



# Adaptation to Coastal Change: Strategies for Evolving and Maintaining Community Valued Spaces, Places, Activities, and Characteristics in the Face of Sea Level Rise



A Thesis Project Presented in Partial Fulfillment of  
the Requirements for the Degree of  
Master of Landscape Architecture



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**“It takes a place to create a  
community and a community to  
create a place” - Fred Kent**



*To my father {papa}, who always believed in me and  
encouraged me to dream big*

# ACKNOWLEDGMENTS

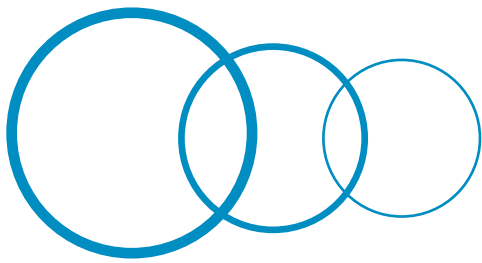
I would like to express my sincere gratitude to my committee chair, Kay Williams, for her excellent guidance during my research and for introducing me to the beauty of the vernacular landscape in her class during my undergraduate career. I also would like to thank my committee co-chair, Michael Volk, for his advice throughout the research process and for conveying a sense of wonder and excitement towards my study. Without the instruction and patience of my committee, this terminal project would not have been possible.

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# ABSTRACT

This study aims to develop adaptive strategies to sea level rise that are sensitive to the vernacular landscape using Cedar Key, Florida as the study area.

In this study, vernacular landscape is defined as an established landscape that developed as a result of people's social and cultural practices. Spaces, places, activities, and characteristics that are valued by a community's residents are used in this study as the defining features that constitute the vernacular landscape.

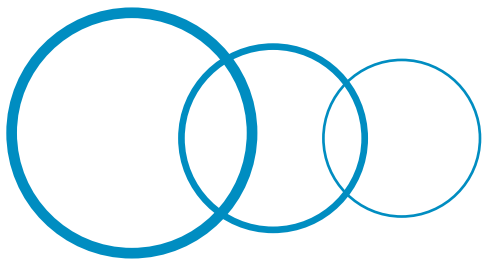
Recent aerial footage and data reflect the fastest rate of sea level rise recorded in 15 years, lending scientists to project an increase of 0.5- 1 meter in sea level by 2100. (Mulkey, 2007). Inundation models projecting a one meter rise in sea level, show a significant loss of coastal land in the city of Cedar Key and other coastal communities. Due to the high risk of inundation, the lifestyle and landscape of coastal communities are inevitably going to be altered. This study seeks to illustrate a process for identifying the key characteristics that define the vernacular landscape of a community and formulate adaptation strategies that are sensitive to it.

Surveys and interviews were deployed to determine what the residents of Cedar Key value about their community. Once a list of the valued spaces, places, activities, and characteristics was compiled, priorities were developed for addressing adaptation strategies. These priorities were centered on the needs of a community and on site analysis. Six different elements of the vernacular landscape were chosen from the list for which adaptive strategies were demonstrated for Cedar Key.

GIS data was used to show the existing physical site conditions of Cedar Key and a projection of a one meter rise in sea level. The compiled data was then overlaid to determine areas affected by inundation. Goals and objectives are established for three different adaptation methods: accommodation, protection, and relocation. Where inundation occurs, relocation was considered as the adaptive method in this study. Opportunities for relocation of the selected elements of the vernacular landscape are illustrated for Cedar Key.

Transferability of relevant findings and lessons from this process were identified for other coastal communities concerned about adaptation strategies in relation to the vernacular landscape. Future considerations relevant to the findings and topics of this study are stated as well as potential next steps for this research.

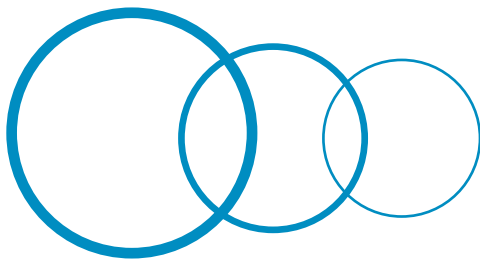
Utilizing existing and newly gathered data to identify the important components that make up the valued spaces, places, activities and characteristics of Cedar Key, this study demonstrates a method for maintaining, adapting, and assisting in the evolution of the key elements that make their community special. Considerations that must be taken into account during the planning process are clearly defined for potential transferability to other communities. Community involvement is strongly encouraged in this study as the basis for many design decisions in sea level rise planning. Rural coastal communities can look towards the methodology used in this study and apply it to their own community in order to cope with sea level rise and elements of their vernacular landscape.



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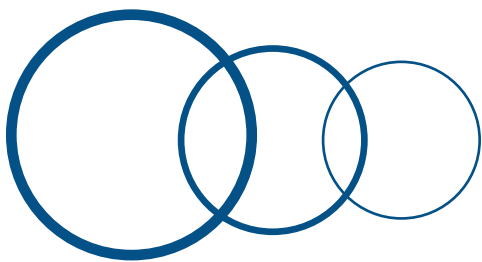
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# Chapter 1: Introduction



“... you begin to realize that the important determinant of any culture is after all the spirit of place” - Lawrence Durrell



# INTRODUCTION

## Intention

The intention of my research is to engage communities in identifying the key elements that make up their vernacular landscape so that adaptive planning can be carried out in a way that maintains or assists in the evolution of these components. This research attempts to reveal and document the vernacular landscape of Cedar Key, Florida and develop adaptive strategies that are sensitive to those in the face of sea level rise. For the purposes of this study, the vernacular landscape is defined as “a cultural landscape that evolved through use by the people whose activities or occupancy shaped that landscape” (The Cultural Landscape Foundation, 2014). My research consists of a character analysis as well as a physical and vulnerability analysis in order to develop an integrated methodology for adaptive planning.

- » Character analysis: On site analysis and community input
- » Physical and vulnerability analysis: Existing site conditions and 1 M. sea level rise model

This approach provides an opportunity for community discussion on what places, spaces, activities and characteristics of the community are valued by residents. This study defines value as something that has high importance to the social and cultural lifestyle of a particular community or area. Community input and on site analysis are used as the tools for determining the key components that make up the vernacular landscape of Cedar Key. Adaptive planning should seek to define and maintain or assist in the evolution of the values of the community in conjunction with its assessment of economic and ecological impacts of sea level rise. Community participation is key to defining the vernacular landscape.

As each community is unique in its own way, no exact template can fit the needs of every community. However, this document can stand as a framework for engaging communities in defining their own spaces, places, activities, and characteristics of value within their vernacular landscape and how to incorporate social and cultural considerations in their adaptive planning process.

## Defining our Landscape

Landscapes are more than the grass, the captivating viewsheds and the sapphire sky; landscapes are everything that we see, feel, and hear when we are outside. Ever evolving and adaptive, the world we inhabit has been shaped by humans over time. Aside from the natural, more apparent landscape is a cultural landscape that “provides strong evidence of the kind of people we are, and were, and are in the process of becoming” (Lewis, 1979). By “reading” the landscape, Pierce Lewis was able to determine a set of criteria, or axioms, to begin to understand the cultural landscape of a region or area. “Reading the landscape” refers to the ability of an on-site observer to recognize the key components that define that landscape or community. Key components include spaces, places, activities and characteristics that are unique to or consistent within the region or area in which they occur and help shape the way of life in that area. Lewis’ exploration of the cultural genesis of the elements of a landscape assisted in the formulation of this research. Reflective of the people who



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have previously lived in or currently live in a place, landscape is a story of culture. Lewis (1979) believed “all human landscape has cultural meaning, no matter how ordinary that landscape might be.”

Vernacular landscape is defined as “a cultural landscape that evolved through use by the people whose activities or occupancy shaped that landscape” (The Cultural Landscape Foundation, 2014). Landscapes reflect the social and cultural norms of the every day lives of people living in a specific community or region. As vernacular implies, a language is contained within the landscape that speaks about the social and cultural practices of the people. Local methods and materials reflected in the vernacular landscape hold true to traditional and local practices. Function has a strong influence in defining what the vernacular landscape of a place or region may be as well (National Park Service, n.d.). The vernacular landscape comprises the spaces, places, activities, and/or characteristics that makeup the lifestyles and landscapes in a community. As these qualities are dependent upon the community they occur in, it is in the unique ways of life of the people that the vernacular landscape is revealed.

## Climate Change and Florida Coastal Communities

According to the Environmental Protection Agency (2014), temperature change records from the past century show an average increase of 1.4° F, caused by natural processes and human activities. Rainfall, droughts, floods, and heat waves are increasing as well alongside these global temperatures. Ocean temperatures have also increased, causing thermal expansion of the water and melting ice caps. As a result, drastic increases in sea level rise are likely to be experienced. (Environmental Protection Agency, 2014).



Figure 1.1: Map of the East Coast of the United States displaying the impacts of an increase in sea level by one meter or less and six meters or less on the coastline.



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As climate change increases and sea level rises, coastal communities are at risk of changes to or destruction of their landscape. Florida's coastline is at great risk of inundation (Figure 1.1), which would drastically change the current coastal lifestyle and landscapes of communities. The International Panel for Climate Change (IPCC) currently projects a global increase in sea level in the range of 7 to 23 inches by 2100 (Jonathan, 2013). Based on recent aerial photographs and data and the occurrence of the fastest rate of sea level rise recorded in 15 years, a projection of 3 feet, or roughly 1 meter, has been established as more a more rational prediction by 2100 (Mulkey, 2007). Cedar Key, Florida shows a mean increase in sea level of 7 inches in the last 7 years according to tide gauges (NOAA, 2013). Planning measures are in the works in many cities and regions to mitigate the effects of sea level rise, but our coastal communities will inevitably experience changes in the natural and man made elements that make up their vernacular landscape.

Inundation of low lying areas will call for increased development needs inland. Property and habitat loss, saltwater intrusion, and increased storm surges may cause coastal communities to surrender their local traditions and will require them to adapt to new ways of life. It is essential that planning takes into consideration not only the affects of sea level rise on the natural landscape, but the vernacular landscape. The valued spaces, places, activities, and characteristics of a community should be acknowledged and adaptive strategies should seek to maintain or assist in the evolution of these elements.

