University of Florida
Florida Resilient Cities:

RESILIENT PORT ST. JOE

Final Report
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UF | UNIVERSITY of FLORIDA

FLORIDA RESILIENT CITIES

Funding for the 2019-2020 FRC program is provided by the Jessie Ball DuPont Fund.

FRC Project Team (2019-2020)

University of Florida's Florida Resilient Cities (FRC) program is led by The Florida Institute for Built Environment Resilience (FIBER), Shimberg Center for Housing Studies (SCHS), and The Center for Landscape Conservation Planning (CLCP). The program bridges community needs with design research through the College of Design, Construction, and Planning (DCP), partnered with faculty from across the university.

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Historic Preservation Program
Department of Anthropology
Department of Psychology
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Follow the Florida Resilient Cities program at: https://dcp.ufl.edu/frc/

Photo courtesy of NASA Observatory

INVESTING IN FLORIDA'S FUTURE

BUILDING URBAN, COASTAL, AND RURAL RESILIENCY

CONTENTS

FOREWARD

For many Florida cities, climate change is not leading to sudden catastrophe but to an accumulation of damages. In addition to hurricanes, nuisance flooding, housing shortages and water quality issues cumulatively lead to large impacts. Such chronic concerns place a demand on municipal officials to act effectively in the short term, pushing long-term resilience off for another day.

In the face of worsening coastal conditions, the pressing needs of today can overshadow future needs, especially for municipalities without large planning staffs or resilience efforts led by nongovernmental organizations.

The University of Florida's Florida Resilient Cities (FRC) is a new research program helping communities across the state develop the capacity to be more prepared for and more resilient to increased risk. Led by the Florida Institute for Built Environment Resilience (FIBER), the program bridges community needs with design research through the College of Design, Construction and Planning, partnered with faculty from departments across the university.

The FRC program offers a design approach to community-scale adaptation. It encourages cities to view climate change solutions as opportunities to invest in redevelopment and adaptive transformation.

Through generous support from the Jessie Ball DuPont Fund, the first FRC project is focused on the City of Port St. Joe and the surrounding region's storm recovery and long-term resilience. The leadership team includes FIBER, the Shimberg Center for Housing Studies, and the Center for Landscape Conservation Planning.

This document presents an overview of a full year of work by UF faculty and students to connect design research to the problems faced in the city of Port St. Joe and across the state of Florida. Over the course of the year, FRC worked with 37 faculty and close to 50 students, across fifteen different university departments and programs, and supported through seven independent sub-grants. Each project described here contributed valuable insights to the city as it continues to rebuild following Hurricane Michael. Greater than the depth of any one project is the breadth and vision that has emerged throughout the process.

FRC is eager to contribute to a compelling future vision for Port St. Joe as the city moves forward with its recovery and defines itself for another century.

FLORIDA RESILIENT CITIES PROGRAM

MISSION

The Florida Resilient Cities (FRC) program helps communities across Florida develop the capacity to be more prepared for, and more resilient to increased risk. Led by The Florida Institute for Built Environment Resilience (FIBER), the program bridges community needs with design research through the College of Design, Construction, and Planning, partnered with faculty from across the University of Florida.

The FRC program offers a design approach to community-scale adaptation. It encourages cities to view climate change solutions as opportunities to invest in redevelopment and adaptive transformation. FRC provides unparalleled access to a broad range of University of Florida faculty, staff, students, and resources. In addition to the specific research needs that UF faculty can fill, FRC delivers project scoping, coordination, project management, access to data, and eventual publication of findings.

Developing resilient communities requires a process that:

1) empowers and synthesizes values and goals of a broad range of stakeholders

2) incorporates dependable baseline data reflecting future conditions

3) builds local capacity to champion, fund, and implement projects.

Through collaborative research projects, access to data analytic tools, and community planning and design, FRC will help Florida meet the challenges that lie ahead.

Port St. Joe Spring research kick off meeting with stakeholders

THE PROCESS

The FRC program engages city officials and residents through a suite of courses and faculty-led research projects to provide solutions to the most pressing challenges within the themes of affordable housing, environmental management, and policies for adaptation to sea level rise. In partnership with city residents, FRC identifies project champions to represent the community's interests. Rapid research and design projects undertaken in partnership with the city ultimately stimulate further implementation efforts.

The FRC selects one city or regional scale partner for a 15- to 18-month collaboration. Initial workshops identify community resilience challenges and needs, that are then matched with research and coursework that focus on individual projects. Faculty and students collaborate with local project champions and community stakeholders throughout the academic year. The partnership culminates in community presentations of the work and an implementation summit to prioritize projects for future research, design development and implementation.

FINANCING FRC

FRC provides unparalleled access to a broad range of University of Florida faculty, staff, students, and resources. In addition to the specific research needs that UF faculty can fill, FRC provides project scoping, coordination, project management, access to data, and eventual publication of findings. FRC projects are publicized both locally and through the UF website and media.

FRC receives in-kind support from the University through faculty and student time, as well as through potential additional donors. However, program funding is also generated through partnerships with the host community, county or state funds, or federal or foundation grants unique to each project.

15-18 Month Collaboration

OUTCOMES FOR BROAD IMPACT

The outcomes of the FRC projects serve as best practice models for the state of Florida, at local and regional scales. As Florida's population increases, gaining 900 new residents a day, the effects of climate change will be exacerbated. The FRC projects aim to respond to current challenges and promote mitigation and adaptation strategies to reduce future risk.

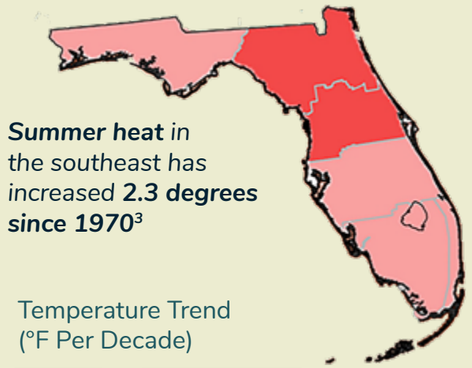
From 2010 to 2018 Florida experienced a **13.3% population increase.** Comparatively, population increase in the United States was 6%[1]. In 2020, the Florida population was over 20 million people and is projected to increase to 24 million at a lower estimate and 30 million at a higher estimate by 2045[2].

Population growth can create potential problems such as a greater need for public services and infrastructure, water availability, and congestion. Concurrently, extreme climate change effects, such as hurricanes and sea level rise, are pushing some Florida cities into population decline.

The **Fourth National Climate Assessment** has published the effects of climate change by region across the country. Florida is considered a part of the Southeast Region with the top effects of concern include urban infrastructure and health risks, flood risks in coastal and low-lying regions, ecosystem impacts, and rural impacts[3].

Extreme Heat

Florida's dangerous heat days currently average at **25 days per year**, it is projected to increase to **130 days by 2050**. Over 620,000 Florida residents are vulnerable to extreme heat. **Health risks** due to increased temperature and increased concentrations of carbon dioxide include heart and lung disease, and risk to mosquito transmitted viruses[3].

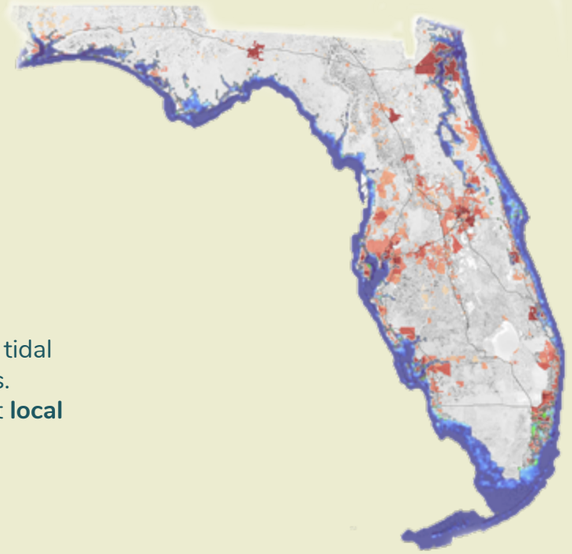


Summer Temperature Trends[4]

Coastal & Inland Flooding

Sea level in Florida will rise **1.25 feet by 2050** putting **4.6 million people** at risk[3].

Florida is subject to flood risks, including tidal flooding, in coastal and low-lying regions. **Infrastructure vulnerability** could impact **local economies**[3].



2100 Intermediate High 6 ft Sea Level Rise Projection by NOAA[5]

Changing Ecosystems

Climate change effects include significantly changing ecosystems which could have negative implications for tourism and natural resource dependent economies. **28% of Florida's population are living in areas at elevated risk of wildfire[3].**

Changing ecosystem impacts include increase risk of forest fire, loss of coral reefs, flooding, air pollution, and mosquito borne diseases.

RESILIENT PORT ST. JOE

LOCATION
WHY PORT ST. JOE
HISTORY
NEEDS ASSESSMENT
BUILDING PARTNERSHIPS
RESEARCH AND COURSE OPERATION

LOCATION

Port St. Joe is located in Gulf County, along St. Joseph Bay. Mexico Beach is located twelve miles northwest of Port St. Joe; Panama City is fifty-three miles northwest.
Apalachicola is located twenty-three miles southeast of Port St. Joe, near the mouth of the Apalachicola River. The Gulf Intra coastal Waterway runs from Port St. Joe to the Apalachicola River, at Gulf County's eastern border.

Regional map of Port St. Joe with surrounding water bodies and cities.

WHY PORT ST. JOE

Port St. Joe is a historic coastal city located on the Florida panhandle. Today the city is known as a relaxing vacation destination on Florida's "Forgotten Coast," but "St. Joseph" was a nineteenth-century hub of trade, commerce and political influence for the nascent state of Florida, and a twentieth-century industrial center for shipping and milling.

However, in 1998 the St. Joe paper mill closed, creating economic decline and an unemployment rate of 14%, compared to the U.S. rate of 3.9% at the time. Population in 1990 was around 4,000 and dropped to about 3,500 in 2010[6]. The mill buildings have since been demolished, leaving an open site for development on St. Joseph Bay.

The city's economic decline intensified with the Deepwater Horizon oil spill in 2010 and with Hurricane Michael in October 2018. Hurricane Michael made landfall as an unprecedented Category 5 in the Florida panhandle, causing catastrophic damage from wind and storm surge. Impacts in Port St. Joe include infrastructure loss, road and building damage and destruction, erosion along the St. Joseph's peninsula and power loss. Gulf County also received inland flooding and tree-downing, inflicting massive damage to the timber industry[7].

Port St. Joe's challenges have not been limited to disaster impacts. The city has experienced various historic, economic and infrastructure losses that have severely impacted residents' wellbeing and the city's sense of place. The community is seeking long-term resilience strategies for adaptation to future risk while preserving the existing history and culture and reviving its economic base. In short, resiliency strategies for Port St. Joe allow the city to cope with short-term disruptions and adapt to long-term changes without losing its essential character.

Damage from Hurricane Michael 2018.

HISTORY OF PORT ST. JOE
200 YEARS OF RESILIENCE

ST. JOSEPH
19TH CENTURY
PORT & RAIL TOWN

1819

Florida territory occupied after purchase from Spain

1829

St. Joseph created as permanent settlement, due to abundance of water and seafood

1831

Town of Apalachicola founded as a port for cotton imports and exports

1836

St. Joseph **established as a town**

First steam powered rail line in Florida connected Lake Wimico and St. Joseph

1838

St. Joseph was selected as the **location of the first state Constitution Convention.**

1845

Railroad closure, business moved to Apalachicola. **A yellow fever epidemic** decimated population.

1850

Storms and a "tidal wave" destroyed the wharf and washed buildings to the sea

1856

Storms destroyed the remaining town

PORT ST. JOE
20TH CENTURY
PORT & PAPER TOWN

1909

Apalachicola Northern Railroad extended to Port St. Joe.

1913

The **City of Port St. Joe** was incorporated

1920

City boom: schools, churches, parks, recreation and tourism

1926

Alfred I. Du Pont began investing in property, infrastructure, port and timber for **paper production.**

1935

St. Joe Paper Company established after DuPont's death

1940

Through mid-century, Port St. Joe served as a **paper mill town, shipping port,** military deepwater training center.

1999

Paper mill closed and site cleared

2018

Hurricane Michael made landfall as a **Category 5** hurricane on the Florida panhandle

PROJECT OVERVIEW

During the 2019 Fall semester, the FRC team facilitated a community visioning workshop and needs assessment, to gain understanding of community identity and values that will enable capacity building for resilience. The workshop included community leaders, residents, business owners, neighborhood organizations, faith-based institutions and non-profits, as well as representatives from local, county and state government and organizations. Activities for the three-hour meeting focused on learning about community concerns, goals and values, and were organized into the following themes:

Reflecting on the Past...

