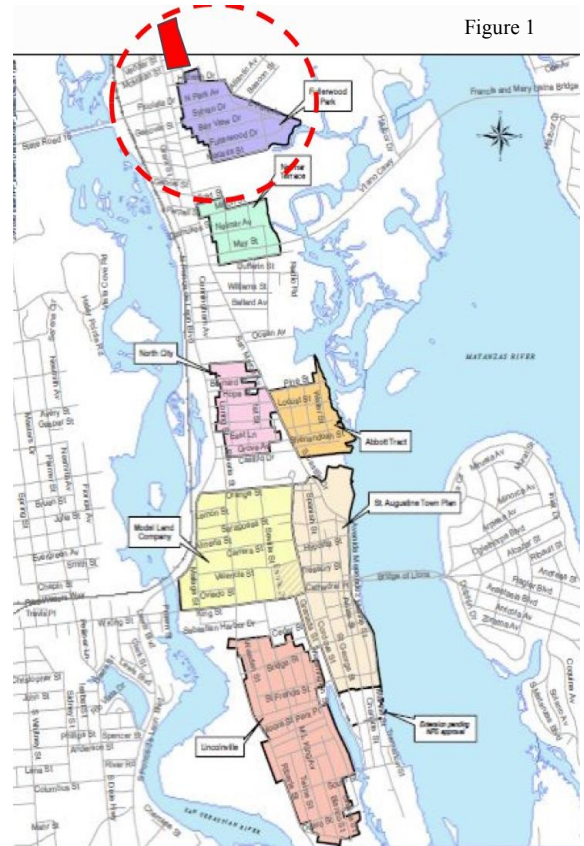


Figure 1

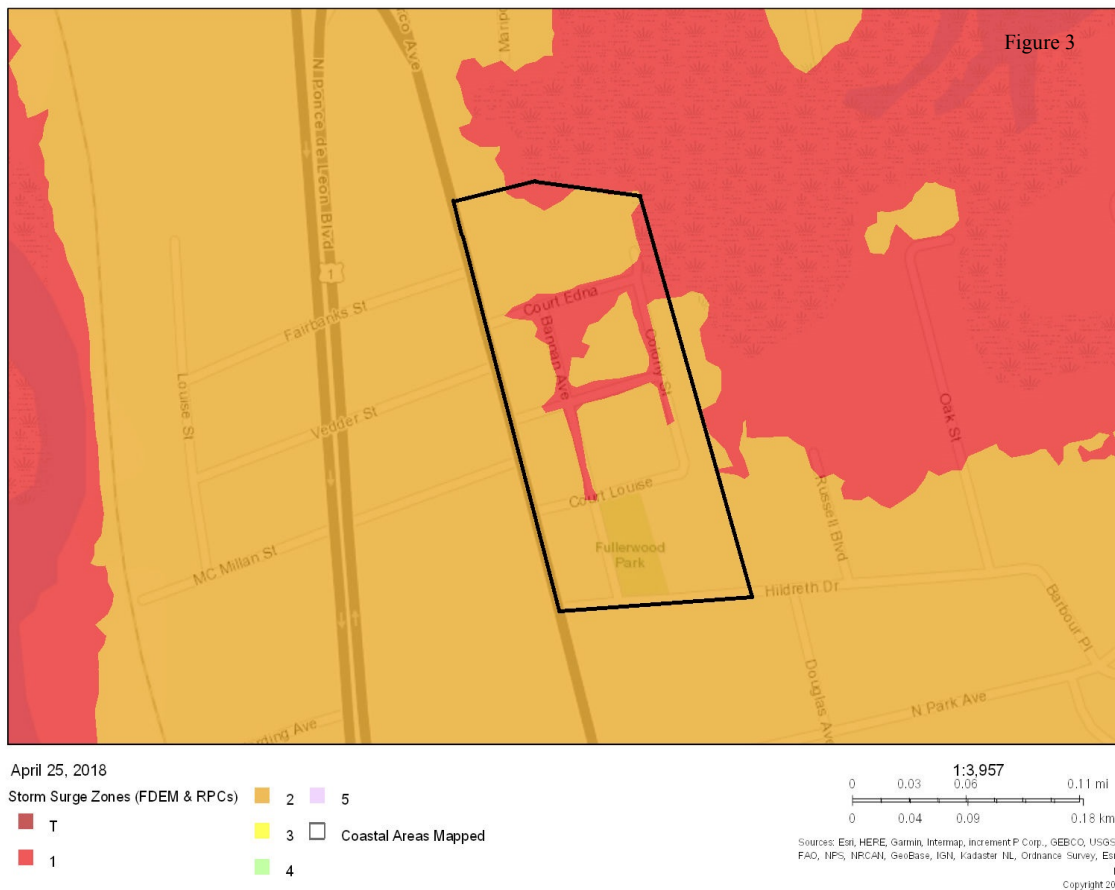


Figure 2. Project area location. a) Florida Peninsula, the red rectangle encloses the approx. location of St. Augustine city. b) St. Augustine city, the red rectangle encloses the approx. location of the project area. c) Project area location enclosed in the red polygon.

II. Problem Statement, Challenges, and Concerns

The project area is affected during a storm events and non-storm related rainfalls. The area may get flooded with a category 1 hurricane as it is in a storm surge zone 1 (Figure 3). The flooding is exacerbated due to elevation gradients in the area, as some vacant parcels have been developed there was additional soil brought in to increase the elevation on these lots, resulting in the base elevation higher than the surrounding areas. This has led to the edges of the project area with a higher elevation than the center, where the older residential parcels are located. This lies a *pool shape* of the area with the lower levels at the center where the most of residential houses are located. There is only one stormwater drainage outflow currently on the site, but the city has plans for new traditional stormwater system.

Figure 3. Storm surge related flood risk. The shade colors indicate the flood risk depending on the hurricane category. The black polygon encloses the project area.



The only pipe line for stormwater, is oversaturated to flush out the rain water to the adjacent marsh. The vulnerable structures are the residential structures located in the center of the site

area, in lower elevation compared to the newer residential buildings. At present, the stormwater pipeline passes through a vacant lot with an exit on the salt marsh. Due to the increased flooding in their properties, the owners have started to take actions to mitigate or reduce the rain runoff. Those actions and other suggestions for the community level are explained in section IV.

Three scenarios of SLR are observed in Figures 5, 6, and 7. The scenarios were projected using the highest rate on the relative sea level change projections from NOAA at the Key West Station (Figure 4). Sea level projections for year 2040 showed a probable migration of the marsh to the project area due to the increase in the sea level on the wetlands area. However, the project area still above the mean water level. On the other hand, projections for 2060 showed some regions that get flooded. Finally, the scenario for 2080 showed an area totally flooded. We are suggesting a long-term strategy to mitigate this case scenarios. We suggest the installation of living shorelines in the marsh, which is describe in detail in section IV.