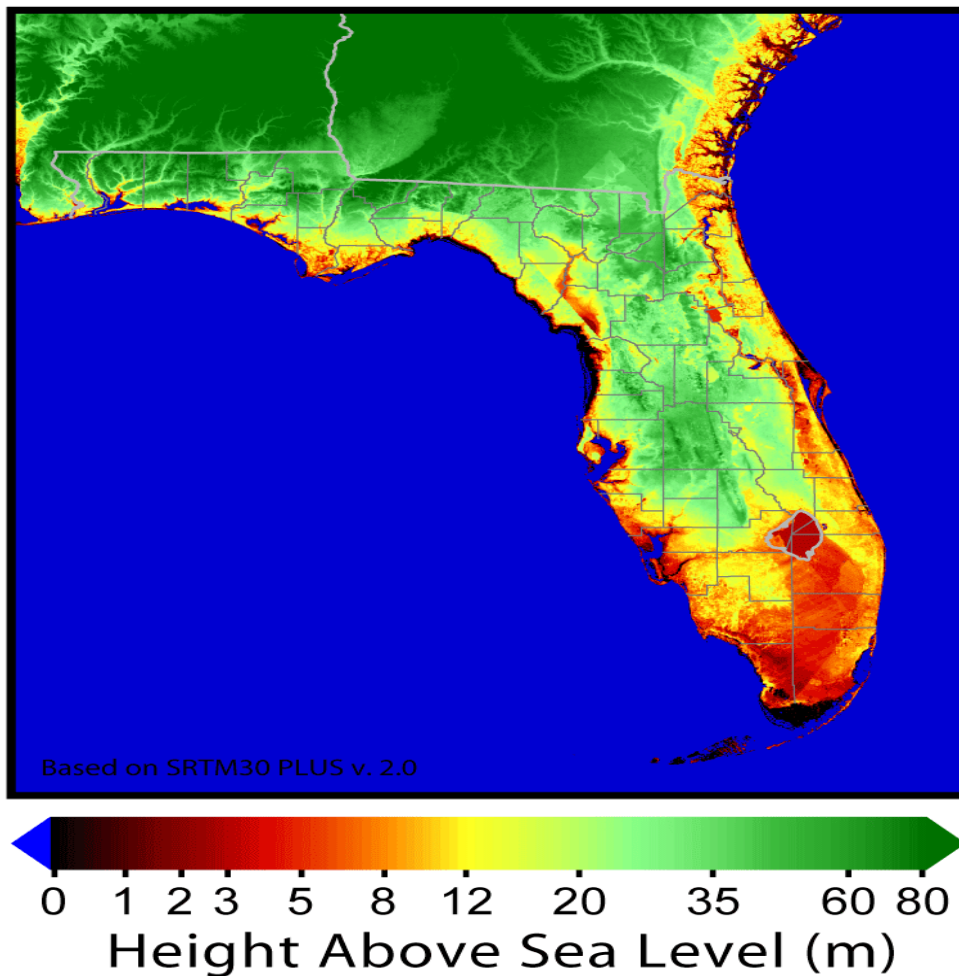


Figure 1.2: Map of Florida showing height above sea level in meters



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## The Vernacular Landscape

To assure culture and ways of life are considered in the planning phase, my study investigates methods of adaptive design to seal level rise that are sensitive to the vernacular landscape of a community, helping to maintain, enhance, and evolve these areas for futures generations.

Most commonly, sea level rise planning is treated in three ways:

- » Accommodation - minimizes the impact of sea level rise by adjusting and evolving structures and systems (Volk, 2008)
- » Protection - uses hard and soft infrastructure as a physical attempt to design for sea level rise (Volk, 2008)
- » Relocation - surrenders the coastline to the sea and moves people and development inland (Volk, 2008)

Currently, planning measures do not take into account the way of life of a community, or the vernacular landscape. A character analysis that consists of on-site analysis and community input is key in identifying elements of high value to the community that constitute the vernacular landscape so that they are considered and addressed in the planning phase.

In order to best define what the vernacular landscape is, it is essential to work with the residents and allow community feedback to assist in describing the ways of life of that region or area. As a visitor of a city or a community, the vernacular landscape is perceived in a different way than it is by those living in that city or community. Often, residents are unaware of their own community's vernacular landscape unless asked to specifically address it, as done in this research. Assisting a community in understanding their cultural, historical and social setting is fundamental in developing a sense of place (Hodgson, 2011).

Exploring the community as an outside observer is also a key factor in gaining a greater understanding of the vernacular landscape of a community or place. An outside observer in this methodology is also the facilitator of the study. The outside observer explores the landscape, noting the community's qualities and perceived ways of life as well facilitates public involvement. Obtaining an outside perspective in addition to the perspective of a resident gives a clearer understanding of the landscape or community as a whole.

Randy Hester, a designer whose work is showcased in "Subconscious Landscapes of the Heart" (1982), worked with the community of Manteo, North Carolina to plan for new development that was sensitive to existing traditions and valued places of their community. From experience, Hester had recognized that new development can inevitably lead to unwanted changes in a community, such as "phony folk culture", so he developed a unique method to avoid this in Manteo. Hester had also previously concluded that "unconscious attachment to a place might be a powerful factor in community planning" (p. 11). Using this information, Hester worked with another community designer, Billie Harper, to conduct behavior mapping in Manteo in order to reveal places of unconscious attachment within the community. Based on their observations, the designers developed a list of the places they felt were important to the social fabric of the community of Manteo. Town Board members then gave the designers resident input to revise the list before it was published in the newspaper. From this publication, residents were asked to rank the specified places "in order of significance to them as individuals" (p. 13). As a result, a weighted list of valued places was



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developed, taking on the name “the Sacred Structure of Manteo” (Hester, *Subconscious Landscapes of the Heart*, 1982).

Hester (1985) then created a map of the town that graphically illustrated these “sacred structures” and published it in Manteo’s newspaper as well. This map made it visually apparent that the community had a subconscious attachment to several places and they wanted them protected. By creating a collective visual for the community to see, it was made known to individuals that the places they use and value were also valued by other residents in their community. It was stated by residents that they were willing to forgo economic gain if it meant protecting these places, showing how truly valuable they were to the community. Hester (1985) declared that losing these sacred places “would reorder or destroy something or some social process familiar to the community’s collective being” (p. 15). The “sacred structures” were then used to direct the final plan for Manteo’s new development. The plan that was chosen preserved the most sacred structures and in turn was the most sensitive to existing rituals and ways of life of the community.

Borrowing from Hester’s (1985) approach, a good tool to determine what a community values is by providing residents with a survey specific to their community that either calls out or displays graphically the components of their community and asking open ended questions about what they feel is important. Traditionally, cultural inventories are used as the main tool for identifying, assessing, and mapping a community’s cultural context and revealing its creative assets (Hodgson, 2011). A cultural inventory is “a survey focused on the cultural assets of a defined area, such as a town or city, a county or a district” that is used as a comprehensive resource for community education and economic development (Tennessee Arts Commission, 2010). Adding to this, Hester (1985) found that the notion of change coming to a community forces “people to think about the social institutions and the environments that matter[ed] most to them” (p. 15). By including this principle in the scope of inventory, the greater wealth of the community can be revealed, exposing a greater range of important places and characteristics (Hodgson, 2011).

Areas valued by the community should be honored and preserved to the utmost degree possible to maintain cultural values. In instances where these areas will be inundated, upland areas should be surveyed for the appropriate relocation of these places and/ or spaces. This report looks at ways characteristics, activities, spaces, and places, favored by the community, can be maintained or evolved so that they are sensitive to the vernacular landscape. Adaptive strategies are illustrated for the community of Cedar Key, Florida so that the lifestyle they value is not lost in the face of sea level rise. The process demonstrated in this study provides guidance for other communities to incorporate the vernacular landscape in their adaptive planning measures as well.



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## Project Study Area

Florida is famous for its unique and beautiful beaches and coastal communities. These seaside communities range in size, characteristics, and location, and all stand at risk of inundation in the face of sea level rise. Cedar Key, Florida remains the only Florida coastal community that is not located directly off of a major coastal highway, giving it a unique character unlike any other coastal community in Florida. Located in Levy County, 2 miles off of the Gulf of Mexico, the only roadway entry point into Cedar Key is 50 miles off of a main highway. Already a low lying community, as the rate of climate change and sea level rise increases, Cedar Key is at an increasingly high risk of inundation. The University of Florida is currently being funded by Florida Sea Grant to work with the community of Levy County, including Cedar Key, to develop possible strategies for adaptation. Cedar Key is also unique in that it is only 2.1 square miles total in area, 0.97 square miles of which are land and 1.2 square miles of water (Deam, 2014). With a little over 700 residents, Cedar Key is able to maintain a very relaxing lifestyle with a captivating spirit and a large sense of community.

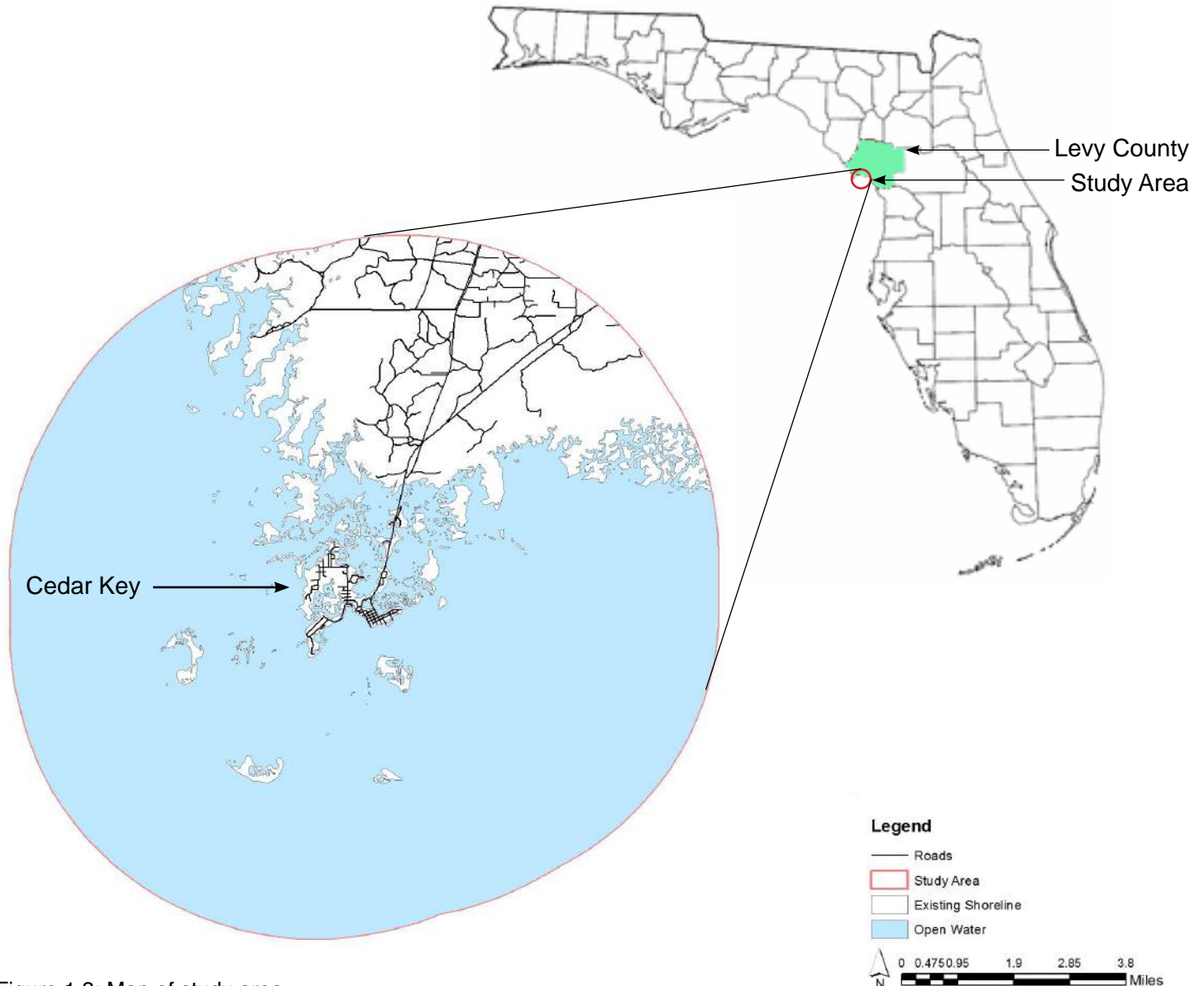


Figure 1.3: Map of study area





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Figure 1.4: View of Dock St. from the water