Reflections included thoughts on community support, workforce development, natural resources, camping, giving back, health access, kid friendly, clean, sea turtle hatching, and natural beauty.

Port St. Joe Post Card c. 1950 (top). North Port St. Joe residents at local beach (bottom).

Describing the Present...

Strengths

Environment
Tourism Potential
Community
Historic Downtown
Resiliency
Arts & Culture
Oysters
Natural resources
Hunting & Fishing
Sea turtle hatching
Economic Opportunity

Weaknesses

Infrastructure
Economic Diversity
Job Supply
Manufacturing
Unity
Food Resources
Affordable Housing
Educational Opportunities

Opportunities

Green Infrastructure
Port & Rail
Food Trucks
Vocational Education
Parks & Green Space
Natural resources
Green Industry
Hazard Mitigation
Water Quality
Airport
High Tech Economy

Threats

Loss of Jobs
Emergency Response
Vacant land
Flooding
Hurricanes
Shoreline Erosion
Loss of tax base
Oil Drilling
Sea Level Rise
Displacement & Gentrification
Algae blooms & red tide

Imagining the Future...

The community members' larger vision for Port St. Joe included increased resilience, rebuild and protect vulnerable areas, eco-tourism, develop multi-family high density housing, community school partnership for job training, and high tech infrastructure. When asked to imagine the future, Port St. Joe residents described ecological restoration, economic development, public health, transformation & continuity, neighborhood cohesion, affordable housing, ecological management, and land ownership.

BUILDING PARTNERSHIPS

Through the community engagement process, the FRC team identified local "project champions" to represent Port St. Joe's interests. The FRC team incorporated the data from the workshop into a "Community Snapshot" document that described the history, statistics, and current economic and environmental challenges of Port St. Joe. This document and a "Request for Proposals" were distributed to UF faculty, encouraging submission of research and coursework proposals to be developed into small projects for the Spring semester.

After a competitive review process, the FRC team directed approximately $50,000 for seven research projects and academic courses that emphasized challenges previously identified by the community. The Spring 2020 small projects were coordinated by FRC to tap into interdisciplinary and collaborative thinking across multiple colleges within the university.

RESEARCH OPERATION: SPRING 2020

The Spring research projects and courses were organized into two themes:

The Community Narratives group comprised two teams who focused on community significance, the strength of social networks and the building of resilience as it relates to historic neighborhoods, cultural capital and place-making.

- Cultural Resource Survey of North Port St. Joe. (Coursework)
- Building Trust Through Stories in Port St. Joe. (Faculty Research)

The Built/Natural Landscapes group comprised three teams who focused on infrastructure, sustainable parks, stormwater management and home-sharing as factors in building resilience in both everyday life and extreme or crisis conditions.

- Planning for Resilient Community: Rural Tourism and Home-sharing in Port St. Joe. (Doctoral Dissertation)
- Building a Resilient Urban Park System in Port St. Joe. (Coursework and Doctoral Dissertation)
- An IoT-Enabled Critical Infrastructure Information Network (ICI-IN) for a Future Resilient City. (Faculty Research)

FRC also supported two courses:

Florida Resilient Cities: The Panhandle after Hurricane Michael – Port St. Joe was a field course that introduced students from different disciplines to the challenges that communities face following disasters.

Advanced Modular Multi-family Housing Design studio investigated the challenge of re-establishing affordable housing in post-disaster communities and centers on designing a modular housing unit for six sites in Port St. Joe. In addition to travel, the Jessie Ball DuPont funding sponsored a student competition award: $3,000 for 1st place and $2,000 for a 2nd place tie.

RESEARCH PROJECTS

- *Cultural Resource Survey of North Port St. Joe*
- *Building Trust Through Stories in Port St. Joe*
- *Advanced Modular Multi-family Housing Design Studio*
- *Planning for Resilient Community: Rural Tourism and Home-sharing in Port St. Joe*
- *An IoT-Enabled Critical Infrastructure Information Network for a Future Resilient City*
- *Fieldcourse: Florida Resilient Cities: The Panhandle after Hurricane Michael – Port St. Joe*
- *Building a Resilient Urban Park System in Port St. Joe*

Cultural Resource Survey of North Port St. Joe

Morris Hylton III, Program Director, Historic Preservation
Linda Stevenson, Adjunct Professor, Historic Preservation

Collaborating Students: Megan Ayotte, Harshitha Beere, Alayna Jackson, Ryan Lester, Tyler Smith, Sam Stokes, and Shristi Tamraker
Project Champions: North Port St Joe Project Area Coalition (NPSJ-PAC), and Dannie Bolden, Vice President, NPSJ-PAC

The North Port St. Joe (NPSJ) Cultural Resource Survey project examines the cultural identity of the African-American community that settled in this location and that has been under represented in prior studies of the City's heritage resources. Working with key local organizations and individuals, this study of cultural, historical, and architectural resources aids in the understanding of the broader context within which the community evolved, the socio-cultural and environmental forces that shaped the community, and the current conditions "on the ground." This survey project documents and assesses the range of built resources, including extant buildings dating from the 1920s to the present day, and includes a variety of building use types; residential, commercial, educational, recreational and spiritual structures and sites. Expanding on the awareness of the role played by racial segregation and the impact of integration during the 1960s on the community, this project examines the importance of the Civil Rights movement through research at a pivotal site, the former George Washington High School. This research supports a recommendation to prepare a National Register nomination for the property.

Research Questions

- What are the origins, history, and development of the North Port St Joe community?
- How does this community's history fit within the context of the overall developmental history of the City of Port St Joe, Gulf County, and the south-east region of the Florida Panhandle?
- Who were important individuals in the historical development of the NPSJ community?
- Which historical/ architectural resources are extant, and which have disappeared?
- How can these resources be interpreted and adaptively reused to benefit the community?

Significance of Work

The results of this research benefit the community of North Port St. Joe:

- Important historical documents, including photographs, newspaper articles, other publications, documents, personal communications and oral histories from several sources were compiled and scanned into a single repository, and shared with the project champions.

- The remaining architectural resources in the community of North Port St. Joe were documented, assessed and recorded in a digital database. These inventoried resources can now be added to the Florida Master Site File database.

- A picture of the community's historical development emerged from the research along with identifying important historical themes. These themes include:

  Impacts of industrial development and natural resources extraction on the creation, subsequent rise and decline of the NPSJ community.

  Impact of economic fluctuations on the community, timber logging, mineral extraction, fishing industry regulations and decline.

  Environmental threats, both short-term (catastrophic events such as hurricanes) and long-term, (such as environmental degradation, water quality, etc.).

  Social and racial divides reflected in the development patterns, segregation and integration, and how these political and social forces affected the community during the 20th century.

Methodology

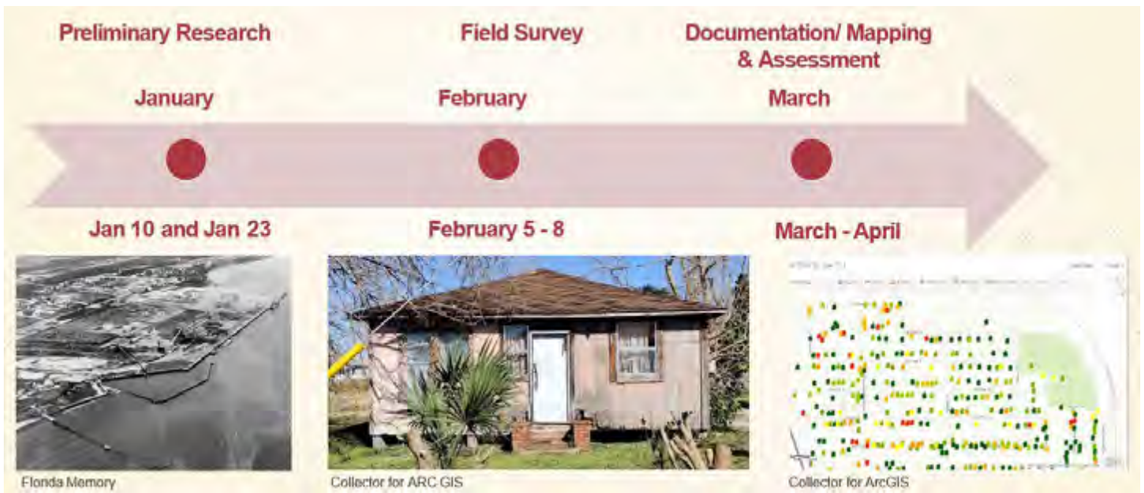
The Project Team utilized a standardized methodology for conducting Cultural Resource Surveys with the following phases of work.

Documentary Research
The first phase consisted of gathering information on the City's history, architecture and neighborhood development patterns. A variety of primary and secondary sources were consulted for identifying individual structures and neighborhoods for potential examination. Three oral histories were conducted with key community figures. Existing local archives were documented, historical photographs and other documents were scanned and entered into a digital database.

Field Work
Prior to the start of the students' fieldwork, faculty undertook a neighborhood windshield survey to understand the character of the community and the quantity and character of extant historical resources. The Gulf County Property Appraiser site was used to create the list of addresses with tax parcel ID numbers for each parcel in the study area. Students gathered site data through a parcel-by-parcel field survey conducted over a two-day period.

The documentation app utilizes the ArcGIS Collector platform and is designed for use on smart phones or laptops, with the capability of linking photographs taken with the phone to each parcel's geospatial and physical data, and compiled on a GIS map. The app includes fields that correspond to the data needed to complete a Florida Master Site File (FMSF) form for each parcel. The data was also correlated on an excel spreadsheet, which simplified the analysis of the aggregate data for certain features, such as quantity of resources of a certain architectural style, type of use, or physical condition.

Evaluation and Assessment
From the field data, FMSF forms and location maps were prepared for each parcel. The data was tabulated by field to assess quantities and analyze conditions of the resources. Physical conditions of the resources (Excellent, Good, Fair, Poor, Ruinous or Vacant) was represented by a color-coded symbol on the GIS map.



Outcomes

The Project Team met virtually with the key principals of the NPSJ-PAC to share the results of the work and make recommendations for next steps and future project considerations.

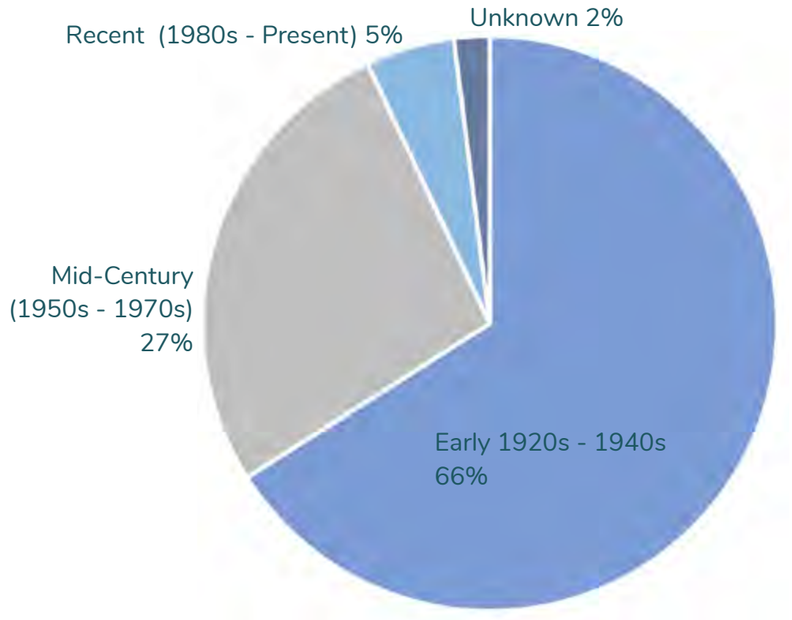
- 305 new Florida Master Site File (FMSF) forms, including 2 Resource Group forms
- The survey of the site of the former George Washington High School (GWHS), a significant community resource with buildings and grounds. Producing 3 new FMSF forms, 2 updated FMSF forms, and 1 new Resource Group form
- Creation of a geo-spatial database compiling the results of the survey project to date
- PowerPoint presentation of research findings, presented via Zoom conference to our community partners on April 22, 2020
- A Story Map web link
- Recorded interview with two local informants on the history of North Port St Joe, important community figures during the period of significance, events during the school integration and Civil Rights movement, and important places and structures in the community
- Digitized record of photographic collection at the GWHS Museum

Next Steps

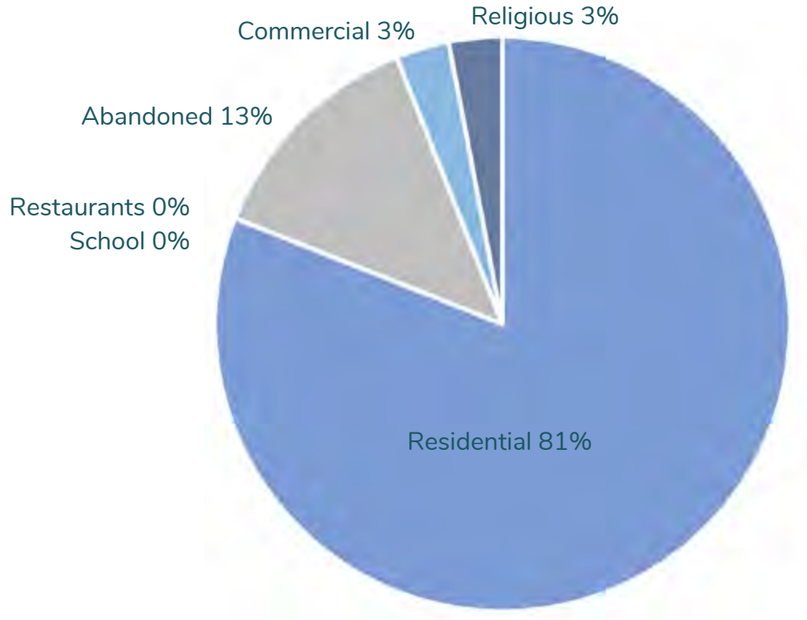
The recommendations for next steps are as follows:

- Research and prepare a nomination to the National Register of Historic Places for the former George Washington High School campus, to aid in planning for adaptive reuse of the site and structures.
- Continue work with the NPSJ-PAC on how this research can inform plans for redevelopment of the commercial corridor of Martin Luther King Jr. Blvd.
- Create an accessible database of the extant historical and architectural resources within the survey area.