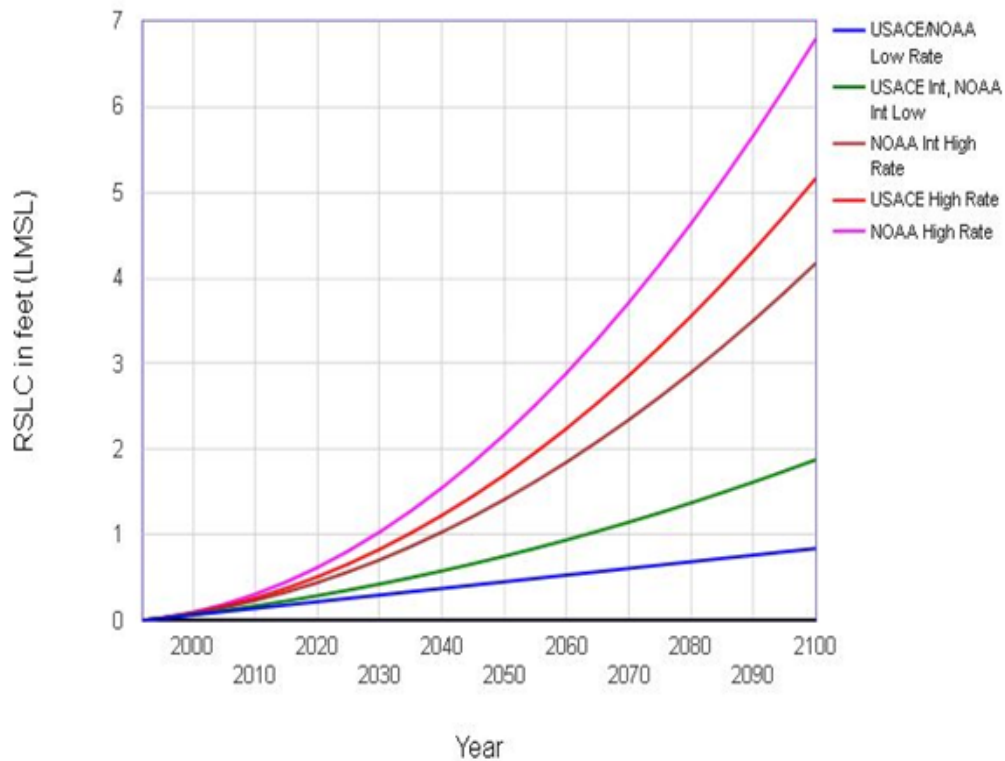


Figure 4. Relative Sea Level Change Projections at Key West, FL (station ID: 8724580), from NOAA

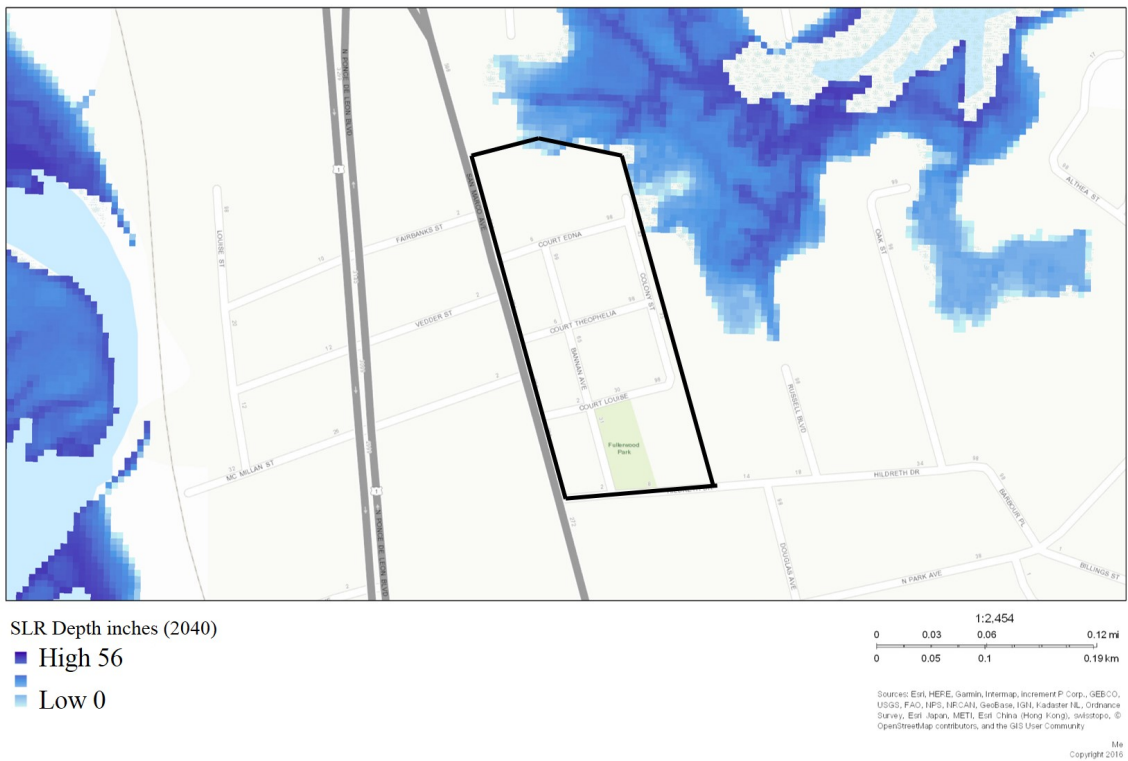


Figure 5. Sea Level Rise (SLR) projections for 2040. Projections from NOAA with a mean higher high water (MHHW) level. The black polygon encloses the project area.