Figure 1.5: Houses elevated on pilings



Figure 1.6: Cedar Key Arts Center

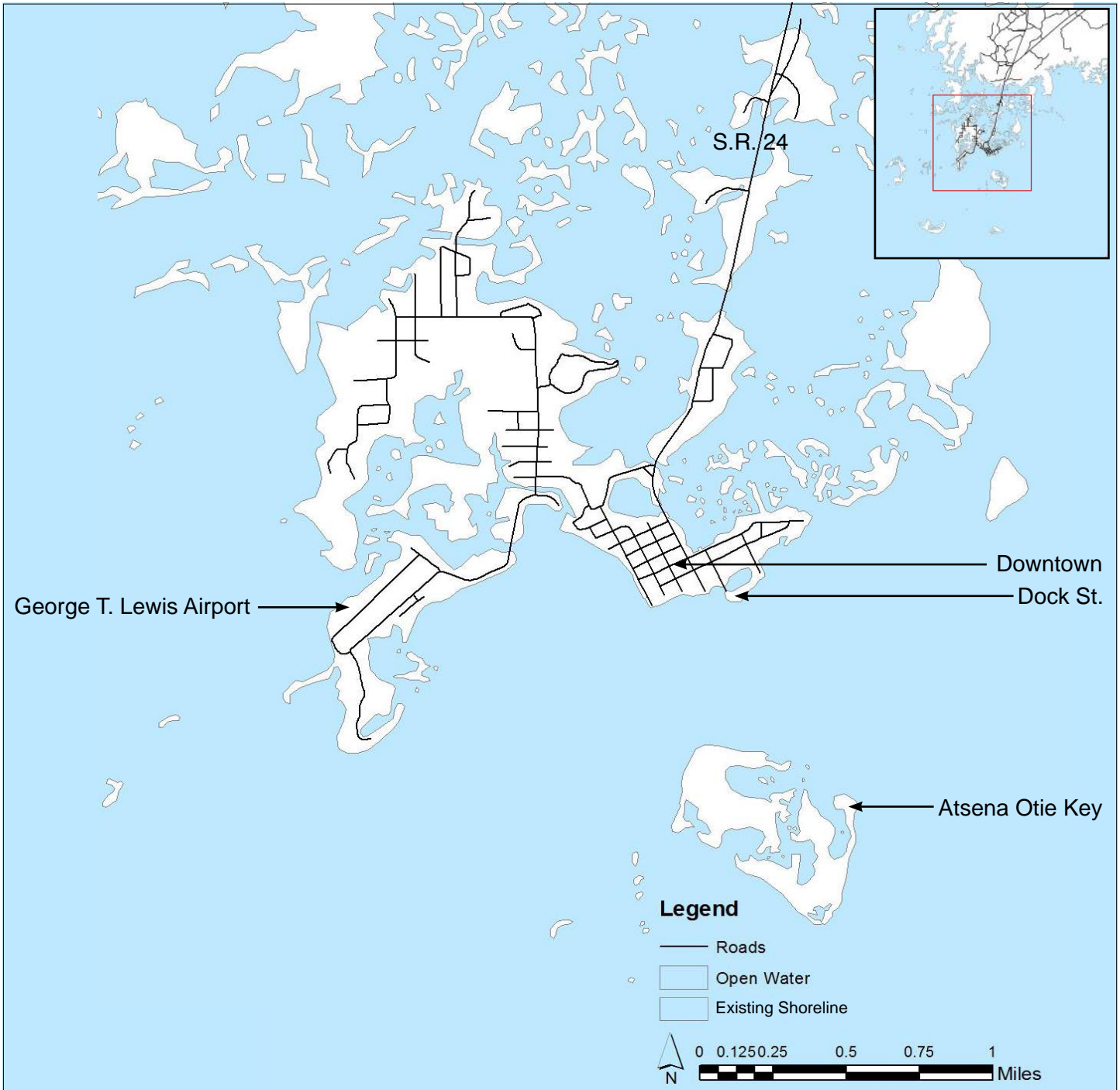


Figure 1.7: Map of Cedar Key



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## History of Cedar Key

Artifacts found at Shell Mound, just nine miles from Cedar Key, indicate the Cedar Keys may have been inhabited as early as 500 B.C. (Low Key Hideaway, 2012), giving it a rich sense of history. It is believed that the Timucuan Indians inhabited the area in the 1500s (Cedar Key Historical Society, n.d.). Maps dating back to 1542 reveal the first graphic documentation of the area, which are labeled by a Spanish cartographer as “Las Islas Sabines”, meaning “The Cedar Islands”. A watchtower was built in the Cedar Keys in 1801 by followers of William Augustus Bowles, an English adventurer, and was destroyed in 1802 by Spanish forces (Low Key Hideaway, 2012). After the First Seminole War, cedar lands are what shed light on the Cedar Keys as timber cruisers, Gilleland and Bird, came from the Suwannee in search of cedar trees for the fabrication of pencils for the E. Faber Pencil Company (Figure 1.8). When the Second Seminole War began, general Zachary Taylor started a supply depot one of the Cedar Keys, calling it Depot Key. It was from Depot Key that Colonel William J. Worth declared the end of the war against the Seminoles (Cedar Key Historical Society, n.d.).



Figure 1.8: Early photo of the E. Faber Pencil Company

After a catastrophic hurricane on October 4, 1842 that caused the army to abandon Depot Key, Augustus Steele bought what was left of the army camps at auction and received permits to develop 168 acres. Steele built a civilian residential and commercial center, which he named Astena Otie, derived from the Creek Indian name for cedar island. Steele was appointed postmaster and David Levy Yulee, Florida’s first elected member of Congress, oversaw all federal policy matters affecting the Cedar Keys (Cedar Key Historical Society, n.d.).

Due to the large growth of the island, the U.S. Congress allocated money for the construction of a lighthouse on Seahorse Key in 1850, sitting 75 feet above sea level. In 1861, after Florida seceded from the union, the lighthouse was used as a prison by Union forces occupying Seahorse Key. Later, residences with wood framing were added to each side of the lighthouse. The University of Florida has been leasing the lighthouse since 1951 as dormitories for a learning lab located next to the boat dock (Low Key Hideaway, 2012).

In 1859, development began in Cedar Key as a result of the expected success the railroad would bring to the town. The Island Hotel (Figure 1.9), that still remains in tact and in use in Cedar Key today, was one of the earliest examples of building types on the island. Completed in 1860, the hotel was built by mixing “oyster shell, limestone and sand to pour tabby walls 10 inches thick. Massive 12-inch oak beams were framed in the basement to support the wooden structure” (Island Hotel and Restaurant, n.d.).



Figure 1.9: Early photo of the Island Hotel



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Figure 1.10: Bird's eye view of Cedar Key 1884

Cedar Key soon became an essential port, shipping lumber to the main land. Two mills existed on Atsena Otie by 1860 and were producing the cedar slats for pencil factories up north (Low Key Hideaway, 2012).

With demand for a coast to coast train, Yulee began construction of Florida Railroad Company consisting of a railroad from Fernandina to Cedar Key. The new railroad company issued a plat on Way Key for the City of Cedar Key, which is the site of present day Cedar Key. In March of 1861, arrived Florida Railroad Company's first coast to coast train. However, war broke out in April, causing the Cedar Keys to be blockaded by union forces and the imprisonment of Yulee. Upon his release from prison in 1866, the Florida Railroad Company began operating again (Cedar Key Historical Society, n.d.).

In 1867, after a 1000 mile walk from Louisville, Kentucky to the Gulf of Mexico, John Muir arrived in Cedar Key. His experience in Cedar Key is documented in his memoir, *A Thousand-Mile Walk to the Gulf*, which was published in 1916 (Low Key Hideaway, 2012).

Upon the incorporation of the "Town of Cedar Keys" under state law in 1869, the town began to grow tremendously. Shops, hotels, tourists, oystering, fishing, boat fabrication, and the production of cedar slats for pencils all began. Cedar Keys population reached its zenith in 1885 with 1,887 residents causing corporate limits to be extended to the mainland and bonds to be issued for the "Dirt Road" to the mainland to be built (Cedar Key Historical Society, n.d.).



Figure 1.11: Home of George Reynolds, manager of Eagle Pencil Company in Cedar Keys



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Due to Henry Plant's Tampa Railroad, Cedar Key population slowly declined, businesses began to fail and the timber resources became exacerbated (Low Key Hideaway, 2012). A devastating storm in 1896 destroyed the Faber Pencil company and Suwanee Lumber Mill as well as many other properties of the Cedar Keys. Soon, Atsena Otie became uninhabited and the population of Cedar Key was reported at 700 in June 1900. At this time, oyster harvesting and fishing became the economic driver as well as a newfound manufacturing of fiber and Donax brushes started by Dr. Dan Andrews (Cedar Key Historical Society, n.d.).



Figure 1.12: Cedar Key Residences, 1980

Electricity arrived in the 1920s and shortly after bonds were issued to pave the streets, sewer systems were installed and the National Wildlife Refuge was formed. Railroad service came to an end in 1932 and the tracks were extracted. Cedar Key School began as a private school in the 19th century, run by Amelia and Eliza Hearn. Their will stated that the school be given to Levy County upon their death in return for their grave site to continue to be maintained. This grave site is still located behind today's gymnasium (Low Key Hideaway, 2012). Cedar Key School burnt down in 1943 and was not rebuilt until 1950. The Fiber Factory closed in 1952 (Cedar Key Historical Society, n.d.).

As Cedar Key saw more development occur in the western end beginning in 1959, special water management services were implemented and water lines to Cedar Key from the mainland were installed. After another relentless hurricane, Agnes, in 1972, timber docks and bridges began to become replaced with concrete structures. This served to be very beneficial as Cedar Key was hit with many storm surges and hurricanes shortly after. The "Storm of the Century" hit on March 13, 1993 and it was during this year that the clamming program began as the key aquaculture business. Clam farming peaked in 1997 with a record of 100 million clams (Cedar Key Historical Society, n.d.).

It wasn't until 1998 that Cedar Key had a storm water runoff and drainage system installed. Cedar Key School burned down a second time in 2002 and was rebuilt in 2004. The rise in real estate prices in Cedar Key occurred in 2003 and has fluctuated at higher and lower rates since (Cedar Key Historical Society, n.d.).

Today, the population of Cedar Key, according to US Census Bureau (2013), is 701. Although this is a vast decline from its peak in 1883, it is the small town atmosphere that has made Cedar Key a staple for the west coast of Florida. Remnants of Atsena Orié Key can be found as stone water cisterns, as well as a graveyard that still remains. (Low Key Hideaway, 2012). Clamming and aquaculture is still a main economic driver in Cedar Key today along with a large income from tourists. The unique town is presently the only self-contained beach town not off of the Gulf Coastal Highway. Residents enjoy the quiet and laid back lifestyle of the island, making Cedar Key what it is today (Cedar Key Historical Society, n.d.).



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## How the Past Influences the Present and the Future

Studying the history of Cedar Key, revealed some of the societal and cultural values that shaped the formation of the community. By unveiling the original industries and early development of Cedar Key, the richness of the community's history can be seen. Historical information also gives insight into some of the authentic elements that can be found in Cedar Key and the events that occurred to make it the place it is today. Photos revealing building materials, architectural styles, and city plans of the past should be used as inspiration for future designs.