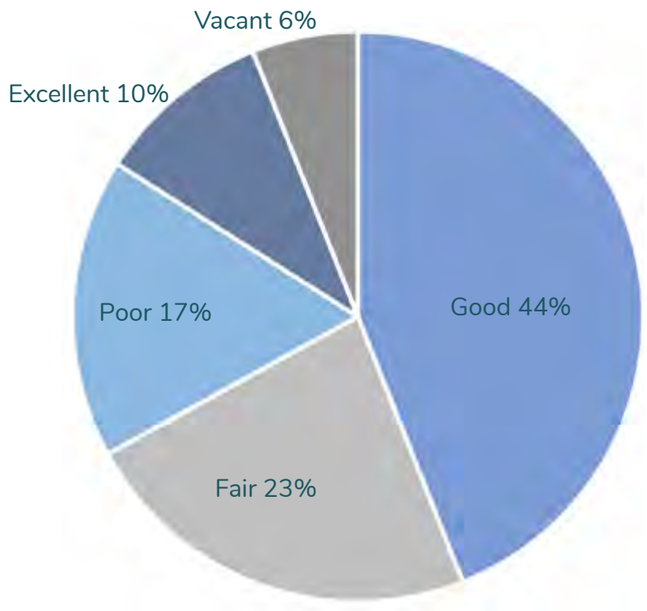
Longer term, the research findings can provide a context for understanding, interpreting and leveraging the community's cultural heritage for future redevelopment strategies for this community. Historic Preservation as a field is by nature multi-disciplinary. The range of other projects conducted within the framework established by the FRC provided a broader perspective for our focused research, and we appreciate the opportunities to see what the other teams were developing as their own projects progressed.



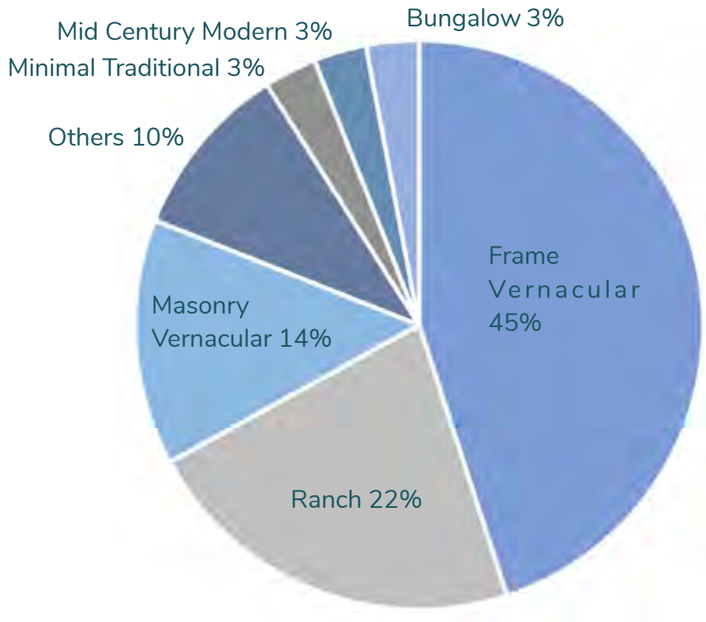
Building period of construction



Building use type



Building conditions



Architecture styles

Thinking long-term, the research findings can provide a context for understanding, interpreting and leveraging the community's cultural heritage for future redevelopment strategies.

Building Trust Through Stories in Port St. Joe

Jason Von Meding, Associate Professor, M.E Rinker, Sr. School of Construction Management, Florida Institute for Built Environment Resilience (FIBER)
Colin Tucker Smith, Assistant Professor, Department of Psychology

Collaborating Partners: Victoria Colvin, Research Assistant, Department of Psychology; Collin Bowie, Research Assistant, FIBER; Deborah von Meding, Editorial assistance
Project Champions: North Port St. Joe Project Action Committee (NPSJ-PAC)
Board of Directors, Dannie Bolden and Marquita Thompkins

Open and strategic communication is a fundamental basis for trust. Through the stories we tell and the language we use, we can influence beliefs and behaviors. In Port Saint Joe (PSJ) – as is common in towns and cities around the United States – not all stories are heard equally and not all local knowledge is understood or valued equally. This research project brings together expertise in disaster social studies (Dr Jason von Meding) and behavioral social psychology (Dr Colin Tucker Smith) and focuses on the dilemmas of knowledge, communication and trust faced by the Black community of North Port Saint Joe (NPSJ). Using participatory methods based on community photography and collective interpretation (Photovoice), the research team worked alongside community members in NPSJ to document the lived experience of residents, with a view towards empowering strategic and transformational change. Putting the voices and creative talents of residents at the center of the project adds power and emotion to the narratives that emerge. Some of the key themes emerging from our project relate to the sense of belonging/connection to a place that residents hold dear, as well as the pride that is felt in being part of a local culture and history. The project has brought into focus stories of resistance and survival in the face of overwhelming odds, and these narratives of resilience demonstrate that the people of NPSJ possess talents, skills and resources that have protected them in oppressive circumstances, but would also help them to thrive in the absence of structural barriers.

Research Questions

- How does a community experiencing risk created in part by systemic/structural inequalities perceive their own power/strength/capacity/agency?
- How can authentic stories rooted in countering the narratives of oppressive power act as liberating processes for the storytellers?
- What are the conditions needed to build trust between those facing systemic oppression (e.g., racist policies) and the beneficiaries of the status quo?
- How can stories about risk and resilience contribute to community organizing to combat the re-creation of risk?

Significance of Work

The research is significant a) through the research process itself and b) through the storied accounts of the participants. It is critical to note that this research was undertaken WITH a community, rather than FOR or ABOUT a community – this meant involving community elders in every step of the process. This is in itself a deviation from the norm in disaster research and responds to the unequal power dynamics between researchers and communities, and the sometimes extractive nature of fieldwork.

The data itself focused on the hidden narratives in the NPSJ community as a result of placing control of the data in the hands of local people who could center local experiences. A feature of Photovoice projects is the potential to challenge dominant narratives about the people involved. The research has uncovered data about the NPSJ community which might otherwise remain hidden.

The project seeks to address equity through the power of storytelling. We argue that authentic accounts paired with imagery created by local people can elicit and inspire empathy in those outside of the community. This is important because many decisions are made for this community by outsiders. Centering and promoting the stories of the people of NPSJ can allow the community to organize around powerful visions of what the community is and can become.

Methodology

As Lawler[8] argues, communities are likely to produce accounts of themselves that are "storied," thus Photovoice provides a fitting means for community members to express their experiences of place (vis-a-vis culture, history, society, participation, adversity, solidarity) and to reflect on emerging themes of the research. While Photovoice has promoted critical dialogue between citizens, advocacy groups, and decision makers[9] in both planning[10] and public health arenas[11 12 13], scholars have also indicated its aptness for studying disaster resilience[14].

We engaged the local community via the North Port St. Joe Project Area Coalition (NPSJ-PAC), in particular Mr. Dannie Bolden, Vice-President, NPSJ-PAC. This enabled us to work directly with a group of community elders. We dedicated additional time for building relationships with elders as per the Photovoice protocols, but once we had established this network it became the driving force of the project. Engagement was commenced face-to-face until COVID prohibited this at which point we moved to email, phone, and zoom. An important feature of this project was building personal relationships with senior members of the community and reflecting on the research process alongside them, amending the plan of action accordingly.

A feature of Photovoice methodology is its liberating potential for participating communities – building critical consciousness and supporting social action[15]. In this project, members of the NPSJ community engaged in activities that caused them to pause and reflect on the particular place-based characteristics of NPSJ. In the course of photographing their community, participants were encouraged to consider what makes their place unique, what they love about it, and what holds the utmost value to them within an overall scope of "narratives of resilience".

We have found that it is difficult (but not impossible) to do Photovoice research during a pandemic without face-to-face engagement. For us it meant modifying the research protocol and IRB approval to substitute face-to-face activities for virtual ones, an addition of unexpected time. Using a community-centered and community-led approach means giving up some control of the schedule in which things will be done. This is essential if researchers are to build trust with the community, but can be daunting given that our research environment is deadline-driven. That said, we remain committed to decentering our power in the entire research process. If we had foreseen COVID-19, we might have been more realistic with our expectations regarding the scheduling of activities. We missed chances to spend more time in January and February in NPSJ getting to know people in person, building trust and a working dynamic as co-creators of knowledge.

In the course of photographing their community, participants were encouraged to consider what makes their place unique, what they love about it, and what holds the utmost value to them within an overall scope of "narratives of resilience".

Outcomes & Next Steps

According to participants, NPSJ has become increasingly isolated from the rest of PSJ over the past 50 years due to closure of schools and businesses in the community, aging infrastructure and a lack of investment. The data generated by the project emphasizes the value of people in this community and the potential they have to improve their place with necessary and deserved investment from the city and state.

Our initial group of Photovoice participants are primarily community elders, and we would like to do further rounds of Photovoice with other demographics, to provide different perspectives. We are also interested in further developing our relationship with the NPSJ-PAC and with individuals in the community for future research collaborations. For example, we are exploring the possibility of assisting Clarence Monnett in the archiving of local oral and photographic histories of African-Americans in Port St Joe. We would love to connect this work with the Samuel Proctor Oral History Program at UF.

The near-term implications of the project involve gathering the community together in self-reflection, creating opportunities for collective reflection, empowerment and belonging. A pop-up exhibition would be an exciting contribution to local community advocacy efforts, while geo-locating the photographs and stories of NPSJ as part of a website would create a public-facing story archive. In the longer-term, we are creating data that supports community efforts to secure investment and support development processes, as well as building trusting relationships for future research collaborations.

The premise of this project has been the idea of building trust between a community that has faced historical injustice and those external to the community that often make decisions for them about them. For this reason, a multi-disciplinary approach was required to not only grapple with the social/economic/political origins of risk but why people behave how they do, and how trust is created – therefore the partnership between disaster research and psychology was key. Although we have not yet been able to closely work with the other teams, we hope to draw on the expertise emerging from study of cultural heritage in NPSJ, in order to link its outcomes to our photovoice project.

The outputs of the project, through a pop-up exhibition, can be of practical use in advocacy efforts for equitable development.

Advanced Modular Multi-family Housing Design Studio

Ryan Sharston, Assistant Professor, School of Architecture, Rinker School of Construction Management, Florida Institute for the Built Environment Resilience

Student Collaborators: Julia Comeau, Kaitlyn Lintz, Kevin Mojica, Aida Muhibic, Patrick Palmer, Tessa Register, John Alligood, Ashish Asutosh, Tej Sanjaykumar Desai, Makayla Myers, Daniel Oak, Ruiying Wang
Project Champion: Frank Wells, Chief Impact Officer, Bright Community Trust

This integrated design project addresses the enormous challenge of rapidly rebuilding communities that have been badly damaged and perhaps even destroyed by major storms. This problem will likely become even more challenging due to the increasingly powerful and more frequent hurricanes that are forecast to strike the U.S., and particularly coastal regions. These events will continue to severely impact communities whose housing stock is essentially destroyed, leaving their population without adequate shelter, often for long periods of time.