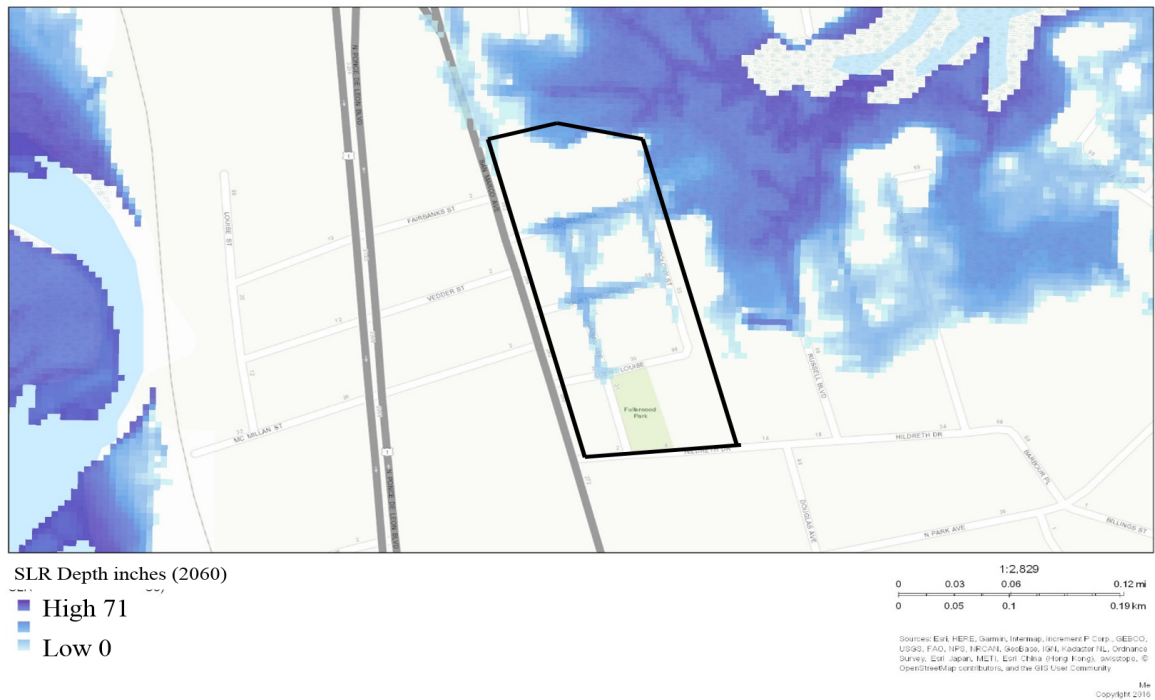
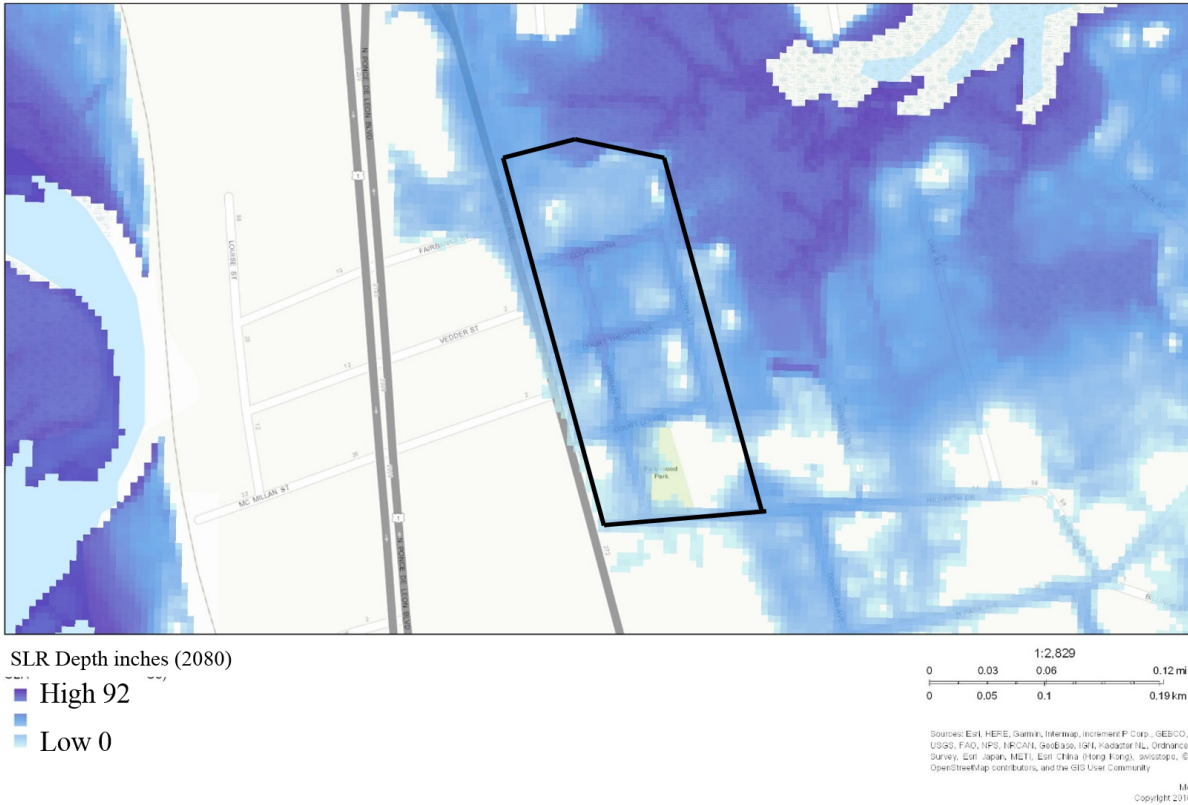


Figure 6. Sea Level Rise (SLR) projections for 2060. Projections from NOAA with a mean higher high water (MHHW) level. The black polygon encloses the project area.

Figure 7. Sea Level Rise (SLR) projections for 2080. Projections from NOAA with a mean higher high water (MHHW) level. The black polygon encloses the project area



III. Adaptation Objectives

Zoning is an essential tool in the adaptive planning framework due to its flexibility and broad applicability. Zoning ordinances typically regulate land-use types, intensity of uses, building densities, parking and other land development-related issues. A number of zoning tools are available to facilitate the execution of St. Augustine's Adaptation Plans. As can be seen in the City of St. Augustine's Current Zoning in Figure 8, the zoning that exists in St.

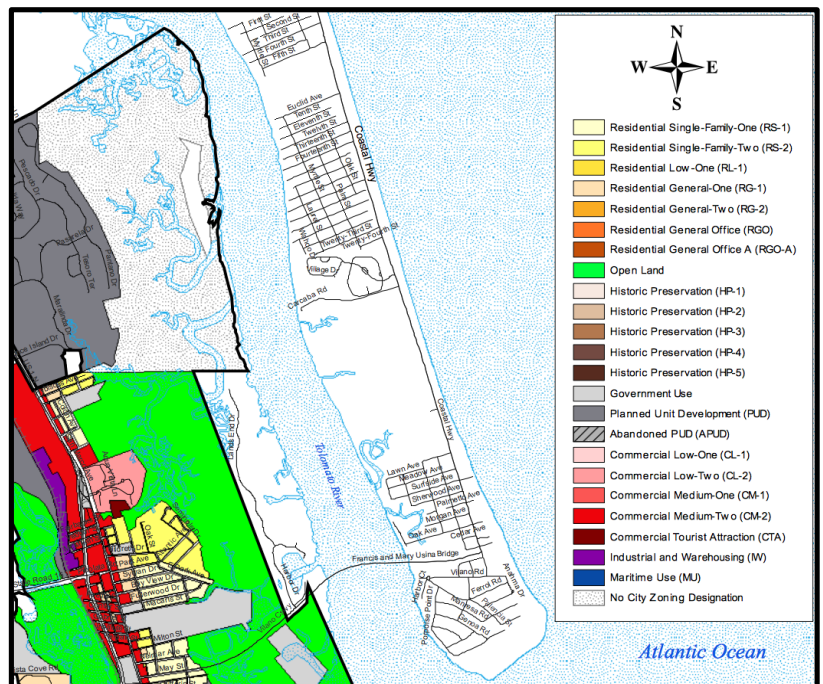


Figure 8

Augustine varies. A significant adaptive tool is building codes to provide standards for structure placement, size, usage, foundations, site drainage and storage, and requirements for extreme weather event protection. Amendments to the building code could address flood-resistant materials to be used and standards to be met in constructing new development to ensure resilience of new structures to sea-level rise and related impacts.

Local governments may create overlay zoning districts to place additional restrictions over an existing zoning district. The particular regulations accompanying an overlay zoning designation may be catered specifically to an individual location's needs, providing varying levels of adaptation. A protection overlay, for example, could require or allow the use of tools that protect properties from sea-level rise, such as flood gates, swales, or living shorelines. An accommodation overlay could limit future development and attach special restrictions such as limiting the amount of fill to be used in new development or requiring drainage plans to be incorporated into development plans. When a location is beyond the reach of protection or accommodation due to extreme vulnerability to sea-level rise, a retreat overlay may prohibit rebuilding or require removal or relocation of existing structures.

Adaptation Action Areas (AAAs) are a specific form of overlay zoning created specifically to address sea-level rise and its related impacts. F.S. 163.3164(1) defines AAAs as a "designation in the coastal management element of a local government's comprehensive plan which identifies one or more areas that experience coastal flooding due to extreme high tides and storm surge, and that are vulnerable to the related impacts of rising sea levels for the purpose of prioritizing funding for infrastructure needs and adaptation planning." Designation of an AAA facilitates the prioritization of funding and adaptation planning catered specifically to the vulnerabilities and needs of that area.