*THEN*



Figure 1.13: Island Key Hotel



Figure 1.14: George Reynolds' Home



Figure 1.15: Downtown CK

*NOW*



Figure 1.16: Island Key Hotel



Figure 1.17: George Reynolds' Home



Figure 1.18: Downtown CK



Figure 1.19: Bird's eye view of present day Cedar Key



# INTRODUCTION

## Priorities and Delimitations

Included in the scope of this study are recommendations for assessing the vernacular landscape and suggestions of adaptation strategies that are sensitive to it. Due to the large variety of approaches that can be taken in adaptive planning, there are other ways to deal with vernacular landscape in the face of sea level rise that have not been explored in this study, but should be reviewed and considered when carrying out adaptive measures.

Protection, accommodation and relocation are spoken about in this research, with goals and objectives pertinent to each; however, time limitations hindered the ability to explore and demonstrate each of these in fine detail. Relocation was studied and illustrated in this study as the main adaptive approach due to its transferability as a learning tool.

Economic and public policy as well as land ownership are not accounted for in this study when looking at adaptive strategies; however, policy should be looked at and followed when using the methodology of this study for other communities.

Vacant and non-developed parcels, which are looked at in this study as opportunities for relocation, are based on Florida Land Cover Classification System (FLUCCS). For the purposes of this research, the following categories were considered as vacant or non-developed parcels:

- » Vacant commercial
- » Vacant residential
- » Other municipal
- » Other counties
- » Forest, park, and recreation
- » Grazing land
- » Timberland
- » Parcels with No Data

Based upon the needs and policy of each community, these classifications may be narrowed down or expanded. Zoning and land value should also be taken into consideration, but are not observed in this study.



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Community feedback resulted in a long list of valued spaces, places, activities and characteristics as displayed in the results of this study. Relocation strategies were carried out in full detail for only a few of these items based upon the priorities specified below:

## What can be learned from community input

The valued spaces, places, activities, and characteristics identified by community input were documented. The opportunity to relocate these elements or their function to dry or upland areas was identified.

## What can be discerned by an outside observer

Based upon the skill set of the outside observer/facilitator, such as a designer or landscape architect, opportunities for relocation for the city of Cedar Key can be highlighted. However, not all aspects of planning can be addressed. Economic and public policy are beyond the scope of this study, but they must be accounted for in the complete process of relocation.

## What data is available

The best available data has been gathered from municipal sources and FGDL.org to inform many of the decisions made in this study and conduct a physical and vulnerability analysis. GIS data is used to identify existing site conditions and project a one meter rise in sea level along Florida's coastline. Due to the inability to access or locate certain data, there may be other factors to take into account for the decision making process that could not be accounted for.

## What is transferable to other municipalities

Due to the uniqueness of every city and or community, not all adaptive planning measures are transferable to every place. The strategies and methodologies that are believed to be most transferable to all communities have been chosen.

## What will best serve the people

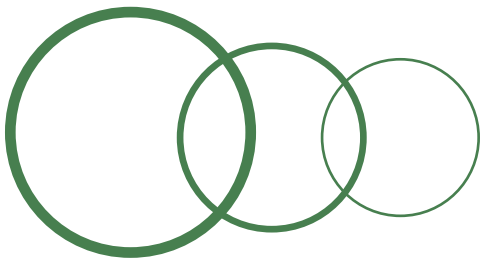
This study is carried out with people and their community as the driving force. The strategies and methodologies in this study seek to maintain the way of life of the people and their communities in order to preserve social and cultural traditions. Public meetings and other iterative refinements were not feasible in the time frame of this research. The results of this study should be shared with the community for feedback and further refined based upon their comments and desires.

# Chapter 2: Literature



“A landscape is beautiful when it has been or can be the scene of a significant experience in self awareness and eventual self knowledge” - J.B. Jackson





# LITERATURE

## Sense of Place

### Genius Loci

Two centuries ago, when a newly found appreciation for aesthetic of rural and garden landscapes came about, the term *genius loci* arose (Hunt & Willis, 1988). Since, the definition has been expanded to apply to any landscape or place (Jiven & Larkman, 2003). Today, we relate more to the meaning found in Roman mythology where genius loci signified “the protective spirit of place”. However, spiritually within the word has lost validity over time as our world has since drawn further away from the concept of spiritual gods and looked more to the sciences of life. Rather than considering the genius loci to be a spiritual guardian or guide, the definition in modern times has been substituted as “the spirit of place,” a location’s unique and distinguishing atmosphere (Vogler & Vittori, 2006). As human beings within a landscape, it is inevitable that we react to our surroundings. The atmosphere of a place stems from its origin and develops over time based on cultural influences, making it unable to be reproduced. It is in landscapes, that the human and nature find harmony (Vogler & Vittori, 2006).

Phenomenologist and architect Christian Norberg-Schulz looked holistically at genius loci, denoting it as the entirety of both physical and symbolic ideals found in nature that also comprises our human environment (Schulz, 1980). This definition is relevant to the view of our landscape as whole and all of its attributes as the foundation of the cultural understanding of a place as looked at in this study. Norberg- Schulz pinpoints nature as the underlying factor of human interpretation and as the basis for which objects and spaces derive meaning. Looking at settlement patterns, Norberg- Schulz determines that one can see the meaning and symbolism in a society or culture (Jiven & Larkman, 2003).

### Sense, Place, and ‘Sense of Place’

Sense, as described by Lynch (1981), “is the interaction between person and place...[and]... depends on spatial form and quality, culture, temperament, status, experience and current purpose of the observer”. Following Lynch’s philosophy, the interaction that occurs between human and their environment is the underlying fabric that forms the basis for how all the factors in that environment are experienced. Adding the non replicable qualities of the environment to this interaction creates a one of a kind atmosphere that we can “sense.” We know when we visit a location for the first time that we have not been there before, not only by the observations around us, but by the matchless feelings we experience in that place (Casakin & Bernardo, 2012). Place, can be defined as “any environmental locus that gather individual or group meaning, intentions, and actions spatially” (Seamon, 2012). Our location on a map can be marked, delineating the place we are currently occupying; however, the sense that we feel in that place is intangible and unable to be charted by anyone but the experienter them self. The combination of the two can be viewed as “sense of place”.



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Jackson (1994) believes 'sense of place' draws on the concept of *genius loci*,

“Sense of place’ is a much used expression, chiefly by architects but taken over by urban planners and interior decorators and the promoters of condominiums, so that now it means very little. It is an awkward and ambiguous translation of the Latin term *genius loci*. In classical times it means not so much the place itself as the guardian divinity of that place. ... in the eighteenth century the Latin phrase was usually translated as ‘the genius of a place’, meaning its influence. ... We now use the current version to describe the atmosphere to a place, the quality of its environment” (p.157).

It is that quality, as spoken about by Jackson, that gives an incomparable identity to a place. Feelings evoked by a place play a large part in our wanting to go or be somewhere. A sense of ownership forms when one feels emotionally attached to a place brought on by its ‘sense of place’. “...We recognize that certain localities have an attraction which gives us a certain indefinable sense of well-being and which we want to return to, time and again (Jackson, 1994, p. 158).”

## Vernacular Landscape

### The Vernacular of a Landscape

There is a tendency to think of vernacular solely as the language spoken by people, but if one widens their perspective, they will see that the world is made up of its own vernacular, spoken by the landscapes that comprise it. Landscapes contain many elements that determine their language or vernacular. Vernacular suggests that the landscape’s elements adhere to local traditions, techniques, materials, and are tied to the local environment, its climate and its economy (Jackson, 1984, p. 85). Just as the life and dynamism of vernacular speech is revealed in dialects, which are local deviations of the larger vernacular, the landscape has local variants within the context of, or in relation to the larger vernacular landscape (Schroeder, 1993). These local variations make each city its own unique place. Only in the passage of its existence does a landscape obtain its identity, or vernacular (Jackson, 1984, p. 43). Jackson (1984) states that we can only truly say what a landscape is when it becomes stagnant, or “ceases to evolve” (p. 43). For the purpose of this study, the definition of vernacular will speak about the strata of places, spaces, activities, characteristics, history, and form that constitute the landscape. The other interpretations of vernacular are to be left aside as they are beyond my scope of study. Like Hubka (1979) suggests in his article, *Just Folks Designing*, the design process for vernacular landscape, one that is dependent upon cultural and historical influence, must be looked at “according to the way ‘thinking traditionally’ structures the designer’s approach to problem solving” (p. 28). Designers dealing with the vernacular landscape begin with the unchanging and acculturate change, facilitating the evolution of the landscape (Hubka, 1979, p. 28). I say facilitate because the landscape evolves majority on its own, simply by humans attempting to live harmoniously with our surrounding natural world (Jackson, 1984, p. 42).



# LITERATURE

## Reading and Defining the Vernacular Landscape

### Role of the Outside Observer

Borrowing from Hubka's (1979) perspective on the way in which folk designers problem solve, vernacular landscape design solutions, or evolutions, rely on past precedent. Design ideas are generated by the decomposition of existing forms and abstracting these ideas to create new, or evolved, forms. The designer achieves an evolution of the vernacular by understanding and readjusting the "hierarchy of ideas" contained within the language of the current landscape (p. 28). For this reason, the outside observer, such as a landscape architect or designer, must first speak the language, or vernacular, of the existing landscape. To achieve fluency of the vernacular, the landscape architect must read the landscape and from this, they will unveil its traditions, characteristics, history, techniques and environmental factors.

Submerging oneself in the landscape, or community, and its culture is key to the role of the outside observer. Visiting the landscape and taking part in the cultural traditions of a place is the only way to achieve a clear and holistic reading and understanding of the landscape. It is suggested that the outside observer prepare a set of "tools" to bring along before their initial visit. All biases, expectations, and presumptions should be left behind as they can get in the way of a clear reading of the landscape. Instead, it is recommended that the observer bring along their:

- » Open mind
- » Curiosity
- » Sense of wonder
- » Detail oriented lenses

Aside from the figurative tools, it is best to bring along the standard site visit tools as well:

- » Notebook and pen for jotting down observations
- » Camera to photograph different areas of the landscape
- » Map to guide you as you go along, and to help orient yourself

(Cronon, 2009).

Approaching the landscape, the observer should begin taking notes about the surrounding context, as this gives greater insight to the community. A landscape should never be looked at in seclusion, but as a piece of a larger landscape. The interrelationship between the two leads to a greater knowledge of why something may look or act the way it does (Cronon, 2009).

When reading the landscape, every landscape has its own unique elements that are note worthy, but there are certain "character defining features" as described by the National Park Service (1992) that are said to be critical to the character of a cultural landscape. Character Defining Features are "a prominent or distinctive aspect, quality, or characteristic of a cultural landscape that contributes significantly to its physical character" (NPS, 1992). These critical features can be categorized as:

- » Topography
- » Vegetation
- » Circulation
- » Water features
- » Structures, site furnishings, and objects



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Within these categories fall many of the details that make up a city or community such as types of vegetation, microclimate, decorative details, and road organization. These character defining features as a whole and their relationship with one another tell the story of the landscape and its historical context (NPS, 1992). To define the vernacular landscape, we must also address these characteristics at a more local and detailed context.

While the above serve as a good framework for familiarizing oneself with the landscape, or community and its surroundings, the vernacular landscape lies in the details that make up the way of life of the people living and working in that landscape. Art, activities, gathering spaces, and building materials are amongst the specifics that begin to tell the outside observer what makes a landscape, the landscape it is. The observer, however, cannot adhere to simply a per-prescribed template of elements to look for, but must instead allow the landscape and the community to determine this. To do so, the outside observer is responsible for becoming involved in the community and reading the landscape from their eyes. The outside observer must determine the best type of outreach for the community they are dealing with and carry out this method in their study area. The landscape architect will act as the facilitator of community participation efforts and analyze the results. It is the way of life of the people that truly defines the vernacular landscape; therefore, the community plays an immense role in assisting the outside observer in the holistic reading of the landscape.