To address the problem of rapidly delivering large quantities of post-disaster housing, we focused on “advanced design” of modular housing. In collaboration with manufacturing industry, this project develops the Advanced Modular Multifamily Housing Design (AMMHD), incorporating cutting edge design and construction technologies. The AMMHD project addresses the design of housing that can be rapidly built in factories, that can cope with future major events, and that can become a community asset.

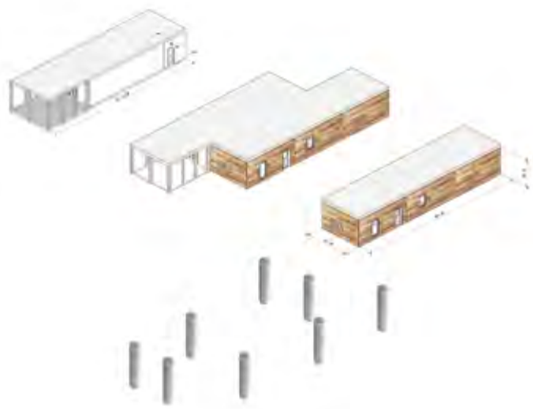
The scope of project is small multi-family post-disaster housing with a focus on conditions in the Southeastern U.S. in general and the City of Port Saint Joe in particular. Senior students from the School of Architecture and graduate students’ from Rinker School of Construction Management centered on design and construction analysis of six manufactured home complexes located on two different sites, focused on housing equipped with advanced technologies and process improvements.

The environmental factors considered in guiding the identification of technologies required for the AMMHD include hurricane force winds, flooding, and storm surges. The attributes required for AMMHD post-disaster housing include high levels of energy efficiency, energy self-sufficiency, appropriate structural strength, and construction flexibility (e.g. de-constructibility and reassembly). In summary, the design project focuses on resilient, sustainable, and affordable post-disaster housing equipped with advanced technologies and process improvements.

Analysis and Technology Improvements

The design and development of affordable, highly energy efficient, and disaster-resilient manufactured homes for the City of Port St. Joe is significant since the city is prone to severe hazardous events, and there is an existing shortage of affordable construction labor and high cost of land.

Coastal Site



Downtown Site

Planning for Resilient Community: Rural Tourism and Home-sharing in Port St. Joe

Yu-Hua Xu, Doctoral Candidate, Dept. of Tourism, Hospitality and Event Management
Lori Pennington-Gray, Professor, Department of Tourism, Hospitality & Event Management; Director, Eric Friedheim Tourism Institute
Zi-Ming Li, Research Fellow, Shimberg Center for Housing Studies
Anne Ray, Florida Housing Data Clearinghouse (FHDC) Manager, Shimberg Center for Housing Studies

Project Champions: David Ashbrook, Mayor Pro-Tem, City of Port St. Joe; Chester Davis, President, North Port St. Joe Project Area Coalition; Cassie Studstill, Realtor, Port St. Joe; Joe Whitmer, Executive Director, Gulf County Chamber of Commerce

This project explored the disaster relief function of the home-sharing accommodation sector for communities. In March, we conducted surveys among residents in Gulf County, and obtained a group of factors that impact residents' willingness to engage in the practice of disaster relief. First, incentives can largely enhance hosts' willingness to leverage their properties for crisis recovery. Second, people who have engaged in the sharing economy as guests are more prone to share their resources for disaster relief. Third, the level of vulnerability in a place can positively stimulate residents to share their homes with people in need. Lastly, good governance and a financially beneficial shared market presents an encouraging environment for people to share their resources during crises. Based on the survey results, we adopted a suitability model to identify the most suitable locations in Gulf County for home-sharing during disaster relief.

Assuming that suitability includes homeowners willing to share their properties, a suitability map was created to assess the suitability of all parcels in the county. The level of attractiveness and level of vulnerability were two major aspects considered during scoring. We recommend designing an incentives-based system that encourages homeowners to register their vacant properties as temporary shelters pre-crisis and to ensure that it is open and accessible in times of crisis. We also recommend screening for architectural safety before registering a home-sharing property for crisis recovery purposes.

Research Questions

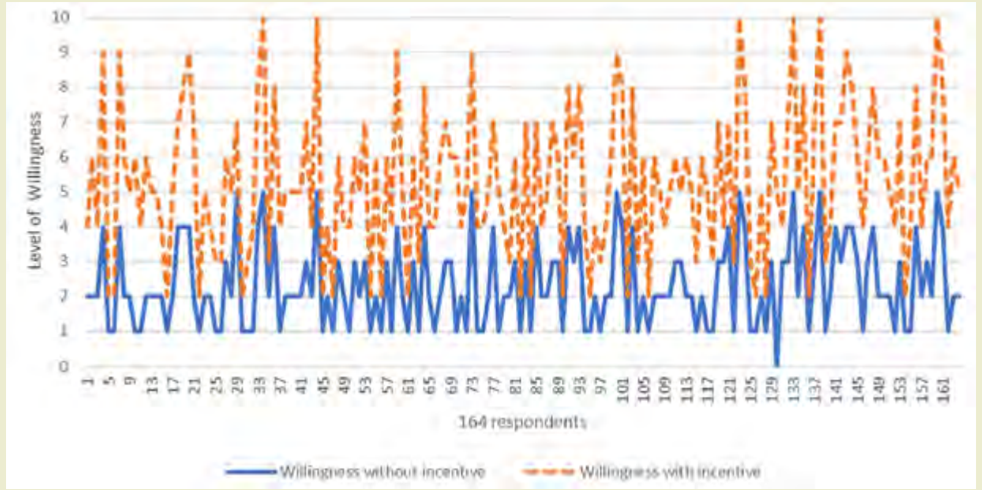
- Can incentives impact residents' willingness to share their properties for disaster relief?
- Can residents' perceived development of the home-sharing economy impact residents' level of agreement with using private properties for disaster relief?
- Can residents' perceived community resilience impact their level of agreement to use private properties for disaster relief?
- Can residents' perception of community policy impact their willingness to share their property for disaster relief?

Significance of Work

Rurality has a unique level of attractiveness that differs from urbanity. Activities like ecotourism, outdoor recreation, and water-based recreation have been drawing a growing number of visitors to rural areas. Port St. Joe is a rural destination that possesses rich tourism and recreational resources. However, the community is experiencing an unprecedented level of economic hardship. Developing tourism has become one of the key strategies for Port St. Joe and the surrounding areas.

A well-supported tourism economy cannot live without a healthy hospitality sector, requiring suitable lodging facilities and accommodation services. The hospitality and accommodation industry can be a major source of investment, job opportunities, and income for local communities. For travelers, the accommodation can become a unique place to interact with the locals, build relationships with the community, and contribute financially to the community. However, rural communities are usually not the first choice for corporate hotel investors. Consequently, the provision of tourist accommodation and facilities in rural areas is largely up to the locals.

Home-sharing is a community-based hospitality business that has become an alternative to large-scale accommodations in rural areas. The home-sharing industry cannot only activate unused real estate and idle labor but also can enable alternative ways for people to meet housing needs. In addition, home-sharing is rooted in community assets. It can encourage private investment, cultivate local entrepreneurship, and accommodate travelers even in times of disruptions. More importantly, it provides local families a chance to bring their home and maybe also homemade products to the marketplace.



Level of willingness to home-share with and without incentive

Methodology

The purpose of this study was two-fold: First, explore the opportunities and challenges to employ home-sharing for disaster relief in Port St. Joe. Second, identify the determinants that have influenced the use of home-sharing economy for disaster relief and create a spatial planning document for home-sharing in Port St. Joe and Gulf County.

Step 1, survey residents' perception of home-sharing, community resilience, disaster response, and relevant policies so as to explore the likelihood of using home-sharing for disaster relief. In January and March of 2020, the team made two trips to Port St. Joe to conduct the survey and interviews.

Step 2, identify the resilience-related factors that have significant impacts on home-sharing development and community crisis recovery. Using census data and real home-sharing accommodation dataset, we evaluated the current geographical distribution of the current home-sharing properties, and made spatial planning suggestions for home-sharing accommodations in Gulf County.

The next step was to optimize the proposed framework by including resilience-related factors from an engineering perspective and test it under different scenarios.

Identify the determinants that have influenced the use of home-sharing economy for disaster relief and create a spatial planning document for home-sharing in Port St. Joe and Gulf County.

Outcomes

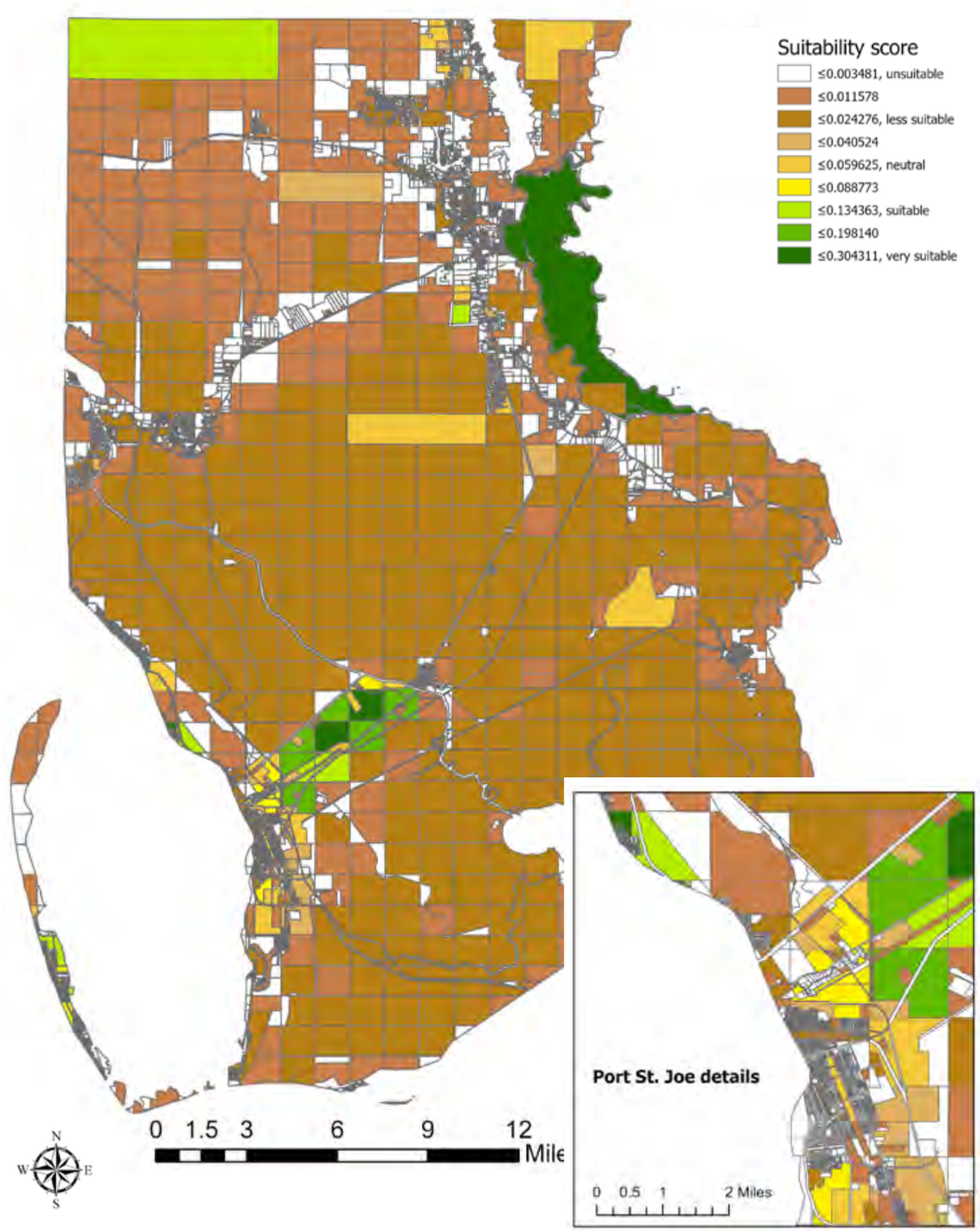
We reviewed how to match vacant housing with hurricane displacement with over 1,000 home-sharing properties in Port St. Joe & the bay area. A total of 169 people responded to a questionnaire that gauged willingness to rent out homes for disaster relief.

From this project, we proposed a model to integrate home-sharing accommodations into a community resilience system. By conducting fieldwork and interviews among stakeholders, the primary research was joined with a statistical modeling to establish a framework to assess the suitability of locations for home-sharing during disaster relief.