In order to provide for the designation of AAAs, policy language supporting such designation must be included in the Coastal Management Element of the Comprehensive Plan. This language should state St. Augustine's intent to designate AAAs to improve resiliency to the impacts of SLR, describe the mechanism for creation of the designation, identify potential funding mechanisms to implement the adaptation actions needed, and identify the criteria triggering designation. The Community Planning Act leaves it to the discretion of local governments to determine criteria for designating the boundaries of AAAs. Examples of such criteria include specific geographic areas such as along the coastline or areas with a hydrologic connection to coastal waters, natural and built systems such as local stormwater drainage systems, and areas which are designated as evacuation zones for storm surge.

IV. Adaptation Opportunities and Design Solutions

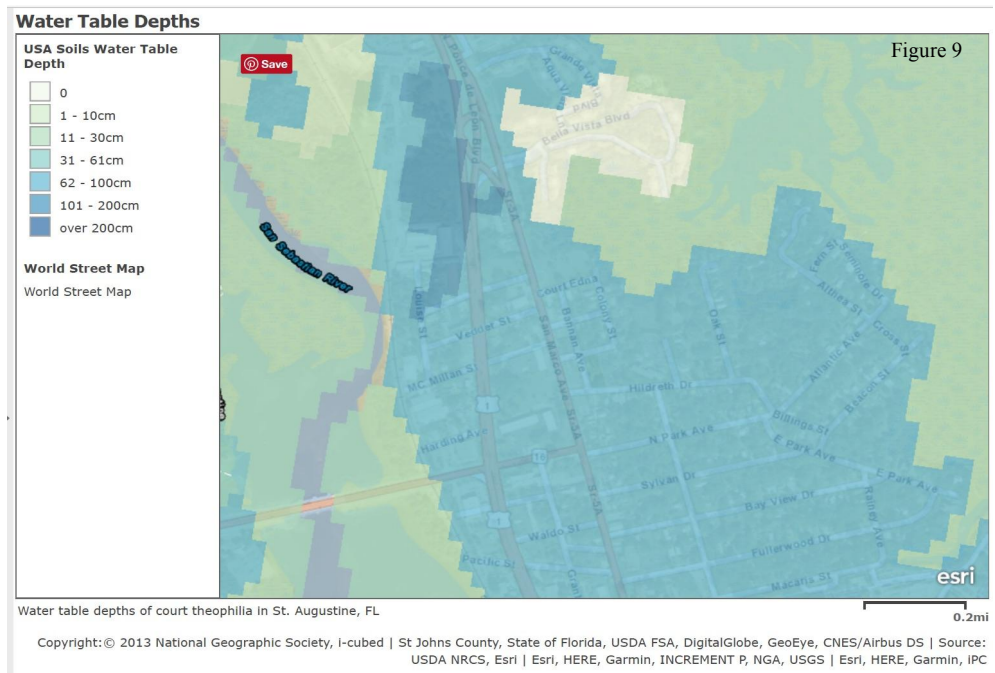
The incorporation of sea-level rise considerations into multiple elements of St. Augustine's comprehensive plan is recommended to ensure a strong foundation for adaptive planning measures. Each local government is required by state law to adopt a comprehensive plan, which serves as a land-use decision making framework for the municipality. Local government decisions regarding land development, economic growth, protection of resources, and delivery of public services must be consistent with the comprehensive plan. Addressing sea-level rise in the comprehensive plan ensures that all subsequent land use decisions are fully informed by such considerations.

Incorporating St. Augustine's Vulnerability Assessment and Adaptation Plan into the comprehensive plan would provide a strong data-driven basis for future planning. This could include identifying areas where future development should be limited or prohibited on the Future Land Use Map, creating a schedule for implementation and funding prioritization for adaptive measures, and identifying specific land-use tools to be utilized in response to sea-level rise.

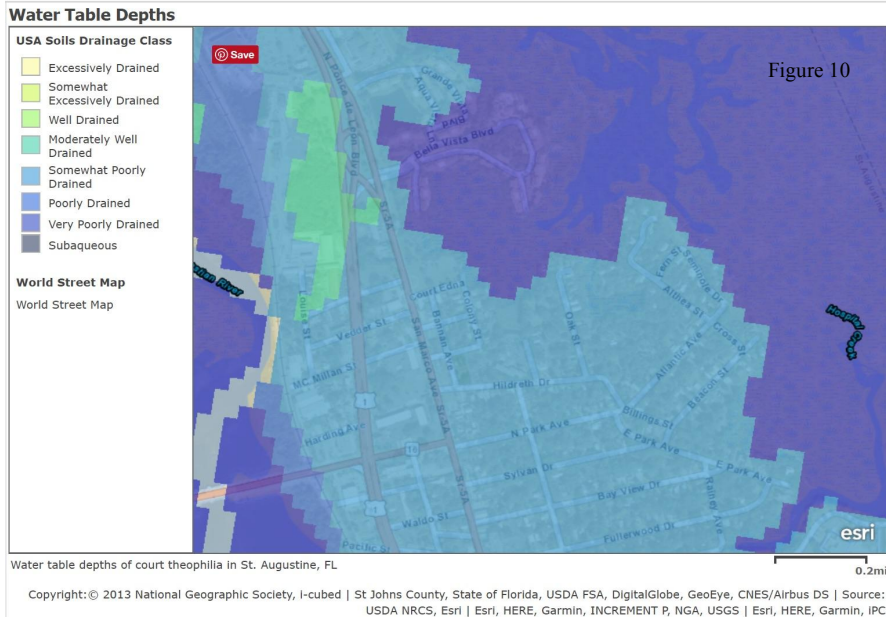
Designating this project area as an AAA would facilitate the application of specific measures to address the site's significant flooding challenges. The absence of limitation on the amount of fill that may be used in new development has created gradient differentials among properties, increasing the incidences of flooding on neighboring properties. The implementation of restrictions on amounts of fill to be used in future development could significantly improve this issue. A related challenge is the lack of accountability for managing drainage on private properties. Building regulations within this AAA could place the onus of drainage responsibilities on private owners, providing for support from the local government. Building regulations that require

flood-resilient construction materials in new development and redevelopment projects could also be implemented.

Water table depths, as seen for the site area in Figure 9, are an important aspect to consider when thinking about adaptive options such as permeable surfaces to replace the existing



non-permeable surfaces. The water table depth map displays the shallowest depth to water in the soil at any time of the year in centimeters. The Court Theophilia site has a depth of 62-100 cm, which after consultation with the Sea Level Rise attorney Thomas Ruppert during the field aspect of this project, could be a possibility to support permeable surface repaving for those streets.