## Role of the Community

Public participation efforts are a common tool in participatory design in which residents, visitors, and stakeholders work alongside expert planners and designers to design valuable community spaces (Meyer, 2011). The International Association for Public Participation (2011) also refers to this type of design tool as public involvement, citizen engagement or participation, collaborative decision-making, and facilitated problem solving. Although this study does not seek to design new community spaces and places, but instead determine which existing spaces and places are already of value to the community and how to evolve these areas of value, the same type of community engagement concept is used. Public participation allows the community needs, interests, and values to be recognized (Meyer, 2011), resulting in the unveiling of the vernacular landscape from a user's perspective.

Communities are receptive to public participation and engagement in different ways, depending on their cultural values and lifestyle. Communities in Action (n.d.) notes eight community assessment tools for effective community participation efforts:

- » Survey asset inventory
- » Community mapping
- » Daily activities schedule
- » Seasonal calendar
- » Community café
- » Focus group
- » Panel discussion



# LITERATURE

Assessing the strengths and weaknesses of a community is the first step in determining the best type of outreach (Communities in Action, n.d.). For the purposes of this study, survey in conjunction with an amended version of community mapping was used as well as one on one interviews. These tools were determined to be the most suitable for the community of Cedar Key based upon their strength as a community that contains a very unique lifestyle and characteristics and their weakness as a community that is vulnerable to inundation by sea level rise. The type of information and feedback desired for this study was also a determining factor in the type of assessment tools used.

## Surveys

Surveys are most successful when they begin with a statement of purpose as this guides the type of questions that will be asked and who the survey will target. Short surveys with easy-to-understand questions are generally a good approach for targeting a community. The way in which the survey is distributed should also be determined by the community (Community Tool Box, 2014). The most common distribution methods for surveys are:

- » Direct mail
- » Interview and phone surveys
- » Drop boxes
- » Media distribution
- » Convenience sampling
- » Group administration

(Community Tool Box, 2014).

Paper surveys tend to accommodate the greatest amount of participants as it does not require internet access, etc. Combining more than one distribution method may be needed to get a well-defined reading of the community (Communities in Action, n.d.). Public locations and organization meetings are a good way to reach a wide range of people. By visiting the community, you can become aware of their public library, city hall, etc. as spots for survey distribution. City websites often contain information about local organizations and groups that are advocates for community involvement (Community Tool Box, 2014). Attending these meetings or speaking with organization directors can aid in survey distribution and feedback as well. Once the surveys are distributed, the landscape architect or surveyor should return to the distribution sites from time to time to collect any completed surveys that have been returned. If the return on the surveys is not as large as anticipated, distributing the surveys a second time or expanding the sample size may be necessary (Community Tool Box, 2014).



# LITERATURE

## Community Mapping

Community mapping, or asset mapping, is “a mapping process carried out by the community for the community” (Roaf, 2005). Communities are able to identify more closely with their communities strengths and assets when asked to address them in participation efforts. Community mapping also makes residents more aware of the elements that truly make their community unique to them and promotes community involvement (Burns, Paul, & Paz, 2012, p.7). Residents can either be provided with a map of their community on which they pinpoint community assets or participants can be asked to draw a map on their own that displays what they feel are the assets of their community. Assets may include community characteristics, spaces, places, activities, and organizations that are essential to the identity and lifestyle of the community. Through the mapping process, a tangible display of the elements that make up the ways of life of a community is formed (Burns, Paul, & Paz, 2012, p.6).

Randy Hester (1985), author of *Subconscious Landscapes of the Heart*, used a type of community mapping in Manteo, North Carolina to uncover the community’s valued places. After experiencing the emotions that came about when speaking to residents of Manteo, Hester concluded that a powerful factor in community planning was to reveal unconscious attachment to a place. Hester describes his undertaking as “finding out precisely what life-style and landscape features were essential to the continued functioning of the town’s culture” (p.11). Behavior mapping (Figure 2.1) allowed Hester to determine the daily activity patterns and setting for the people of the community by observing several locations around town

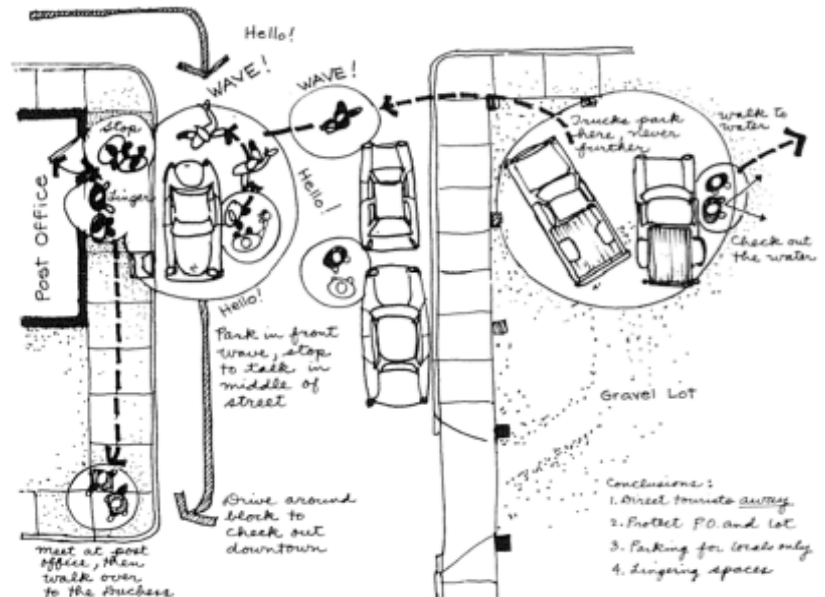


Figure 2.1: Behavior mapping of Manteo done by Hester

and recording what residents did and where. From this, Hester and another designer, Billie Harper, composed a list of the places they felt “were important to the social fabric” (p.12). These places were pinpointed on a map and dubbed “sacred structures” and indicated what the community felt should be protected in community planning, even if it meant sacrificing economic gain. This literature is pertinent to this study because it shows how participatory efforts and tools can unveil the social and cultural assets of a community. Hester notes that these places were not the most appealing, not even to a trained professional. For example, the post office parking lot was unexpectedly found to be a gathering spot for residents that really added to the community’s identity. Just as this study aims to uncover community values to determine the vernacular landscape, Manteo’s community values were found in the subconscious, but revealed to the conscious mind once community efforts were carried out. Hester also found by developing a collective graphic of what the community valued, residents were able to see that others in their community also shared these values (p.15). A cohesive depiction of community values displayed important social trends and cultural setting as aimed for in this study and became an important factor in design and planning decisions moving forward (Hester, 1985).



# LITERATURE

## Climate Change and Sea Level Rise

A warming atmosphere, caused by fossil fuel emissions is causing an increasing rise in sea level at greater than historic rates. Green house gas emissions, a predominant cause of sea level rise, are increasing due to the burning of fossil fuels from the industrialization of our planet. The World Bank predicts that a rise in sea level of even one meter could lead to 74,903 square miles of flooding in coastal cities, driving out at least 56 million people from their homes (Janin & Mandia, 2012). The International Panel for Climate Change (IPCC) projects a global increase in sea level in the range of 7 to 23 inches by 2100 (Jonathan, 2013). Potentially, in thousands of years, the sea level could rise up to about 11 meters, or 38 feet. An estimate in 2006 claimed that a 10 meter, or 32.8 feet rise in sea level would negatively affect 397 million people (Janin & Mandia, 2012).

Florida, a state developed along the coastline with porous bedrock and frequent tropical storms, has more real estate and residents at risk of inundation due to sea level rise than any other state. Within four feet of Florida's high tide line, approximately 2.4 million people and 3.1 million homes account for almost half of the nation's risk to sea level rise (Strauss, n.d.). Sea level rise acceleration will inevitably lead to a higher water table here in Florida. As the water table and sea level rises, sea walls and other protective structures will weaken. Hydrostatic pressure will also increase from the combined heightening of the water table and sea level rise, undermining the foundations of buildings and infrastructure and making them more vulnerable at times of flooding and hurricanes. Estimates indicate that real estate "over \$130 billion, on half of Florida's existing beaches, and on substantial critical infrastructure, including 2 nuclear power plants, 3 state prisons, 68 hospitals, 74 airports, 115 solid waste disposal sites, 140 water treatment facilities, 334 public schools, 341 hazardous-material cleanup sites (of which 5 are Superfund), 1,025 houses of worship, and 19,684 historic structures" (Stanton & Ackerman, 2007) will be impacted. Planning for sea level rise with such devastating effects must be done very careful to build up or protect these vital land areas. Such planning measures are very expensive and can even be near impossible in some scenarios.

Florida's natural coastal ecosystems, including the Everglades, the Ten Thousand Islands, Florida Bay, and the Big Bend coastline, are already beginning to experience the effects of sea level rise. These landscapes support a large variety of species and natural communities, some of which do not exist anywhere else. Included in these are barrier islands, bays, tidal salt marshes and creeks, shellfish beds, coral reefs, estuaries, mangrove swamps, seagrass beds, oyster bars, lagoons, and the coastal ocean. Salt water intrusion is currently occurring in some of Florida's aquifers and will be worsened by sea level rise. Major alterations in plant and animal communities are anticipated. Coastal infrastructure is also expected to undergo a large shift, as much of it is not built to withstand a substantial rise in sea level. Relocation or accommodation of the infrastructure will need to be carried out as the sea continues to rise (Florida Oceans and Coastal Council, 2010).

Natural resources are at the heart of Florida's quality of life and unique environment. These resources have economic and ecological in addition to providing food, recreation opportunities and other materials essential to Florida's culture and lifestyle (Florida Oceans and Coastal Council, 2010). Degradation of natural resources will inevitably cause a change or evolution of Florida's culture. Significant planning measures must be carried out to assure the effects of sea level rise are addressed and the way of life of the people and the environment is maintained or evolved appropriately.



# LITERATURE

## Adaptive Planning

Florida has many dedicated organizations that are taking a stance on sea level rise planning. Counties and municipalities such as Sarasota County have, or are, in the process of putting together comprehensive plans for climate change adaptation. Punta Gorda, Florida is developing a climate change plan that centers on sea level rise (Lausche, 2014). Visualization and modeling tools are being used in planning in Florida to locate and demonstrate areas of inundation with current sea level rise projections. Regions are joining together to take sea level rise adaptive planning to the next level. Palm Beach, Broward, Miami- Dade, and Monroe County have formed the Southeast Regional Climate Action Plan. As a region, these counties, municipalities, and their partners have developed “regionally consistent” methods for sea level rise impacts mapping.

Three strategies are looked at in terms of adaptation to sea level rise:

- » Accommodation- adjusts and evolves structures and systems in response to sea level rise (Volk, 2008).
- » Protection- protects the land by using hard and soft infrastructure (Volk, 2008).
- » Relocation- redistributes the shoreline population further inland and to upland areas (Volk, 2008)

In Florida, accommodation and protection methods have begun to be implemented. Relocation is seen as a last resort in many cases, as it surrenders land to the sea and requires many homes and infrastructures to be displaced. As the sea level rise effects increase, relocation will be necessary and is the main adaptation strategy identified in this study.