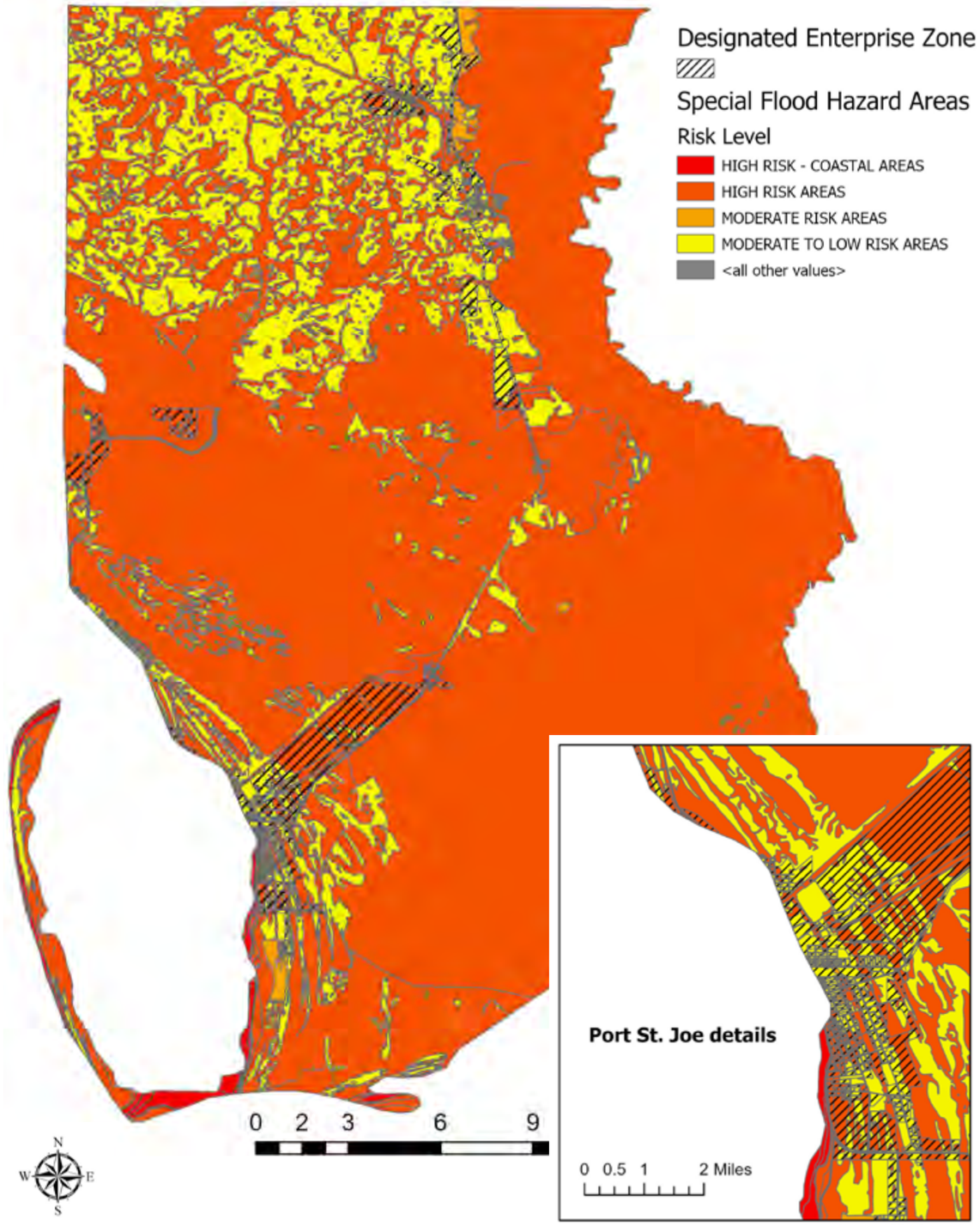
We recommend designing a system based on incentives to encourage homeowners to register their vacant properties as temporary shelters ahead of any crisis and ensure that it is able to be open and accessible for hurricane evacuees in times of crisis.

Next Steps

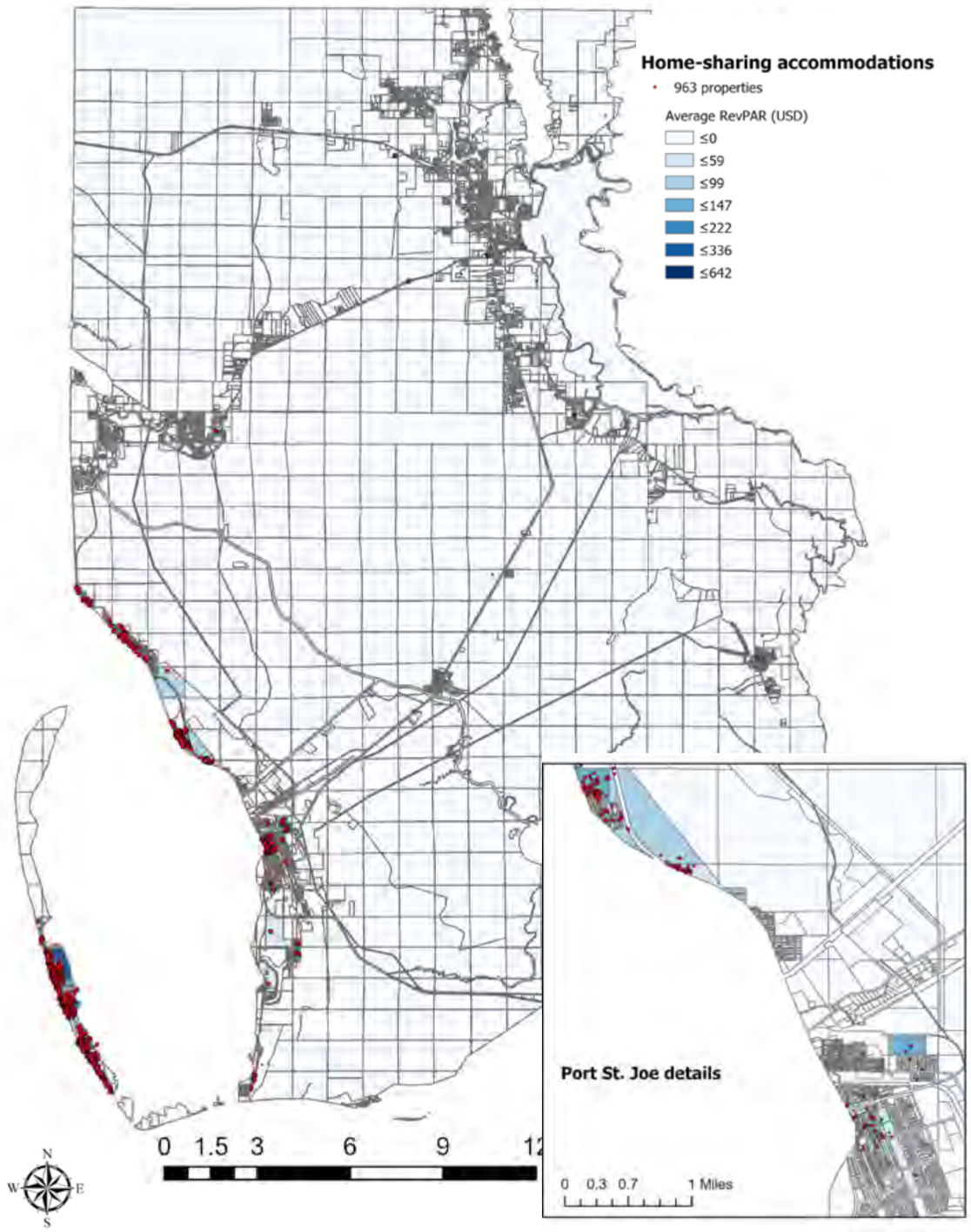
Future studies can further explore the interaction between the sharing economy and community/ destination resilience. The sharing economy may contribute to destination resilience in a broader extend.



Suitability Map of Developing Home-sharing Accommodation for Disaster Relief in Gulf County, Florida



Special Flood Hazard Areas and Designated Enterprise Zone in Gulf County, Florida



Profitability of Home-Sharing Business in Gulf County, Florida

An IoT-Enabled Critical Infrastructure Information Network (ICI-IN) for a Future Resilient City

Rui Liu, Assistant Professor, M.E. Rinker, Sr. School of Construction Management
Xiao Yu, Assistant Professor, Department of Civil and Coastal Engineering
Xilei Zhao, Assistant Professor, Department of Civil & Coastal Engineering

Collaborating Student: Faxi Yuan, M.E. Rinker, Sr. School of Construction
Project Champion: Kevin Pettis, Manager, Port St. Joe Wastewater Treatment Plant
Collaborating Partners: Paul Thorpe, Resource Planning Manager, and
John B. Crowe, CTP Program Manager, North West Florida Water Management District

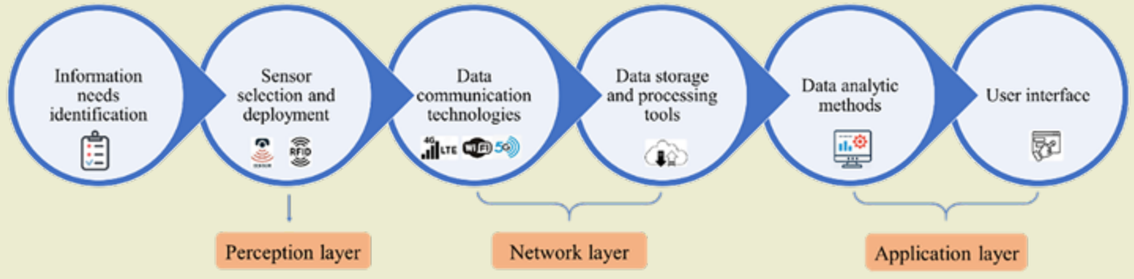
Critical infrastructures (CIs) include transportation, electricity, healthcare, information technology, emergency services, and water systems. CIs play a critical role in supporting emergency management agencies (EMAs) and affected people's crisis response activities during disasters, such as transportation for evacuations, drinking water provision for basic needs, and electricity supply for making food. Previous studies including crisis informatics and the use of the Internet of Things (IoT) cannot include comprehensive situation awareness of CI conditions in crisis. To resolve this gap, this project takes the first step for supporting crisis response activities of the EMAs and affected people through enhanced situation awareness of CIs. Using Port St. Joe as the case study area, this study evaluates the CIs information needs. This project investigates the affected people's information needs of CIs' various sectors through a questionnaire among residents. The findings can support the comprehensive implementation of the IoT enabled smart system for CIs such as the optimized distribution of the limited resources to CIs sectors which are in the most urgent needs of the affected people. Additionally, this project has built the fault tree model to validate the effectiveness of IoT for enhancing situation awareness of CIs. The results demonstrate that implementing the IoT-enabled critical infrastructure information network help to enhance the situation awareness of CIs and further improve community resilience.

Research Questions

- What are the information needs in terms of critical infrastructures (CIs) to support their responses in Hurricane Michael?
- How can the IoT-enabled CIs information network (ICI-IN) enhance community resilience?

Significance of Work

This project not only demonstrates the effectiveness of the ICI-IN for enhancing community resilience but also reveals humans' information needs of CIs to make their response strategies. The findings pave a way for the future design and implementation of the ICI-IN in Port St. Joe as illustrated below. The ICI-IN involves with identification of CIs information needs (this project), the selection and deployment of proper sensors for CIs data collection, communication, storage and analysis of CIs data, and the design of user interfaces for the EMAs and affected people. The comprehensive implementation of the ICI-IN depends heavily on the evaluation of information needs, such as which information items are needed by the EMAs and affected humans during disasters. The findings in this project can support the selection and deployment of proper sensors for CIs data collection.



The implementation flow of the ICI-IN for CIs

Methodology

This project conducted the questionnaire among the residents to investigate both the EMAs and affected humans' information needs of CIs in hurricanes. The first part asks the demographic characters of the respondents, including race/ethnicity, gender, and age. The second part of the survey includes seven questions, which were described in Table 1. In Q1, the CIs' impact evaluation includes four levels: not impacted (i.e., 0.00%), lightly impacted (i.e., 33.33%), impacted (i.e., 66.66%) and seriously impacted (i.e., 100.00%). In Q2 to Q6, the evaluation for the information needs of CIs various information items also has four levels including no need (i.e., 0.00%), somewhat need (i.e., 33.33%), need (i.e., 66.66%) and strongly need (i.e., 100.00%). In Q7, there are nine numbers from 1 (first recover priority) to 9 (least recover priority) for the rank of recover priority of CIs sectors.