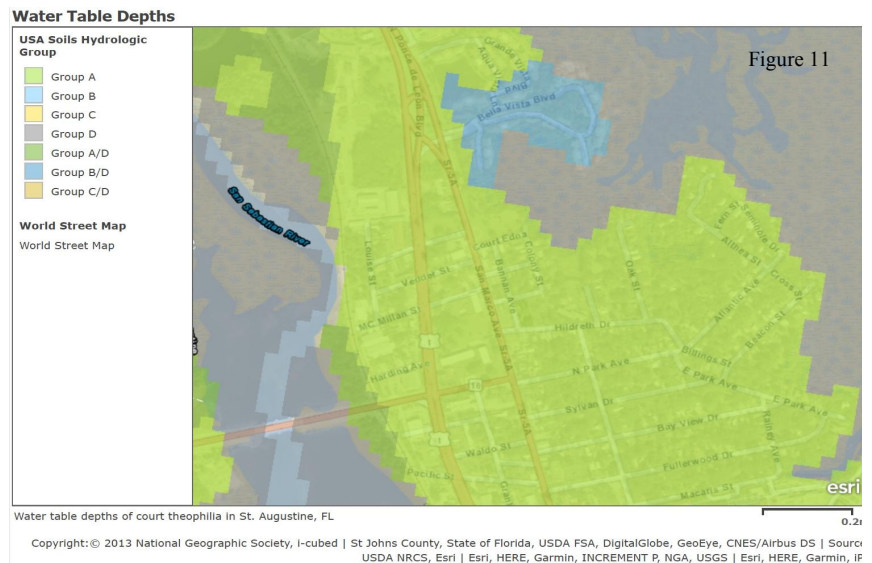


Soils vary widely in their ability to retain or drain water. The rate at which water drains into the soil has a direct effect on the amount and timing of runoff, what crops can be grown, and where wetlands form. In soils with low drainage rates water will pond on the soil's surface. Poorly drained soils are desirable when growing crops like rice where the fields are flooded for cultivation but

other crops need better drained soils. The Court Theophilia site is in the area that is somewhat poorly drained class, as is all of the surrounding area, as can be seen in the map in Figure 10.

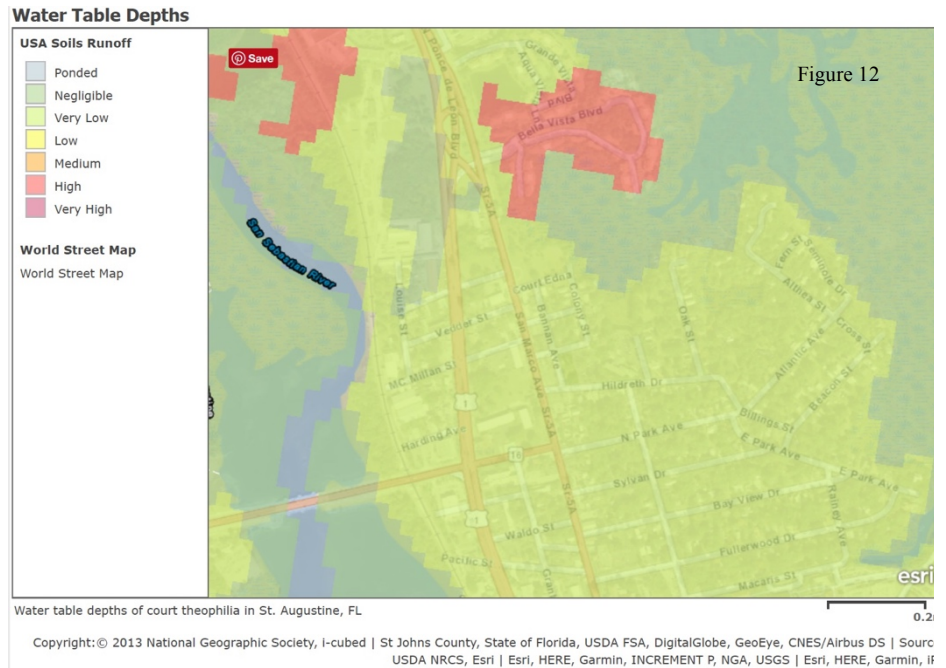
When rain falls over land, a portion of it runs off into stream channels and storm water systems while the remainder infiltrates into the soil or returns to the atmosphere directly through evaporation.

Physical properties of soil affect the rate that water is absorbed and the amount of runoff produced by a storm. Hydrologic soil group provides an index of the rate that water infiltrates a soil and is an input to rainfall-runoff models that are used to predict potential stream flow. The Court Theophilia site is in Hydrologic Group A, as can be



seen in Figure 11. **Group A** soils have a high infiltration rate and low runoff. These soils consist of deep, well drained sands or gravelly sands and have a high rate of water transmission. If the runoff is low, this should not overwhelm the drain system.

Surface runoff is the loss of water from an area by flow over the land surface. The amount of water that runs off an area is dependent on the slope of the area and the rate at which water infiltrates into the soil. Runoff is higher on steeper slopes and lower in flatter areas. Similarly, runoff is high when soils are relatively impermeable to water and lower where soils absorb water rapidly. Concave areas typically don't produce runoff and are classified as Negligible in this layer. The Court Theophilia site is in the low soils runoff class as can be seen in Figure 12, which is also all the surrounding area except for the marsh area.



The strategies suggested are presented for the city and the community. For each level, we decided to arrange these suggestions as short-term and long-term.

City Level

The city of St. Augustine is developing a storm water drainage project. In addition, we suggest the use of permeable surfaces as a short-term action and a living shoreline as a long-term action. The vacant lot along the northern strip of the project area presents a particularly valuable opportunity for flood mitigation as an undeveloped buffer zone. Through zoning changes, acquisition, or securing a conservation easement, this lot could be maintained in its currently undeveloped form, leaving the existing permeable surfaces of soil and gravel to encourage infiltration and floodwater retention.

Short-term

The project area is listed in the Capital Improvement Plan for traditional stormwater retrofit, with an estimate of \$ 1.36 million for design and construction. The city engineering department is planning the installation of a stormwater drainage system. This project could incorporate check

valves which main function is prevent the backflow coming, for instance, from the marsh through tides.

In addition to the city project, we suggest the use of permeable surfaces. A potential use for the northern vacant lot could be the construction of a stormwater park to be incorporated into the larger stormwater infrastructure plan. The park would serve as a reservoir for stormwater, while supporting ecosystem functioning and natural water filtration processes and contributing aesthetic and recreational value to the community. There has been research to show that over a 25 year time horizon, utilizing permeable surfaces for roadways is most cost efficient than traditional road surfaces.

Utilizing zoning tools such as setbacks and buffers, the city could establish within the AAA mandatory development setbacks to a specified distance from the salt marsh, and encourage the incorporation of vegetative buffers between properties, along the roadways, and along the salt marsh.

Long-term

The study area is located adjacent to a salt marsh which in a sea level rise scenario may present an increase in flooding during high tides (see Figures 5, 6, and 7). On the nature, there are barriers which act as protection during storm impacts on coastal regions. Those natural barriers as salt marshes, mangloose, reefs (among others) may help to reduce the tidal ranges, wave energy, and act as a trap for sediments reducing the erosion. We are suggesting the installation of a living shoreline in the salt marsh next to the area. A living shoreline have the same protection function as a natural barrier. The NOAA define the living shorelines as “a protected and stabilized shoreline that is made of natural materials such as plants, sand, or rock”. In addition, the living shorelines helps to reduce the carbon emissions, reduce the nutrient pollution, and as a fish habitat (NOAA). The main benefit for the project area will be the trap of sediment which increase as the sea level rise. The design and costs of the shoreline will depend on the tidal regime and wave climate of the area. Small or absent wind waves are expected in the area, since is far away from the wave effect at the inlet. Because of the small waves, we suggest the use of *Spartina alterniflora* since have been used in other east coasts states because of his ability trapping sediment (Currin et al., 2010). We suggest for the project area (Figure 14) a living shoreline with a longitude approximate of 256 meters (0.16 mi). However, a better option is to include the surrounding areas extending the longitude of the living shoreline.

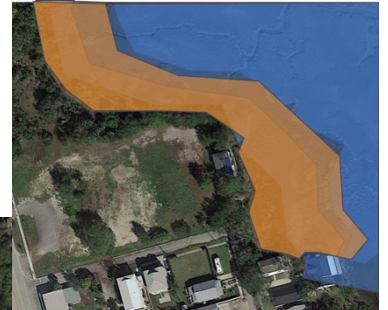


Figure 13. Suggested location of the living shoreline.