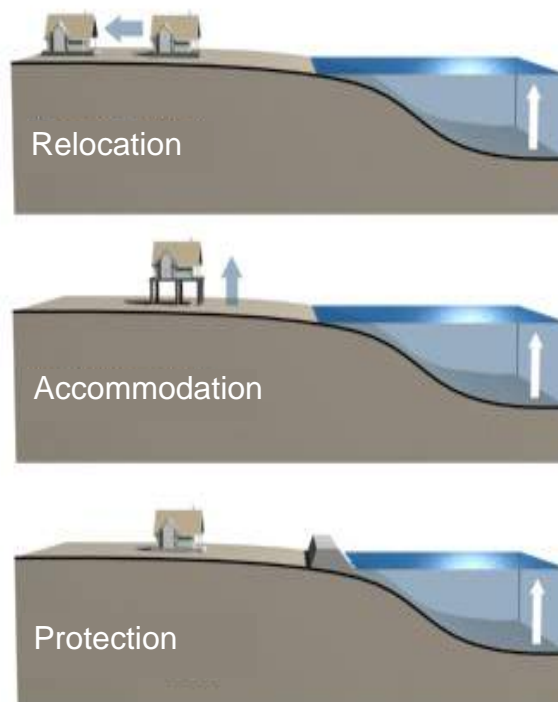


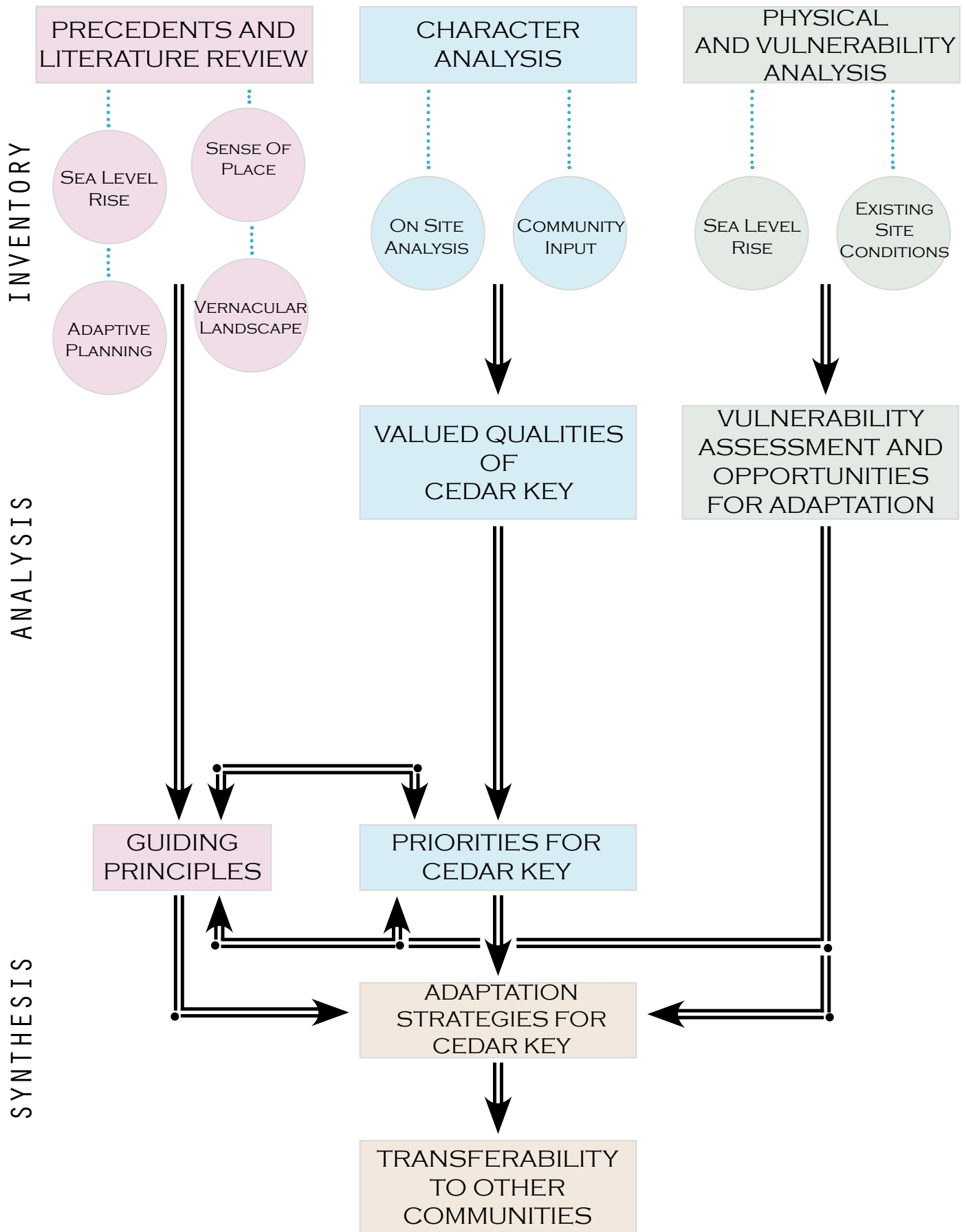
Figure 2.2: Visual representation of adaptation strategies



# Chapter 3: Methodology



“A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise.” - Aldo Leopold





# METHODOLOGY

## Overview of Methodology

### Precedents and Literature Review

After reviewing literature to understand the effects of **sea level rise** on coastal communities in Florida, it became apparent that social and cultural values were not addressed at a community scale in relation to **adaptive planning**. Further research revealed the importance and significance of a landscape's **sense of place**. Connecting this to people and their community, the **vernacular landscape** was explored in because of its depiction of the social and cultural ways of life. Relationships were drawn between the effects of sea level rise and the vernacular landscape. Cedar Key, Florida was chosen as the study area because of its unique community structure and values and its vulnerability to sea level rise. Precedents and literature review then aided in developing **guiding principles** pertinent to maintaining key elements of the vernacular landscape of Cedar Key. Guiding principles can be defined as principles that direct a design decision or concept. These guiding principles helped direct **adaptation strategies for Cedar Key** that display opportunities for relocation in the face of sea level rise.

### Character Analysis

To define the vernacular landscape of Cedar Key, **onsite analysis** was conducted to determine the character defining features of the community from the perspective of an outside observer. **Community input** was then needed to illustrate the ways of life of the residents and determine what they value, or cherish, most about their community. Based on the current lifestyle of Cedar Key and the desired information from the community, surveys and one-on-one interviews were determined to be the best tool for community participation. The findings from the onsite analysis and the results of the community input identified the **valued qualities of Cedar Key**. Findings were organized according to the type of character defining feature they exemplified: spaces and places, activities, or characteristics. These findings were further categorized based upon the priorities and delimitations of this study, resulting in six community valued elements to be addressed as **priorities for Cedar Key**. These elements include:

- » Green space
- » Downtown
- » Arts
- » Trails
- » Connectivity
- » Building typologies

**Guiding principles**, aimed at maintaining key elements of the vernacular landscape, and predetermined goals and objectives assisted in the identification of opportunities for relocation for the selected valued spaces, places, activities, and characteristics, demonstrating **adaptation strategies for Cedar Key**. The methodology exhibited in this study, for the city of Cedar Key, is **transferable** to other communities and municipalities. Outside communities can look to this study to determine their own vernacular landscape and carry out adaptation strategies in a way that is sensitive to it.



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## Physical and Vulnerability Analysis

Goals and objectives were established for this study to determine areas appropriate for protection, accommodation and relocation and highlight the valued spaces and places of the residents. A bathtub model, or map showing inundation from sea level rise occurring at a persistent elevation (DNREC, n.d.), was used to project a one meter sea level rise on the coastline of Florida. When zoomed into the study area, this **sea level rise model** showed areas of Cedar Key, and areas within its surrounding five mile radius, that would be inundated with a one meter rise in sea level, and those that would remain as dry land. GIS data was gathered and analyzed to display **existing site conditions** including:

- » Critical infrastructure
- » Conservation areas
- » Vacant and undeveloped parcels
- » Road access
- » Flood zones

Overlaying the site conditions with the sea level rise bathtub model resulted in a **vulnerability assessment** that displayed **opportunities for adaptation**. Using this assessment in conjunction with **guiding principles**, **adaptation strategies for Cedar Key** were identified. The methodology and findings of this study were then discussed based upon their **transferability to other communities** concerned with this research.

## Character Analysis

### Reading the Landscape

Adhering to the role of the outside observer, I approached my first site visit with a preliminary set of “tools” as suggested by Cronon (2009). With me, I brought my open mind, curiosity, sense of wonder, and detail oriented lenses. I did my best to leave all biases, expectations, and presumptions behind to avoid them from getting in the way of a clear reading of the landscape. I also brought along a notebook and pen for jotting down my observations, a camera to photograph different areas of the landscape and a map I obtained from the Historical Museum to guide me as I went along, as well as another place for recording my observations. Spatially organizing my thoughts on a map helped me orient myself and really begin to understand the story of Cedar Key.

### Taking Notes

Approaching the landscape, I began taking notes about the surrounding context that led me into Cedar Key. I looked at the roadways, the vegetation, the building types, and the overall layout. Because a landscape should never be looked at in seclusion, but as a piece of a larger landscape, I did not confine my observations to just Cedar Key. The interrelationship between the upland areas leading to Cedar Key and Cedar Key itself allowed me to gain a greater knowledge of why some things in Cedar Key function or look they way they do. Because I was in a vehicle at this time, as many observers may be, a voice recorder made it easier to note observations that I then wrote down later.



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I began my observations with noting the “character defining features”, as described by the National Park Service (1992), that are said to be critical to the character of a cultural landscape:

- » Topography
- » Vegetation
- » Circulation
- » Water features
- » Structures, site furnishings, and objects

These however, are broad categories in which fall many of the details that make up Cedar Key, such as types of vegetation, microclimate, and road organization. For the larger, surrounding context leading me into Cedar Key, I took a broader approach and really got into the details once I had crossed the bridge into Cedar Key.

## Looking Local

The vernacular landscape lies in the details that make up the way of life of the people living and working in that landscape. In this research, Cedar Key Florida was observed, studied and recorded to determine its vernacular landscape, answering the question of: *What makes Cedar Key, Cedar Key?*

After determining the characteristics around the community from field observations, Cedar Key was delineated into seven “zones” (Figure 3.8) that displayed a variation in their characteristics and physical conditions. These zones differed depending on type of vegetation, sidewalk presence, lot size, building height, land use, microclimate, and water access. Separating a large landscape or community into smaller “zones” with comparable characteristics allowed me to have a clearer reading of the landscape by highlighting the main elements in each area. These were not pre-prescribed elements to look for but were instead determined by the landscape itself. Due to the uniqueness of each landscape or community, the vernacular landscape cannot adhere to a predefined list of attributes. It is for this reason that we experience the beauty of various towns, each evoking their own feelings and way of life.

## Community Input

Once I had determined the vernacular landscape from an outsider’s perspective, it was essential to involve those living in Cedar Key to truly define the way of life and the vernacular landscape.