To explore the effectiveness of the ICI-IN for enhancing community resilience, this project has designed the fault tree model of CIs for human's crisis responses. We have built two fault tree models, one without the ICI-IN and one with the ICI-IN. By comparing the failure mechanisms of CIs and further their impacts on humans' crisis responses in these two fault tree models, this project has demonstrated the effectiveness of the ICI-IN for enhancing community resilience.

No.	CIs information items	Questions
Q1	TSS: traffic conditions, roads, and bridges; WWS: drinking/supply water system, wastewater system, and stormwater system; ESI: power/electricity grids, and gas and fuel stations; IT: internet for computer and mobile devices; ESS: first responders and the EMAs; HPH: hospitals and shelters.	Which of the CIs sectors do you think impacted your responses and activities (e.g., evacuation and travel to shelter/hospitals) during hurricanes, and to what extend?
Q2	Traffic conditions: traffic lights functions, traffic counts/volume and traffic incidents; Road conditions: flooded or not, water depth, and fallen trees and electrical lines; Bridge conditions: flooded or not, blocked or not, and load capacity; Harbor conditions: flooded or not.	Which of the information of the TSS sector do you need to support your response activities in hurricanes and to what extend?
Q3	Drinking water system 1: contamination areas and available drinking water sources; Drinking water system 2: location of the broken pipeline and broken time; Sewer system 1: flooded or not, contamination areas, with chemical contamination materials or not, and impact residents' health or not; Sewer system 2: location of the broken pipeline and broken time; Drinking water and sewer system: sewer system contaminates drinking water sources or not; Stormwater system 1: flooded or not, flooded areas, and impact residents' evacuation or not; Stormwater system 2: location of the broken pipeline and broken time.	Which of the information of the WWS sector do you need to support your response activities in hurricanes and to what extend?
Q4	Gas and fuels: gas/fuel stations with available gas/fuels; Electricity: areas without electricity, location of fallen/broken electricity lines, and fallen/broken time.	Which of the information of the ESI sector do you need to support your response activities in hurricanes and to what extend?
Q5	The names and contact information of emergency services such as local EMAs, fire brigade, police department, and ambulance services; The types of services provided by various emergency services agencies: medical and evacuation services.	Which of the information of the ESS sector do you need to support your response activities in hurricanes and to what extend?
Q6	Medical service centers: closed or not, accessibility, bed capacity, and medical facilities; Temporary medical service stations and shelters 1: bed capacity, and medical facilities; Temporary medical service stations and shelters 2: supplies of food, water, and other materials; Accessibility to temporary medical service stations and shelters.	Which of the information of the HPH sector do you need to support your response activities in hurricanes and to what extend?
Q7	The CIs subsectors are the same as the information items as in Q1.	What is your rank for the recovery priority of these nine CIs subsectors?

Table 1. The Content of the questionnaire

CIs significance levels on humans' crisis responses

With residents' responses in Q1, this research calculated the average impact levels for the nine CIs sub sectors on their response activities. The results are illustrated in Table 2. The ranks in reflect the significance of CIs various sectors in supporting humans' crisis responses. For instance, the top two CIs sub sectors are related to the affected humans' basic needs such as the drinking water system supporting their water needs, and the electricity and fuels supporting them to make food.

CIs subsectors	Impact level	Rank
ESI: power/electricity grids, and gas and fuel stations	94.87%	1
WWS: drinking/supply water system	85.90%	2
WWS: wastewater system	81.94%	3
IT: internet for computer and mobile devices	81.33%	4
TSS: traffic conditions, roads, and bridges	76.00%	5
ESS: first responders and the EMAs	69.44%	6
WWS: stormwater system	66.67%	7
HPH: hospitals	62.50%	8
HPH: shelters	50.00%	9

Table 2. Significance levels for nine CIs sub sectors

Residents ranked the top two critical infrastructures of concern as the power grid at 95% and the drinking/ supply water system at 86%

Humans' information needs of CIs conditions

For the replies to Q2-Q6, this project has quantified the level of affected people's information needs of CIs' 19 information items. The results are presented in Table 3. Using the WWS sector as an example, the affected citizens prioritized the drinking water system near the top of their needs, including Drinking Water System 1 and Drinking Water System 2 (see details in Table 1). This phenomenon is reasonable as the drinking water system fulfills the affected people's basic needs for drinking water.

Contrary to the drinking water system, the affected people were less concerned about the sewer system (rank 12 for two sewer system items). When referring to whether the sewer system contaminates the drinking water sources (rank 7), the affected citizens presented more concerns than that to the sewer system. Additionally, the affected citizens showed less interest in the stormwater system including stormwater system 1 (rank 11) and stormwater system 2 (rank 13).

CIs sectors	CIs information items	Need level	Rank
TSS	Traffic conditions	66.66%	14
	Road conditions	85.51%	8
	Bridge conditions	86.95%	6
	Harbor conditions	60.60%	15
WSS	Drinking water system 1	97.22%	2
	Drinking water system 2	88.89%	4
	Sewer system 1	77.78%	12
	Sewer system 2	77.78%	12
	Drinking water and sewer system	86.11%	7
	Stormwater system 1	80.55%	11
	Stormwater system 2	72.22%	13
ESI	Gas and fuels	98.61%	1
	Electricity	95.83%	3
ESS	The names and contact information of emergency services	84.72%	9
	The types of services provided by various emergency services agencies	84.72%	9
HPH	Medical service centers	88.89%	4
	Temporary medical service stations and shelters 1	86.11%	7
	Temporary medical service stations and shelters 2	87.50%	5
	Accessibility to temporary medical service stations and shelters	83.33%	10

Table 3. Evaluation of information needs for 19 CIs information items.

The affected citizens prioritized the drinking water system near the top of their needs

Evaluation of ICI-IN effectiveness for community resilience

Two fault tree models for the impacts of CIs failures on humans' crisis response are illustrated in Figures 1 and 2. The example scenario is: During Hurricane Michael some roads were affected by the hurricane and residents needed to evacuate from their houses. Without the IoT enabled CIs information network (ICI-IN), Figure 1 shows how the lack of road/traffic conditions contributed to failures in humans' evacuation activities. The failure in evacuation activities can further fail humans' crisis responses.

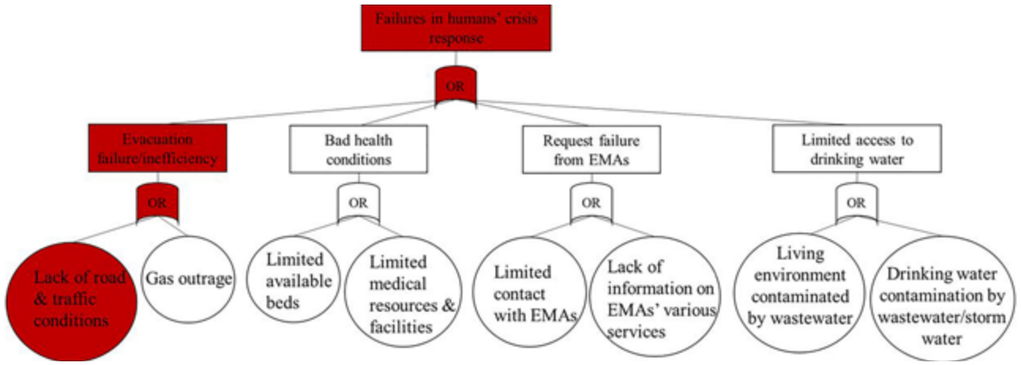


Figure 1. Fault Tree of CIs for humans' crisis response

Figure 2 illustrates how the disaster impacts on the road network or traffic can impact humans' crisis responses with the involvement of the ICI-IN. When there are disaster impacts on road network/traffic conditions and the failure of ICI-IN occurred, residents will lack information on road/traffic conditions. As a result, the implementation of the ICI-IN can reduce the probability of lack of road/traffic conditions that can further increase community resilience.

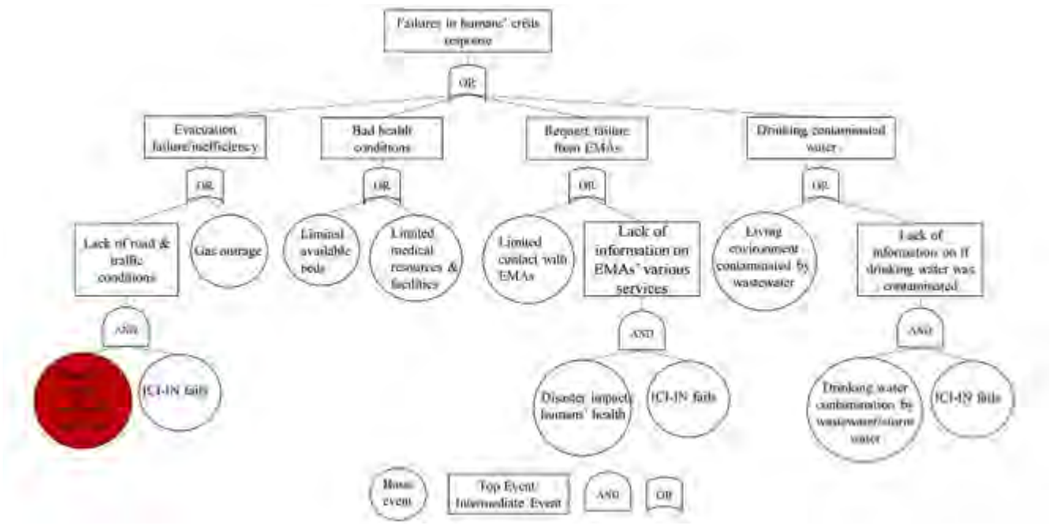


Figure 2. Fault tree modification by including IoT enabled CIs information network (ICI-IN)

Implementation

The survey results help the future work on the identification of the affected humans' concerns with CIs condition data. For instance, according to the affected people's feedback on the impacts of various CIs sectors (Table 2), CIs planners can give the priority of limited resource distribution to the ESI, WWS-drinking water system, WWS-wastewater system, IT and the TSS sectors.

Specifically, the results of the affected people's evaluation of their needs in CIs' various information items (Table 3), can refine the priority in the use of resources as following:

1) TSS sector: Resource use can be firstly used to monitor road and bridge conditions.

2) WWS sector: The priority in the use of resources should support the monitor of drinking water system 1 & 2, and drinking water and sewer system (Table 1).

3) ESI sector: The delivery of resources to support the monitor of gas and fuels, and electricity, should have the priority.

4) HPH sector: The resource use priority should be spread to monitor medical service centers, and temporary medical service stations and shelters 1 & 2 (Table 1).

The complete implementation of the ICI-IN system for CIs in Port St. Joe can benefit the EMAs and affected humans from various aspects such as the selection of evacuation routes, distribution of gas/fuel stations with available gas and fuels, whether the drinking water in their houses is available and the conditions of medical service centers and shelters. As a result, the implementation of the IoT enabled smart system for CIs can enhance both the EMAs and the affected people's response capacities during disasters, which can further improve community resilience. The enhancement of community resilience helps to establish resilient cities.

Next Steps

This project evaluates the CIs information needs of the EMAs and affected humans during disasters. The findings in this project help set the priority in the use of limited resources to implement the IoT enabled smart system for the traditional CIs. Future work will focus on the selection of proper sensors to monitor CIs' various information items by referring to the summarized use priority of resources in the current study. Additionally, our future work will involve with more scenarios when comparing the two fault tree models. More failure mechanisms will also be considered from the basic events. Meanwhile, interviews with experts and managers from related management agencies in various CIs sectors will be conducted, which will help to quantify the failure probability of basic and intermediate events. The probabilities can be applied to quantifying the community resilience increase by implementing the ICI-IN in Port St. Joe.

Opposite:
Port St. Joe Research Students, Faculty, Stakeholders

Florida Resilient Cities Field Course: The Panhandle after Hurricane Michael – Port St. Joe

Administrator: Carolyn Cox, Coordinator, Florida Climate Institute (FCI)
Faculty Core Team: Jeff Carney, School of Architecture; Alyson Larson, College of Journalism and Communications; Tim McLendon, College of Law; Cleary Larkin, Florida Institute for Built Environment Resilience; Corene Matyas, College of Liberal Arts and Sciences; Thomas Ruppert, Florida Sea Grant; David Prevatt, Department of Civil and Coastal Engineering

The multi-disciplinary field course introduced students to the challenges of disaster recovery and long-term resilience through collaborative research and field-based exploration in the City of Port St. Joe. The Fieldcourse was coordinated by the Florida Climate Institute. Faculty and students represent the Colleges of Design, Construction & Planning, Engineering, Law, Journalism, and Liberal Arts & Sciences. Lectures, readings, and research prepared students for a one-week intensive spring break workshop in the City during spring 2020.