Community Level

To encourage participation in available adaptive measures, a number of incentives may be offered to private property owners within the AAA. St. Augustine may offer tax deductions to landowners who donate an easement on a portion of their land for use as vegetative buffers, and offer tax rebates to landowners who retrofit their homes or businesses to be more resilient to storms and flooding. To encourage the application of adaptive measures in new development, St. Augustine may reduce permit application fees for new development and redevelopment within vulnerable areas that incorporate flood protection measures beyond minimum requirements in the building code.

Short term

We suggest the installation of green structures such as green roofs. The green roofs contribute to reduce the stormwater runoff by retaining part of the rainfall and attenuating the flooding. Their design consists in vertical layers in descending order of vegetation, soil, geotextile filter and the drainage material (Berndtsson, 2010). Green roofs have been tested successfully in places such as Germany (*e.g.* Mentens et al., 2006) or in Michigan (*see* VanWoert et al., 2004). Actually, in countries like Japan, Singapore, Belgium, and Germany the government have begun to impose the installation of green roofs (Mentens et al., 2006). In brief, the installation of green roofs in some buildings within the project area (with flat roof) will help to reduce the stormwater runoff.

Long term

One long-term option that residents can utilize is to plant water absorbing plants, in fact some area residents have already done so. Plants such as the wax myrtle or red maple trees are ideal for this area after researching the growing climate for this area of Florida. The Wax myrtle grows up to 5 ft/year and lives through tough conditions including areas that are hot, cold, wet and salty. This makes it ideal for this location, in addition to some residents already have this planted and it is an insect repellent. The red maple tree is best to be grown in wet locations, another ideal item to plant for this area to help retain excess water.

All of these measures suggested are meant to help for the project timeline of 20-30 years. With the nature of sea level rise, it is prudent to discuss managed retreat as an option much further down the line, and well outside of the project time parameters. At some point, the financial decision will have to be made if it is feasible to continue updating the existing infrastructure and cost compared with other options for displaced residents.

Communicating Sea Level Rise in Historic Communities like St. Augustine

When implementing a plan to communicate sea-level rise to the people of historic coastal communities like St. Augustine, there are three areas to focus on according to the United Nations and Economic Commission for Europe (UN/ECE) Guidelines on Sustainable flood prevention (2004): Awareness, Preparedness and Participation.

AWARENESS: It is essential that residents in coastal communities recognize that flooding is a general part of their surrounding environment. From a city standpoint, providing knowledge and information on the risk can help prevent unnecessary repercussions from members of the community. With no hazard awareness, it is rare that incentives will be of any help as members would have already suffered from the emotional, mental and physical toll that flood remediation can cause.

PREPAREDNESS is ultimately the result of awareness. From a community perspective, it is based on the necessary information being provided so that individuals can identify ways to mitigate the potential damages. From a city perspective, it is making sure that the city has a plan of action for flood mitigation as well as proper lead time to address flooding and its acting forces in communities.

PARTICIPATION: Public participation in the city's decision-making process to mitigate the effects of flooding, improve the quality and the implementation of those decisions. It provides the public the opportunity to express their concerns and enables city authorities to take account of their concerns when implementing plans of action to mitigate the effects of sea-level rise.

After studying the three sites in St. Augustine and engaging with the public in those three sites, suggestions around awareness, preparedness and participation arose at each site. Court Theophelia harbors a strong community of residents that are dedicated to their neighbors and to keeping their neighborhood above water. In light of increased nuisance flooding, as well as the aftermath of Hurricanes Matthew and Irma, many of the residents consider themselves a lower priority to the city of St. Augustine in terms of flood relief. Without any historic ties or significant economic value the residents identify as underdogs — and while they are passionate about keeping their community alive, a number of people in Theophelia have already considered putting their houses for sale in search of higher ground.

The key to maintaining local morale is to give residents short term solutions to implement while longer-term solutions are being developed. Some residents have already begun planting water-absorbent plants in hopes to reduce nuisance flooding. A residential campaign can be created to educate locals on absorbent flora, rain barrels and rain gardens and encourage them to include some of these options on their property — for their own benefit as well as for a potential tax credit.

While overall consensus is to reduce flooding instances in the neighborhood, some residents may be unaware of certain restrictions that may be put on their properties — like setback restrictions, limiting impermeable surfaces, limiting plant and tree cover, etc. — dependent on the city's adjusted development code. If new codes are established, residents need

to be made aware of how it affects their properties. While there is potential for new limitations, the narrative should focus on the positive impacts of the changed codes. The standardization of the rain barrels, gardens and vegetation as well as fill unification and permeable surfacing will help residents contribute to flood reduction.

Although this site held the immediate focus of St. Augustine, there are other residential areas throughout the city as well as private business suffering from the effects of sea-level rise. Instead of creating a communication plan to address the specific problems to each individual area, creating a grassroots campaign that is centered on awareness, and preparedness, while encouraging participation not only from residents but business owners as well could be the answer to communicating sea-level rise. Campaigns like “Weather It Together” in Annapolis show how important it is to get community involvement when facing sea-level rise. Focusing on the sustainability and longevity of the historic city and its communities rather than the doomsday narrative often seen can promote public engagement from residents and business in not only the city’s efforts but in self-mitigation practices as well.

V. Implementation

The implementation aspect for this plan involves both the city and local community residents. The project was organized with background information and preparation in the 8 weeks preceding the time in the field, including reaching out to residents as soon as the information was available to make contact. To implement the design, there will need to be coordination with both the City engineer, City Planning staff, Public Works staff, local residents, and contractors. The possibility exists for a different stormwater management system if the ability to acquire the vacant parcel is an option, as it would provide an outlet for water overflow. A further cost analysis would need to be conducted once the city decides which direction is open, depending on the possibility of acquisition of said vacant parcel. With the existing budget of \$1.36 million already in future expected expenditure, the possibility also exists for a potential cost savings. Through utilization of storm water credits on future bills for existing residents, the local residents would be able to share the direct smaller costs by taking measures on their locations. Adapting new measures within the comprehensive plan enables the city to restrict any future development issues within the site that could lead to future additional costs. The city could receive possible funding in the form of federal grants, with the National Heritage Area option.

Team Qualifications

Tucker Berardi

Tucker is a Journalism pro masters student in the College of Journalism and Communications. Tucker's background is in reporting on marginalized communities and researching innovative storytelling.



Maanvi Chawla

Maanvi is trained as an architect in India, and has worked with Indian firms including INTACH on heritage inventories, condition assessments, measured drawings; prime being the CER report prepared for the Prince Claus Fonds after the 2014 floods in Kashmir. With a focus on the technicalities of heritage, she is supplementing her graduate study at UF with science courses along with her Masters to research on historic materials valuable to the local Floridian context, one of them being Ocala block.

Braulio Juarez

Braulio is a Coastal and Oceanographic Engineering student in the Civil and Coastal Engineering Department. Braulio's background consists in an undergraduate degree in Oceanology, and a Masters degree in Physical Oceanography in Mexico. He has interests in coastal dynamics and estuarine processes.