Linear methodology does not apply here, as the participants are the drivers of the process. Community participation is key to the foundation of the methodology that must occur in order to define the vernacular landscape. As each community is unique in its own way, the qualitative process of the methodology carried out in this research is unique to Cedar Key, Florida. For subsequent communities, the outreach process to gain community participation may vary based upon what best fits each community, city, town, or municipality. For Cedar Key, community outreach was determined to be done most effectively via surveys. For the survey process, it is essential to have knowledge of frequently visited public locations that the surveys can be offered at. In Cedar Key, I determined such places to be the library, city hall, and Cedar Key School. I also reached out to local organizations including the Cedar Key Historical Society, Cedar Key Arts Center, and Nature Coast Conservancy,



# METHODOLOGY

inquiring about the amount of members and meeting times so that I could either attend these meetings with the appropriate amount of surveys or provide the organization president with copies to distribute at the meeting, which I picked up at a later date. I found that it was best to check back at the distribution locations every two weeks for two months to assure that I was giving participants ample time to fill out and return their surveys. I completed the appropriate Institutional Review Board (IRB) application and documents through the University of Florida and gained approval before distributing any surveys. A consent form was and always should be included with each survey.

Building upon the concept of community asset mapping, a map (Figure 3.1) was included in the surveys (Figure 3.2) that gave participants the opportunity to pinpoint the spaces or places that they valued most with a marker, and to give reason as to why they cherished these spaces or places. Activities and characteristics were also acknowledged in the directions as valued places. Activities and characteristics were also acknowledged in the directions as valued elements of the community that could not be located on a map, but may be described in writing. Because the terms sea level rise and climate change are so charged, they were not mentioned in the surveys. Instead, in order to trigger the mind of the participants to really consider what they valued and loved about their community, a prompt scenario pertinent to their location was given:

*Large floods due to storm surges are a possibility in coastal communities. IF a flood were to occur and damage a great deal of Cedar Key, Florida, altering it in many ways, what would you miss most about the town?*

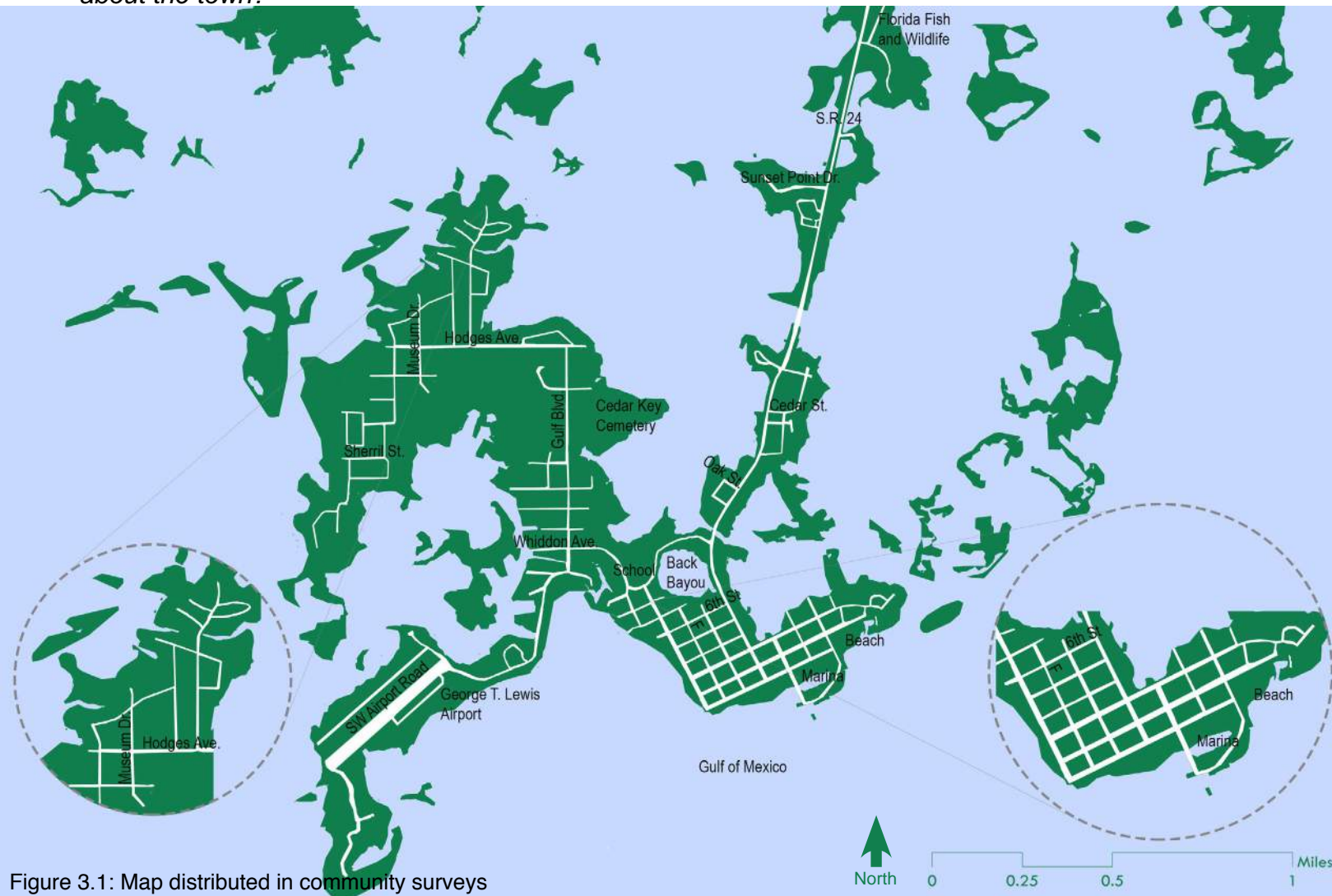


Figure 3.1: Map distributed in community surveys



# METHODOLOGY

**Instructions:** Please fill out the survey below in order to assist with **defining the valued lifestyles and landscapes of Cedar Key, Florida.**

*Large floods due to storm surges are a possibility in coastal communities. IF a flood were to occur and damage a great deal of Cedar Key, Florida, altering it in many ways, what would you miss most about the town?*

Locate and number on the attached map, three places, spaces, activities and/or characteristics that you feel make Cedar Key a unique place. Include a brief description below as to why you chose these places, spaces, activities and/or characteristics. If a characteristic (ex: ability to walk many places) and/or activity (ex: scavenger hunts) cannot be pinpointed on a map, you may just describe it below.

*Please scan and send completed survey back to [clavisconti@gmail.com](mailto:clavisconti@gmail.com)*

*Or drop off the completed survey at the location that you received this survey.*

**Numbers on the map should correlate with the numbers of the description**

- 1.
- 2.
- 3.

Name\*: \_\_\_\_\_

Address\*: \_\_\_\_\_ Cedar Key, Florida

Phone Number\*: \_\_\_\_\_

Age: \_\_\_\_\_

Years/months of Residency in Cedar Key: \_\_\_\_\_

*\*Optional*

Please place a check mark in either of the following boxes:

I would like to have my information and responses kept private as part of the statistical analysis

I would like to have my information to be kept private, but I allow my responses to be published anonymously using a broad demographic identity such as “resident of 20 years said...”

Figure 3.2: Sample of survey used for community participation



# METHODOLOGY

## Informed Consent

**Protocol Title:** Community valued spaces, places, and characteristics of Cedar Key, Florida

**Please read this document thoroughly before you volunteer to participate in this study.**

**Purpose of this study:** The purpose of this study is to identify the spaces, places, activities, and characteristics of the community of Cedar Key, Florida that are valued by the residents in order to define the lifestyle and cultural uniqueness of the place.

**Your role in this study:** Locate three places, spaces, activities, and/or characteristics on a map of Cedar Key, Florida, provided by the researcher, that make Cedar Key a unique place. Include a brief description as to why you chose each.

The amount of time this study will take will vary depending on your responses.

**Risks and Benefits:** There are no risks in participating in this study. Participants should not take photographs in areas they do not feel comfortable in. Cedar Key and the community will benefit by feeling a sense of ownership to their unique elements and residents will have gained a higher appreciation for what they value most in their community.

**Confidentiality:** Your identity will be kept confidential if stated so on the documents provided. You may leave out any personal information and file the map findings as anonymous if you wish. If you are open to further conversation about the information you provide, you may be contacted to discuss your findings and community values within five months of the original study date. All participants will remain anonymous in the publishing of this research, but if you so choose, your comments may be quoted without using your name. Only broad demographic information will be used, for example: “a resident of 20 years said...”

**Voluntary participation:** This is a completely voluntary study. You are not required to take part in this study. There is no compensation to you for participating in this study.

**Right to withdraw from the study:** If at any point, you choose to withdraw from this study, you may do so with no penalty.

**Contact information for questions about this study:**

*Claudia Visconti*, Graduate Student, Department of Landscape Architecture, University of Florida. Phone: (941) 993.4600 Email: [cvisconti@ufl.edu](mailto:cvisconti@ufl.edu)

Figure 3.2: Sample of consent form used for community survey





# METHODOLOGY

**Contact information about your rights as a research participant in the study:**

IRB02 Office, Box 112250, University of Florida, Gainesville, FL 32611-2250; phone 392-0433.

**Agreement:** I have read the procedure described above. I voluntarily agree to participate in the procedure and I have received a copy of this description. If I have indicated on the map document, I give consent to quote anonymously my responses in this study.

Participant: \_\_\_\_\_

Date: \_\_\_\_\_

Principal Investigator: \_\_\_\_\_

Date: \_\_\_\_\_

Figure 3.2: Sample of consent form used for community survey



# METHODOLOGY

Responses were then tallied and organized by the category under which they fell: spaces and places, activities, or characteristics. The valued spaces and places were marked on a map that created a visual framework displaying what areas in the community were most valued by its residents. These results were then digitized and put into GIS so that they could be overlaid on other data maps.

Priorities and delimitations of this study guided the selection of six of the identified valued elements for which design scenarios and opportunities were illustrated. Two elements were chosen from each of the three categories (spaces and places are joined in this scenario) of responses. Some identified elements have been further generalized in order to provide greater transferability to subsequent communities. For example, several parks in Cedar Key were identified as valued by the community so strategies for “green space and trails” were carried out rather than for one park in specific. This data makes up the qualitative analysis portion of the study.