In the first part of the semester, students were introduced via lecture to fundamentals of the planning & design, law & policy, engineering, and communications challenges facing coastal cities in relation to sea-level rise, storm risk, and other factors that affect their long-term resilience.

During the Spring Break trip to Port St. Joe, the students worked in four interdisciplinary teams on four project at distinct scales, undertaking a scenario analysis exercise in which they used knowledge gained from the readings and lectures to envision how Port St. Joe not only recovers from Hurricane Michael but builds back better and more equitably and resiliently than before. The students spent five intensive days visiting relevant sites and hearing from residents and experts in a variety of fields to inform their understanding and their scenario analysis and associated work product.

From this scenario analysis exercise, students developed alternative policy, design, infrastructure, and communication paths that this coastal city might pursue to address several discrete challenges and will assess the efficacy of these various paths.

Four Projects at Four Scales

Project Topics:

Regional Land-Use and Water Quality: Balancing Restoration and Economic Development for Regional Resilience Parks Network

A Regional Park Network Connecting Port St. Joe and Protecting its Future

Housing and Neighborhoods: Promoting Sustainable, Equitable Places for People to Call Home

A Resilient Urban Design and Flood Management Strategy to Reconnect Port St. Joe and Adapt to Greater Flood Risk.

Each interdisciplinary team prepared a proposal and a documentary video for Port St. Joe. This solutions-oriented product provided a window into the proposal development and presentation process, one that design, engineering, law, and journalism students may encounter in their professional endeavors. The projects were presented by the teams, in Port St. Joe on Friday, March 6, to an audience of local stakeholders including faculty, municipal partners, and citizens.

All projects touched on issues of environment, policy, and people as they work to recover from Hurricane Michael, build resilience to future storms, and adapt to climate change risk. Different disciplines on the team combined to cover scientific, public policy, communications, and design processes to rapidly respond to a given condition and produce a desired result.

Regional Resilience

STUDENT TEAM
Morgan Allison, Sustainability in the Built Environment
Joshua Baker, College of Journalism and Communications
Andrea Bonvecchio, Levin School of Law
Xiaoyu Chen, School of Landscape Architecture & Urban Planning

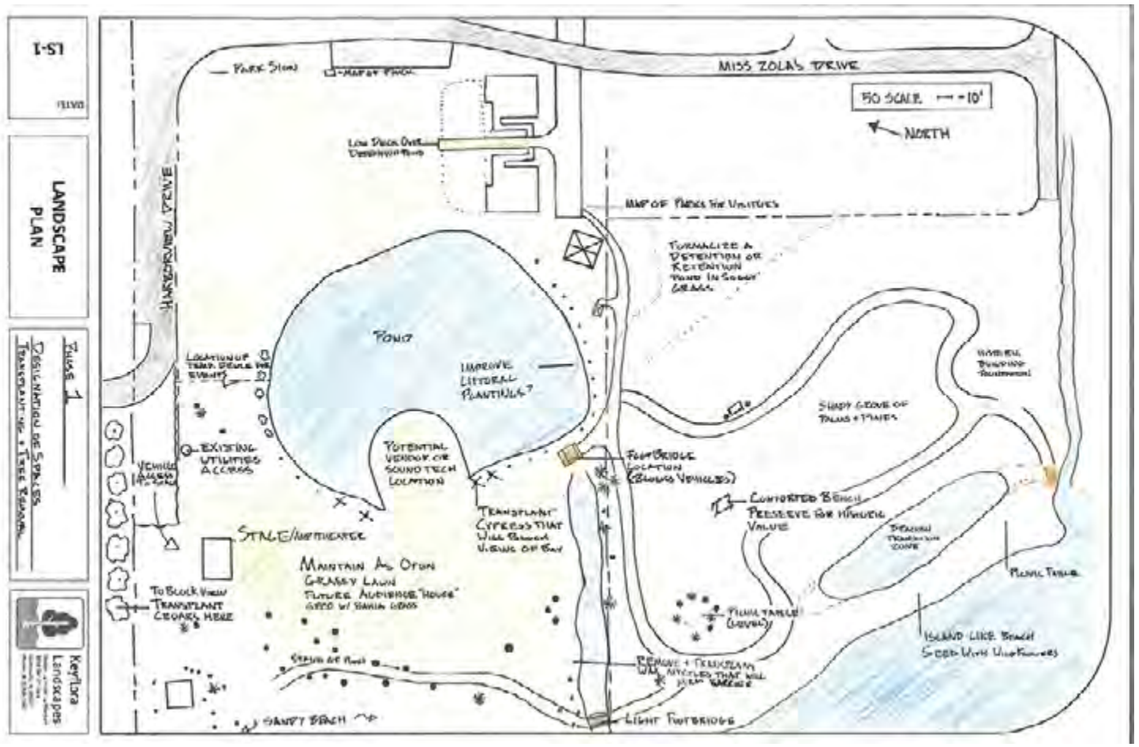
The **Regional Land-Use and Water Quality: Balancing Restoration and Economic Development for Regional Resilience project** focused on resolving issues surrounding the economic and environmental resiliency of Port St. Joe, examining how the natural resources in and around the city are vital to Port St. Joe and the greater Gulf County region. The projects goal's were to examine future population projections in relation to hydrological systems and agricultural systems.

View the interactive proposal and documentary video on the team's Spark page.

Regional Park Network

STUDENT TEAM
Kanglin Chen, School of Landscape Architecture & Urban Planning
Amy Fu, College of Journalism & Communications
Isaac Graham, College of Design, Construction & Planning
Brandon McKinley, College of Journalism & Communications
Blake West, Sustainability in the Built Environment

The **Regional Park Network team's vision was to generate a sense of community, create connectivity between the city and the bay**, integrate Port St. Joe history, nature, and urban environment, and maximize use of land. The project aimed to accomplish this by understanding how the community uses their parks, creating an enjoyable walk from downtown to the bay front, by celebrating the historic lighthouse, and by making parks functional with stormwater management.

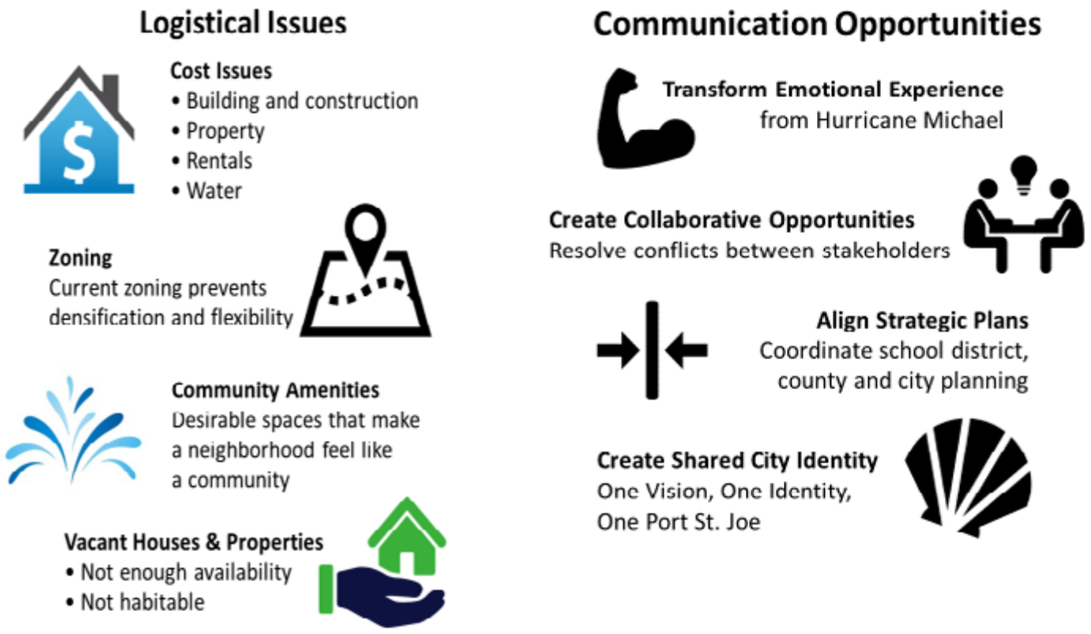


View the interactive proposal and documentary video on the team's Spark page.

Housing and Neighborhoods

STUDENT TEAM
Moritz Cleve, Journalism and Communications
Kim Fowler, Communications
Carlee Simon, Design, Construction, and Urban Planning
Sophia Palombo, Sustainability and the Built Environment

Hurricane Michael destroyed much of the existing housing stock in Port St. Joe, displacing residents and exacerbating the challenge of housing affordability. With high construction costs, residents of low to medium income levels struggle to continue living in the city today. The project vision is a Port St. Joe community unified in its opinions, values, and long-range goals. The proposal includes diversifying housing types, reducing construction costs through modular methods, and consistent public engagement.



View the interactive proposal and documentary video on the team's Spark page.

Urban Design

STUDENT TEAM
Morgan Allison, Sustainability in the Build Environment
Joshua Baker, College of Journalism and Communications
Andrea Bonvecchio, College of Law
Xiaoyu Chen, Urban and Regional Planning

Port St Joe is currently facing disparities worsened by Hurricane Michael, that has left the city with both emotional and physical scars. The project vision for Port St. Joe is to see the city reconnected as one by creating a civic corner, with stormwater improvements, pedestrian and bicyclist centered walkways, connecting North Port St. Joe to downtown and to the marina. A connection could improve congruent traffic and activity creating unity increasing community resiliency.

View the interactive proposal and documentary video on the team's Spark page.

Building a Resilient Urban Park System in Port St. Joe

Yi Luo, Assistant Professor, Department of Landscape Architecture
Michael Volk, Research Assistant Professor, Department of Landscape Architecture
Kanglin Chen, Doctoral Student, Department of Landscape Architecture

Collaborating Students: Nora Abbot, Maceo Abreu, Julia Best, Eliza Breder, David Erin, Isabella Guttuso, Nicole Herrera, Yu-Ya Huang, Baptiste Humeau, Blake Linquist, Pedro Llanos, Tamarind Matthews, Kyle Peterson, Jarred Randall, Phillip Seymour, Kathryn Stenberg, Julia Walton, Hongpei Xiang, Yanni Xu
Project Champion: Michael Lacour, City Financial Analyst & Fair Housing Coordinator;
Bill Kennedy, Port St. Joe Redevelopment Agency

This project studies the opportunities that city parks provide to retain stormwater, minimize the risk of surge inundation, promote outdoor activities and a healthy lifestyle, and establish neighborhood connections. The doctoral research comprises a literature review and a user survey that both illustrate key factors that contribute to social resilience. The research results were presented to the Landscape Architecture Site Planning and Design studio to assist students in redesigning the selected parks. These design proposals will help create an attractive park system that serves as inclusive and vibrant spaces for people to live, work, and play in addition to capturing and treating stormwater runoff.

Research Questions

- How does the community use the PSJ parks?
- What are the critical components of the social resilience functions of urban parks? How important are these functions?
- What is the capacity of current stormwater retention/detention basins in the selected inland parks in PSJ?
- How to create a resilient park system in PSJ that engages the community, establishes connectivity, and strengthens social bonds?
- How is the stormwater retention/detention capacity of the park improved by the proposed design by students?

76% of park case studies have used green infrastructure and/or low impact development techniques to reduce the flooding risk and defend against disaster impacts.

Significance of Work

Urban parks play a crucial role in enhancing community resilience from environmental, economic, and social aspects. As exposure to climate change and flooding increases, there are growing interests towards using nature-based solutions to mitigate disaster impacts. According to the Landscape Performance Series, one of the largest case portfolios for exemplary ecological practices in North America, 76% of park case studies have used green infrastructure and/or low impact development techniques to reduce the flooding risk and defend against disaster impacts.

In addition, Narayan[16] reveals coastal wetlands in the northeastern coast of the U.S. avoided $625 Million in direct flood damages during Hurricane Sandy in 2012. Urban parks are well known for presenting opportunities to enhance social interaction and community bonds, celebrate local history and culture, and improve public health and the quality of life. [17] [18] [19]

According to the City, there are ten parks and two trails in Port St. Joe. These parks suggest great potential for resilience enhancement. In addition, the parks have several significant historical locations, offering opportunities for education and ideal locations for local festivals and events. One goal of this project is to foster community engagement and establish a connection between the north and south, and ultimately contribute to social equity and resilience.

Methodology

The project is composed of research and design. The research was carried out from January to early March 2020, and the design was from March to early May 2020.

The community helped with obtaining the background knowledge, student field research, and research survey. The research team met with the City and other research teams of the FRC program in January 2020 and retrieved information to prepare for the research and design studio. On February 28th, Dr. Luo and the students met with local champion, Michael Lacour, and conducted field research.