Jennifer Krouchick

Jennifer is an Urban and Regional Planning student in the college of Design, Construction, and Planning. Jennifer's background includes an undergraduate degree in Community and Regional Planning with a focus on stormwater management, Sustainable and Urban Design, and comprehensive plan element work. During her graduate studies, Jennifer has worked on research projects involving emergency management in coastal communities and focused her studies on GIS, Urban Coastal Analysis, and Transportation and Land Use.

Kathryn Slattery

Katie is a student in the Environmental and Land Use Law Program at the UF Levin College of Law. Katie's background is in Biology and Psychology, and she has interests in climate change adaptation at the regulatory and local level.



VI. Conclusions and Future Recommendations:

Living Community of Historic St. Augustine – a National Heritage Area:

Fullerwood Park and other neighborhoods in the city, like the study area, are communities that have St. Augustine residents living in since decades, and in many cases, centuries. While the tangible historic fabric of the city has been well-preserved and well taken care of, the living community of St. Augustine makes for an important stakeholder of that heritage and the crucial witness to Sea Level Rise along this coastal city.

National Heritage Areas, designated by the National Park Service, are zones that consist of historic landscapes which are lived in by the community that is connect to the site at a historical, cultural or religious level. As per the definition of the National Park Service, “National Heritage Areas (NHA) expand on traditional approaches to resource stewardship by supporting large-scale, community driven initiatives that connect local citizens to the preservation and planning process.” Through the designation of a National Heritage Area, the National Park Service supports the zone’s/site’s community through technical, planning and limited financial means to lead their own initiatives that preserve and promote the heritage of the zone/site.

In case of St. Augustine, which already occupies an important position as a heritage precinct at a national level, the case of being an National Heritage Area becomes valid when the living community element comes into play, which otherwise gets dominated by the architectural and archaeological richness of the city. With many living residents that descend from families that are known to be significant to St. Augustine’s history and in extension of post-Columbian America, St. Augustine makes for an indigenous community of descendants of the perhaps the earliest European settlers e.g. the descendants of the Triay family, whose historic home from 1807 that was built during the second Spanish Period (1784-1821), still live in the city and possibly in a neighborhood like the Fullerwood Park. The Triay family and their likes, who would be dealing with Sea Level Rise in very near future, are at risk and it is imperative that the St. Augustine community is encouraged and strengthened to deal with the Sea Level Rise keeping in mind their importance and significance in relevance to the built heritage of the city.

By proposing the architecturally historic city and the non-historic or not-as historic living neighborhoods of St. Augustine to be designated as a National Heritage Area, the City of Augustine can increase the likelihood of federal support to engage the people of St. Augustine on the issue of Sea Level Rise. Like in the case of the study area, the community was observed to have been already tackling the issue of nuisance flooding by planting water absorbing plants on their properties – with support that would come from being a National Heritage Area, a large-scale tree planting drive could be enacted by the community with support of the local and federal governments. Provisions by the National Park Service in terms of technical, planning and financial means can allow the City officials to educate, reinforce and encourage the community to not only face Sea Level Rise but make their way through hit and find solutions.

Appendix A – Team Resumes

TUCKER BERARDI

3020 SW ARCHER RD APT 63 GAINESVILLE, FL 32608 (352)801-8446 TBERARDI@UFL.EDU

Communications media specialist and storyteller. My experience ranges from journalistic reporting and investigation to designing marketing campaigns and creating diverse digital media messages. Stories are central to sharing ideas and innovations, and the modernization of those storytelling techniques is critical in vaulting one message above the rest of its competitors.

PROFESSIONAL EXPERIENCE

SOUTH FLORIDA GAY NEWS, FORT LAUDERDALE, FL
Social Media Manager and Reporter, May 2014 – Present

- Maintain social media accounts — design campaigns, event coverage, monitor metrics
- Create weekly calendar of events throughout South Florida
- Report and write news articles for print and web editions of SFGN
- Edit and upload stories to website
- Specialized in conversion therapy coverage — reporting on city and county bans of conversion therapy, following research on the practice and speaking with political and academic professionals on dealing with the practice in South Florida's cities

UF PUBLIC RELATIONS DEPARTMENT, GAINESVILLE, FL
Social Media Specialist, January 2018 – Present

- Maintain social media accounts — coverage, design graphics and promote events
- Graphic design and photography
- Video and photo coverage of classes and events within the department
- Overall promotional video for the public relations department.

INSTITUTE FOR PUBLIC RELATIONS, GAINESVILLE, FL
Freelance Videographer, March 2018 – Present

- Conduct video interviews in Florida, New York and Washington D.C.
- Capture and edit video for social media channels and IPR website

EDUCATION

UNIVERSITY OF FLORIDA, GAINESVILLE, FL
Masters of Communication, May 2019

FLORIDA ATLANTIC UNIVERSITY, BOCA RATON, FL
Bachelor of Mass Media Communications

- Minor in Sociology

ADDITIONAL SKILLS

- Adobe Suite with significant experience in Photoshop, Lightroom, Premiere, Audition and Spark.
 - SEO trained for web copywriting and articles
 - Journalistic and promotional photo and video skills
-

Braulio Juarez
PhD. Student
Civil and Coastal Engineering Department
University of Florida
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Education

(2014) B.S., Oceanology, Universidad Autónoma de Baja California, México

(2016) M.S., Physical Oceanography, CICESE, México

(2016-Present) PhD. Student, Civil and Coastal Engineering Department, University of Florida

Experience

September 1st, 2015. IMECOCAL campaign AH1509-011, aboard of the Alpha Helix Oceanographic Vessel (6 days, 781.7 NM). Researcher in charge: M. S. Luis Erasmo Miranda Bojórquez. Captain in charge: Nuñez

August to November 2015. Teaching assistant at Physical Oceanography Department, CICESE

Meetings

February 15th, 2018. Juarez B., So S., Valle-Levinson A., and Guerra G., Tidal and residual circulation in a multiple-inlet deltaic system. Ocean Sciences Meeting, Portland, OR. United States

February 7th, 2018. Juarez B., So S., and Valle-Levinson A., Tidal and residual circulation in a multiple inlet deltaic system. Water Institute Symposium, Gainesville, FL. United States

November 8th, 2017. Juarez B., Valle-Levinson A., Wind-driven flow in a coastal plain estuary. Coastal and Estuarine Research Federation Biennial Conference, Providence, RI. United States.

August 1st, 2017. Juarez B., Valle-Levinson A., Wind-driven flow in a coastal plain estuary. Young Coastal Scientists and Engineers Conference-Americas, Dauphin Island, AL. United States

Workshops

November 5th, 2010. Basic concepts of Ocean Data View software (16 hrs). Imparted by Dr. Reiner Schlitzer (AWI) at Ensenada B. C., México.

May 17th, 2014. Introduction to the hydrodynamics of coastal lagoons and estuaries. Imparted by Dr. Arnaldo Valle-Levinson (University of Florida) at Ensenada B. C., México.

May 17th, 2015. Delft3D: Introductory Course. Imparted by Dr. Edwin Elias (Deltares, USA) at Ensenada B. C., México.

O B J E C T I V E

To constantly keep learning and adding to a dynamic and sensitive work environment that pushes my abilities to engage in insightful processes and to arrive at commendable, stimulating results.

E D U C A T I O N

Masters in Historic Preservation, University of Florida, Gainesville FL, USA, **currently pursuing - GPA 3.97/4.00**

B. Architecture, Shri Mata Vaishno Devi University, Katra, J&K, **2012 - CGPA: 8.56/10**

Class XII, Girls Higher Secondary School, Srinagar, J&K, JK BOSE, **2006 - 82%**.

Class X, Presentation Convent High School, Srinagar, J&K, JK BOSE, **2004 - 87%**.

E X P E R I E N C E

Preservation Institute St. Augustine, Florida, USA, Aug 2017-present

- I am the graduate assistant helping plan and establish a materials conservation laboratory by and for the University of Florida's Historic Preservation program in collaboration with other academic partners and government establishments in the oldest colonial city of United States, St. Augustine, FL.
- Aside from establishing equipment and material science resources for the laboratory, I am working to establish material libraries and archives with writing Historic Structures Reports of heritage structures in the city.

Employment

ICR ICC Inc., New York, USA, Jun 2017- Aug2017

- As an intern at the heritage conservation firm, I was tasked to perform conservation approaches' tests/mock ups, condition assessment surveys, and research for many significant buildings of New York city like the JP Morgan Library, 740 Park Avenue, Belvedere Castle in Central Park among others.
- I was also responsible for re-organizing/inventorying their conservation laboratory.

Internship

Envision Heritage, University of Florida, Gainesville FL, USA, Aug 2016-May 2017

- As a graduate assistant, I was part of the team of other graduate assistants that carried out 3D laser scanning, photogrammetry for historic structures.
- I was responsible for producing 2D documentation from point clouds using Pointools and AutoCAD for historic buildings in Nantucket, MA and Barbados.
- I was responsible for producing detailed measured drawings of the interiors of one oldest houses in country, the Bowne House in New York; the scope of work also included preparation of a timeline of conservation and retrofit measures taken in the interiors since 1660.

Employment

Pro-bono Consultant, Srinagar, J&K, Apr 2016-Jul 2016

- I initiated heritage walks in the old city of Srinagar, as part of my WIP online public awareness blog, *ZoonDubb Collective*.
- I was also part of the team organizing the annual *Dara Shikoh Arts Festival* hosted by the *Dara Shikoh Centre for the Arts, Srinagar*.
- I volunteered with ICOMOS India to help develop content, websites as part of the preparations for the upcoming ICOMOS General Assembly in 2017 being hosted in New Delhi. I also mentored the US/ICOMOS IEP participants, who were part of the Indian - US exchange that year.

Volunteering

25 SW 5TH Terrace, Apt. 4260
Gainesville, FL 32601

Ph: (267) 342-7157
Email: jkrouchick@gmail.com

Jennifer L. Krouchick

Education

- 08/2015 - Present **University of Florida** Gainesville, FL
Master's degree candidate in Urban & Regional Planning (Expected Graduation Date August 2018)
- Student Planning Association President 2016-2018 – University of Florida
 - Selected as part of student interdisciplinary group to undertake scenario analysis and field work in St. Augustine, FL in addition to a public presentation of proposed sea level rise adaptation plans
- Jim Beeler Public Service Memorial Award for Significant Public and Community Service awarded April 2018 by the Department of Urban and Regional Planning, University of Florida*
- 08/2014 **Temple University** Philadelphia, PA
B.S. awarded in Community and Regional Planning
- Outstanding Leadership in Planning Studio awarded Spring of 2014 by the Department of Community and Regional Planning, Temple University*

Professional Memberships

American Planning Association - National and State Member

Computer Skills

Proficient in Microsoft Windows, MS Office Suite, Apple OSX, QuickBooks, Cognos, Hyperion, and Lotus Notes
Extensive Experience with GIS, Photoshop, and Google SketchUp
Exposure and experience with CUBE & ESRI Story Map
Studio class and project work with LUCIS (Land-Use Conflict Identification Strategy) modeling in 2016

Work Experience

- 12/2017-Present **University of Florida** Gainesville, FL
OPS Employee Researcher with Dr. Kathryn Frank
- Research Project focused on Healthy and Resilient Water Infrastructure for Coastal Communities
 - Worked with small group to document informal emergency management processes in the city of Cedar Key, FL
- 09/2017-Present **University of Florida** Gainesville, FL
- Part of small group project to document the informal emergency response procedures of Cedar Key, FL
 - Presentations of research to the community, with a final product to include a Story Map for future use
- 05/2016-05/2017 **University of Florida** Gainesville, FL
GIS Geocoding / Data Quality Control OPS Employee with Dr. Ilir Bejlari
- Geocoding of traffic crashes in Florida and/or for GIS transportation data processing and quality control and assurance using a web-based GIS system
- 09/2016-01/2017 **University of Florida** Gainesville, FL
- Worked with a small group commissioned to perform an audit of Florida County Planning Disaster Recovery Plan – reviewed policies, procedures, and financial sections of PDRP
 - Created report with recommendations for changes to PDRP, including presentation of findings and recommendations to Manatee County Planning Representatives
-

KATIE SLATTERY

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(321) 890-2256 kslattery@ufl.edu

EDUCATION

University of Florida Levin College of Law, Environmental and Land Use Law Program, Gainesville, FL, *Juris Doctor Candidate*, May 2019

GPA: 3.74 (Top 5% of class)

Honors: Book Award in Administrative and Natural Resources Law, Fall 2017

Dean's List, Fall 2016, Spring 2017, Fall 2018

Conservation Law J.D. Summer Fellowship, Summer 2017

Activities: Environmental and Land Use Law Society, President, Fall 2017-Present

Florida State University, Tallahassee, FL, December 2015

Bachelor of Arts in Psychology with a minor in Biology, *magna cum laude*

GPA: 3.78

Honors: FSU Honors College, Fall 2012-Spring 2016

President's List, Fall 2013, Spring 2014, Spring 2015

University Academic Scholarship, Fall 2012-Spring 2016

Activities: Environmental Service Program

EXPERIENCE

University of Florida Levin College of Law, Gainesville, FL, May 2017-Present

Research Assistant to Professor Amy L. Stein

Researching the intersection between national security, presidential power, and energy security. Drafting footnotes including original propositions and Bluebook citations.

Alachua Conservation Trust, Gainesville, FL, June 2017- July 2017

Legal Extern

Drafted gift agreements and conservation easements. Gathered parcel information using GIS, tax collector and clerk of court records, and environmental assessment reports.

Researched process of founding a wetland mitigation bank under local, state, and federal laws and guidelines.

Tropical Conservation and Sustainable Development: Law, Policy & Professional Practice Program, San Jose, Costa Rica, May 2017-June 2017

Study Abroad and Practicum Participant

Researched Tempisque-Bebedero River Basin stakeholders and relevant responsibilities under international and Costa Rican domestic law. Compiled findings and recommendations into memorandum to be utilized in a future stakeholder workshop.

Florida Department of Environmental Protection, Tallahassee, FL, December 2015-May 2016

Policy Intern

Served as project manager on U.S. Virgin Islands Coral Reef Protection Project in coordination with Florida Department of Environmental Protection, Florida Coastal Office and U.S. Virgin Islands Department of Planning and Natural Resources.

Appendix B – Acknowledgements

As a team we would like to thank the City of St. Augustine, especially the Mayor, City Manager and Staff, City Engineer Jessica Beach, all the residents of the Court Theophelia Site, and all our fellow classmates in this experience. All of the presenters that each week helped prepare us for the field week, thank you for taking the time to help us learn new and innovative ways to approach this project. Thank you to all of our professors, each of you provided such a wealth of expertise and guidance to help us navigate such an amazing field experience. A special thank you to Carolyn Cox and all her staff who helped coordinate all the events for this course throughout the entire semester! Viva St. Augustine!

Appendix C –References/Sources

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