The students identified the indicators of social resilience and constructed a composite index of park-related social resilience from the literature review. Data for the research were collected from free and open data sources. The raw indicators underwent a process of scaling and synthesis after being collected.

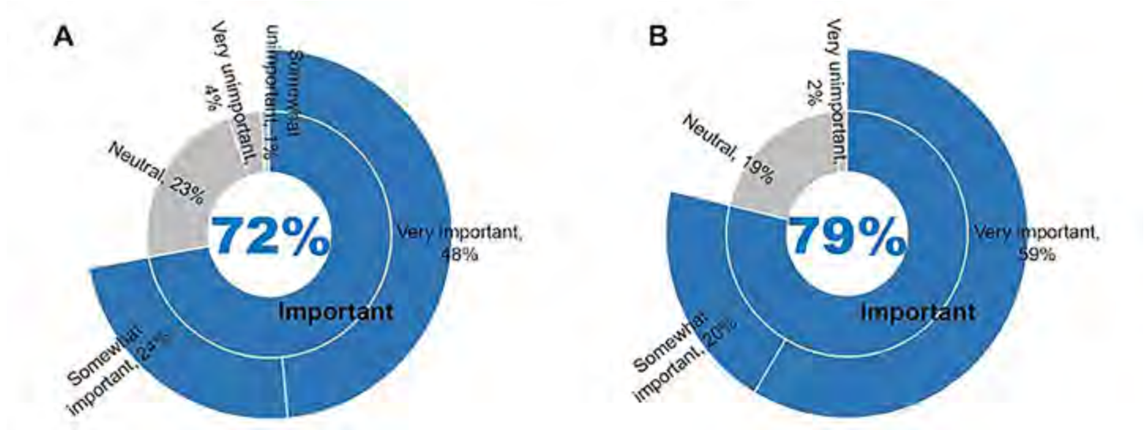
From March 1-6, 2020, the project's doctoral research assistant, Kanglin Chen, conducted an on site survey and obtained 97 responses from PSJ park visitors. Data was collected through an on site, paper-based questionnaire.

Outcomes

The study reflects that certain park services were more easily detectable than others, including recreation, education, and social relations. In addition, people's understanding of resilience may not be as deep and comprehensive as they thought. Though people have the consciousness of resilience, technical and particular suggestions for resilience are less likely to be put forward by the public.

In comparison, detailed suggestions regarding park use can be effectively extracted via questionnaire. Among the 97 survey respondents, 72.6% are residents in PSJ, 20.2% were from other areas in Gulf county, and 6% were out-of-state tourists. Half of the survey respondents reported visiting a park at least once a month, and 85% reported spending over half an hour in a park during each visit. In addition, 75% of respondents have attended public events in parks during the past year. According to a stakeholder we met at the community workshop in 2019, Port St. Joe lacks a connection between the northern and southern parts of the City, physically and socially.

We also extracted resilient-related topics from Trip Advisor reviews of four typical parks, to explore the social resilience functions that parks can provide. And further, we may explore the topics discussed relevant to these resilient topics through social media data. Limited by time, funding, and technical issues, these plans were not achieved in this study. Survey results were used instead.

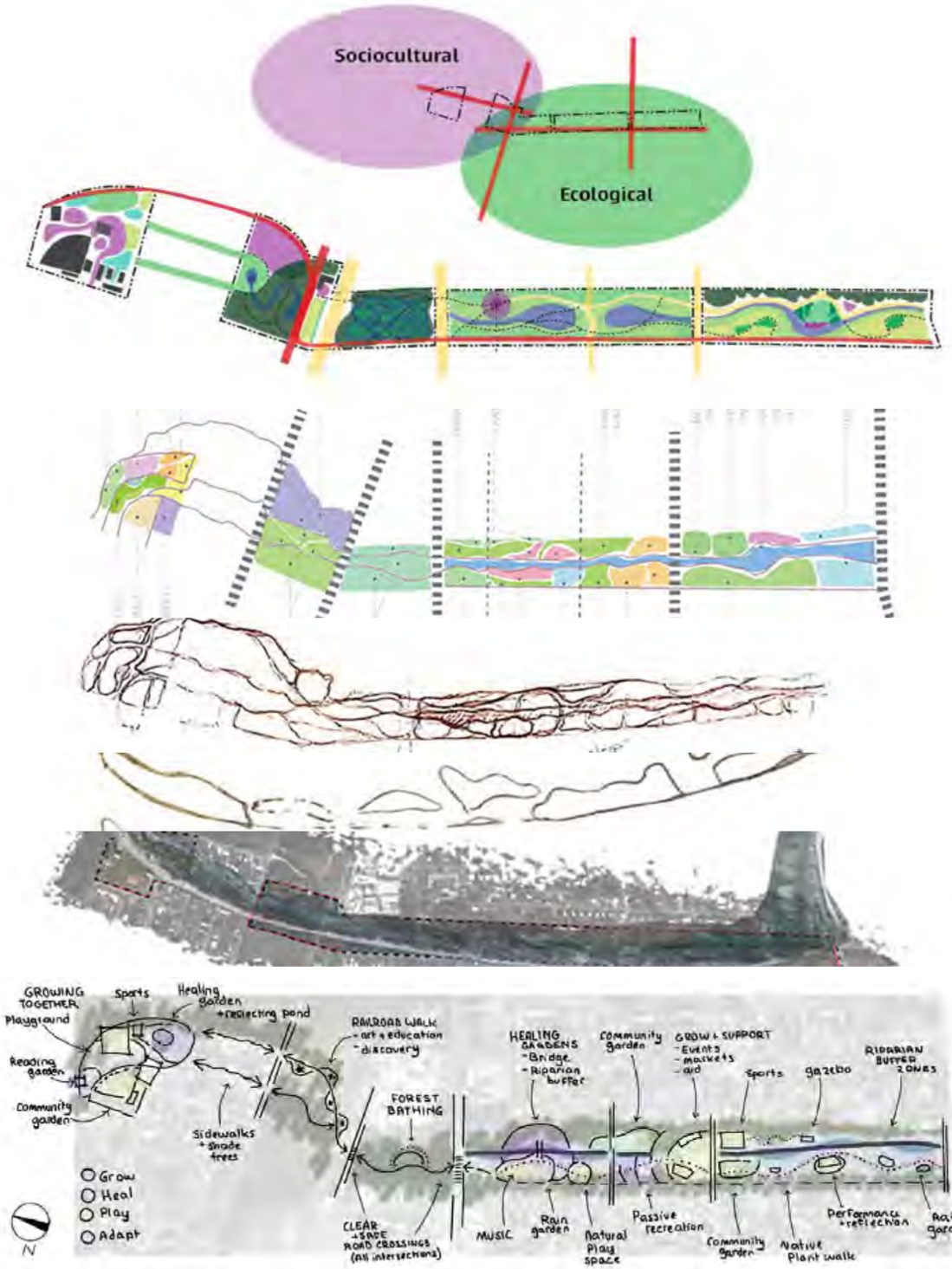


The respondents' recognition of the importance of parks and resilient design strategies is quite high. Public recognition: (A) Importance of parks in a hazard area; (B) Importance of resilient strategies in park design

Next Steps

We would like to continue the partnership with the City of Port St. Joe related to place making, equity, and resiliency. One potential project is to assist with additional green space inventory, planning, and design. This could include an assessment of vacant parcels and vacant city-owned lands and their potential for adaptive reuse, including nature-based stormwater management, urban agriculture, housing, recreation, or other uses to enhance the vitality, economy, and productivity of Port St. Joe. We can also assist with the next steps in design development for the central linear park, a focal area of this project. We look forward to investigating Hurricane Michael's impacts on the mental health of PSJ residents and assisting with identifying the crucial environmental factors that are most important for improving post-disaster mental health in coastal communities, and specifically within Port St. Joe. In the near term, the City can host more educational events such as disaster training in the parks and adding more signs to raise the awareness of nature-based stormwater treatment practices. These events can also help strengthen community bonds. For the long term, the City can consider adopting the potential design concepts based on existing student work and developing them into construction documents for implementation.

Inspiration from history, geography, flora, and fauna



Park designs increased stormwater catchment by 1.5 to 20 times the existing on site stormwater holding capacity.

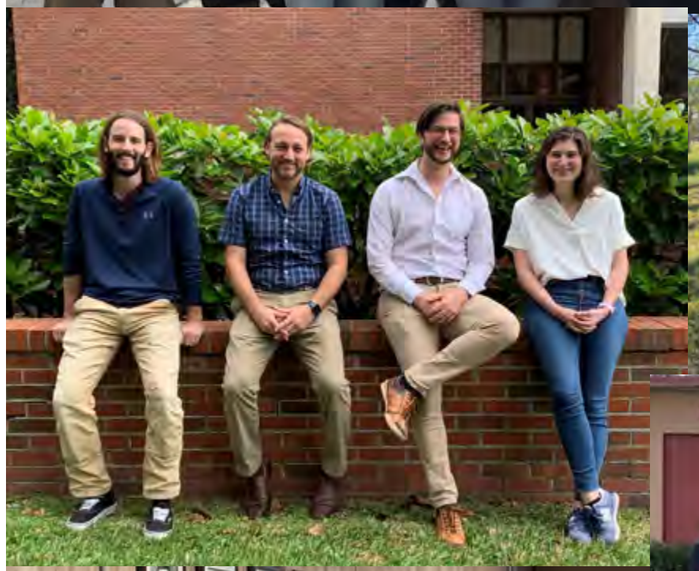
Designs prioritized community unity, passive recreation, and stormwater catchment.

Conclusion

The FRC team held an online community workshop in August 2020 for the research teams to present their work to almost forty stakeholders and receive feedback. Additionally, the FRC team has received funding from Jessie Ball DuPont for a second year in Port St. Joe. The second year of funding provides time for deepening community relationships and trust, exploring in further depth challenges that were discovered through the first year process, and opportunities for community engagement and feedback that will direct the next steps of projects.

Year Two projects are focused on community engagement for parks and open space design, partnering with the City government and Parks & Recreation staff, and with schematic design and engagement for the new Port St. Joe civic center. This funding is allowing us to continue developing projects for future implementation and time to design a public exhibition, tentatively planned for Fall 2021 in Port St. Joe, as a means of community outreach and feedback on the FRC projects.

The engagement process will provide the residents of Port St. Joe with an active opportunity to participate in the decision-making process of governmental projects, such as new park designs for resilience. The public exhibit will offer another chance for significant input and feedback from the community, as well as presenting the two-years of work for the community in a synthesized way that imparts interconnected and interdisciplinary knowledge about their community's resilience, and the importance of their decision-making for the future. These efforts at community engagement and decision-making will move resilience projects forward so that the city and local organizations can apply for grant funding to assist with development or implementation.



Opposite:
Port St. Joe Research Students, Faculty, Stakeholders

Appendix A - Stakeholders & Partners

Over the course of the project, the FRC team has had the privilege of working with numerous citizen stakeholders, government staff, elected officials, and others. The projects are only as strong as the community members who champion their implementation. Below are the people who have made this work possible:

Citizens of Port St. Joe

Apalachee Regional Planning Council
Bay Savers Florida
Bright Community Trust
City of Port St. Joe
Dewberry Engineering
FEMA
First United Methodist Church
Florida Sea Grant
Florida Housing Coalition
Forgotten Coast Adventures
Gulf Coast Community College
Gulf County Chamber of Commerce
Gulf County Emergency Management
Gulf County Health Department
Gulf County Tourism Development Council
IndieDwell Florida
The Joe Center for the Arts
Long Term Recovery Group
Northwest Florida Minority Business Chamber
Northwest Florida Water Management District
North Port St. Joe Project Area Coalition
The Port Authority of Port St. Joe
Port St. Joe Redevelopment Agency
The Star Newspaper
State Housing Initiative Partnership (SHIP)
The Studstill Law Firm
Studstill Realty Group

Appendix B - Endnotes

[1] ("U.S. Census Bureau Quick Facts: United States" n.d.)
[2] (Rayer and Wang 2020)
[3] (Carter et al. 2018)
[4] ("Summer Temperature Trends" n.d.)
[5] ("Sea Level Rise Viewer" n.d.)
[6] (Studstill C. 2019)
[7] (US Department of Commerce n.d.)
[8] (Lawler 2002)
[9] (Nowell et al. 2006)
[10] (Nykiforuk et al. 2011)
[11] (Wang 1999)
[12] (Lopez et al. 2005)
[13] (Annang et al. 2016)
[14] (Schumann et al. 2018)
[15] (Seedat et al. 2015)
[16] (Narayan et al. 2017)
[17] (Luo et al., 2019)
[18] (Kazmierczak, 2013)
[19] (Wolch et al., 2011)

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