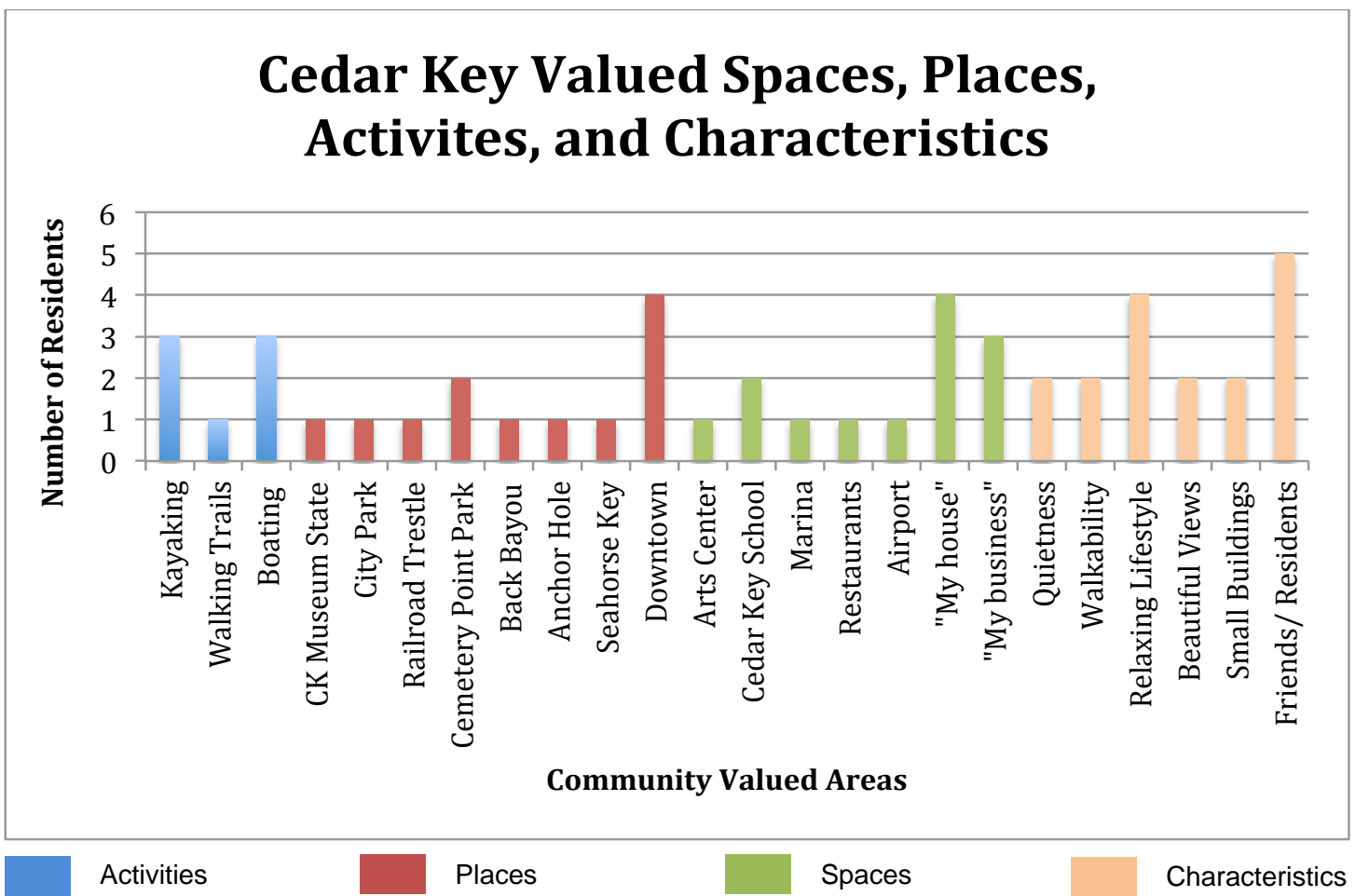


Figure 3.3: Graph displaying results of community input



# METHODOLOGY

## Physical and Vulnerability Analysis

### Data Gathering

Outside of the field work and participatory processes with the members of the community, a great deal of quantitative data is needed in order to analyze the physical conditions of the land found within the study area. Physical site conditions must be identified in addition to community valued elements of the landscape so that existing natural and developed environments are accounted for. Existing site conditions inform the location of critical areas, such as infrastructure and conservation lands, that should be protected and sensitive areas, such as flood zones, that should be avoided. Quantitative and qualitative data gathering was carried out simultaneously for the most part; however, the analyses occurred separately and were then overlaid. Quantitative data collected in this study is based on geographic information systems (GIS) data and can be gathered from local municipality and county websites or through a statewide database where available. Often it is necessary to reach out to external sources and contacts as not all data is published publicly. For this study, [www.fgdl.org](http://www.fgdl.org) was the primary source of GIS data. The data layers I gathered were based upon predetermined goals and objectives (p.44) that aimed to identify areas for protection, accommodation and relocation. My goals and objectives for this study acknowledge both qualitative and quantitative analysis and are listed below. The goals and objectives of this study led to priorities for addressing the existing physical site conditions of Cedar Key.

Raster data was initially used for all data analysis in this study; however, discrepancies in some raster files resulted in the usage of vector data instead. In these instances, both raster and vector maps are shown. Ground truthing and reviewing data results for faults is essential in legitimizing the data and making informed decisions.

- » Vector data - a digital representation that uses lines, points, and polygons. This type of data is best used for displaying county boundaries or streets or other data with discrete boundaries. Vector data is more adaptable to scale changes.
- » Raster data - a digital representation using pixels divided into a grid of cells that create a surface. This type of data is best used for storing data such as a satellite image or an elevation surface.

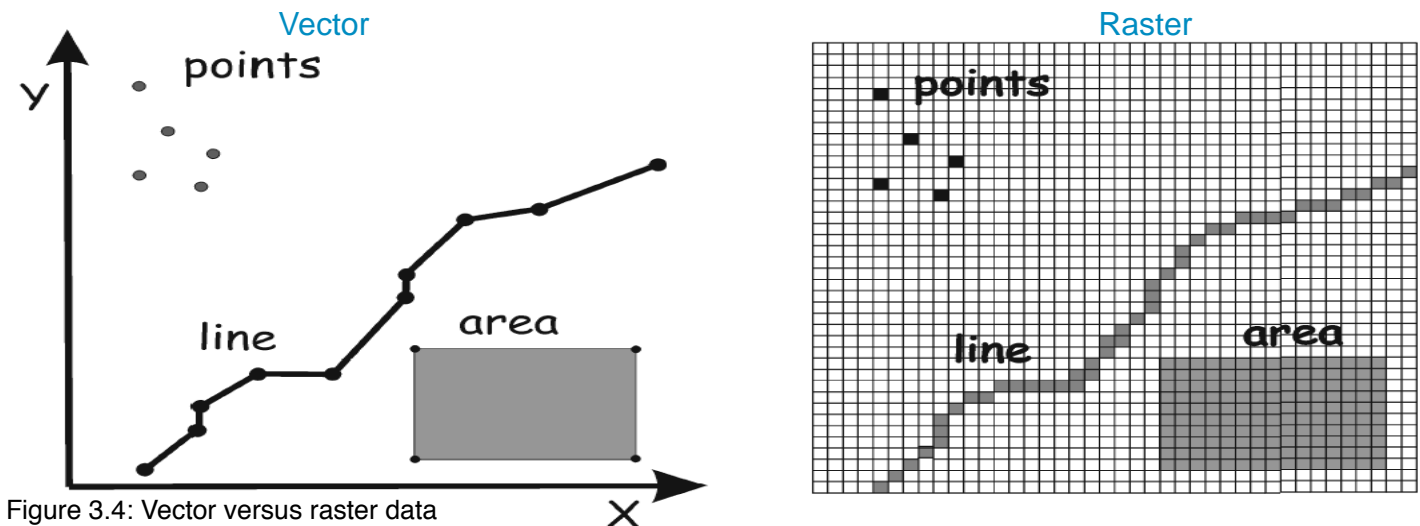


Figure 3.4: Vector versus raster data



# METHODOLOGY

## Goals and Objectives

Goals and/or objectives that are not in bold font are beyond the scope of this study, but should be carried out where feasible. (O = Objective; S.O. = Sub-Objective)

### **Goal 1: Identify important upland, non-conservation land in Cedar Key, Florida**

#### **O 1.1: Identify important areas based on qualitative analysis**

*(See Section 3.2 for a description of the process of identifying important areas)*

O. 1.2: Prioritize upland, non-conservation lands based on land value

O. 1.3: Identify historic areas and buildings within upland, non-conservation lands

O. 1.4: Prioritize upland, non-conservation lands based on population density

O. 1.5: Locate important sites and infrastructure found within upland, non-conservation lands

S.O. 1.5.1: Identify schools

S.O. 1.5.2: Identify grocery stores

S.O. 1.5.3: Identify parks

S.O. 1.5.4: Identify water access points

S.O. 1.5.5: Identify critical infrastructure

### **Goal 2: Identify areas inundated at high tide by a 1 meter sea level rise**

#### **O. 2.1: Identify important upland, non-conservation land inundated at high tide by a 1 meter sea level rise**

### **Goal 3: Identify areas inundated at high tide by a 1 meter sea level rise where protection is a suitable response**

#### **O. 3.1: Identify critical infrastructure inundated at high tide by a 1 meter sea level rise where protection is a suitable response**

O. 3.2: Identify areas of high land value inundated at high tide by a 1 meter sea level rise where protection is a suitable response

O. 3.3: Identify historical areas and buildings inundated at high tide by a 1 meter sea level rise where protection is a suitable response

O. 3.4: Prioritize upland, non-conservation lands based on land value where protection is a suitable response

O. 3.5: Identify historical areas and buildings within upland, non-conservation lands where protection is a suitable response

O. 3.7: Prioritize upland, non-conservation lands based on population density where protection is a suitable response

### **Goal 4: Identify areas inundated by a 1 meter sea level rise where accommodation is a suitable response**

O. 4.1: Identify open spaces that are inundated at high tide by a 1 meter sea level rise, but are not inundated at low tide by a 1 meter sea level rise where accommodation is a suitable response



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## **Goal 5: Identify areas inundated at high tide by a 1 meter sea level rise where relocation is a suitable response**

**O. 5.1: Identify important upland, non-conservation lands (excluding major utility areas) inundated at high tide by a 1 meter sea level rise where relocation is a suitable response**

O. 5.2: Prioritize upland, non-conservation lands based on land value where relocation is a suitable response

O. 5.3: Identify historical areas and buildings within upland, non-conservation lands where relocation is a suitable response

O. 5.4: Prioritize upland, non-conservation lands based on population density where relocation is a suitable response

## **Goal 6: Identify potential upland areas for infill and greenfield development**

**O. 6.1: Locate noninundated vacant and undeveloped parcels and greenfields that are located in or within 5 miles of the study area**

**S.O. 6.1.1: Identify noninundated vacant and undeveloped parcels and greenfields that are located outside of floodzones**

**S.O. 6.1.2: Identify noninundated vacant and undeveloped parcels and greenfields that have access to roads**

**S.O. 6.1.3: Identify noninundated vacant and undeveloped parcels and greenfields that are located outside of conservation lands**

**S.O. 6.1.4: Identify noninundated vacant and undeveloped parcels and greenfields that are located outside of major utility areas**

### Definitions:

*Vacant parcels - Parcels with existing development that is not in use*

*Undeveloped parcels - Parcels with no existing development currently*

*Greenfields - Existing agricultural or forest land with potential for development to occur*

The data sets used to fulfill the qualitative goals and objectives were:

- » Florida Parcel Data by County : Florida Department of Revenue - 2010
- » Florida Managed Areas : Florida Natural Areas Inventory - 2014
- » Florida Land Use, Cover, and Forms Classification System : FLUCCS
- » Flood Zones : Federal Emergency Management Agency - 1996
- » Florida Utility Data : Florida Department of Revenue - 2010
- » Major Roads : Florida Department of Transportation- 2014
- » Shoreline : University of Florida GeoPlan Center - 2012
- » 1 meter sea level rise bath tub model : Tidally adjusted sea level rise projections for Florida (Unpublished data)



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## Goal 1: Identify Important Areas in Cedar Key

A character analysis was performed for the community in order to determine the valued qualities of existing Cedar Key. Onsite analysis carried out by an outside observer gave an initial impression and feel for the community. Character defining features were used as a guide for what the observer noted as important elements that make up Cedar Key. Community input was then used to understand the ways of life of the community from the perspective of its residents. Surveys and one-on-one interviews identified the valued spaces, places, activities and characteristics that those living in Cedar Key believe to be crucial to their lifestyle and their community. The identified valued spaces and places were then digitized and located on a map (Figure 3.5) that provided a visual representation of the important areas of Cedar Key. These important spaces, places, activities and characteristics were observed for opportunities for relocation in the face of sea level rise.

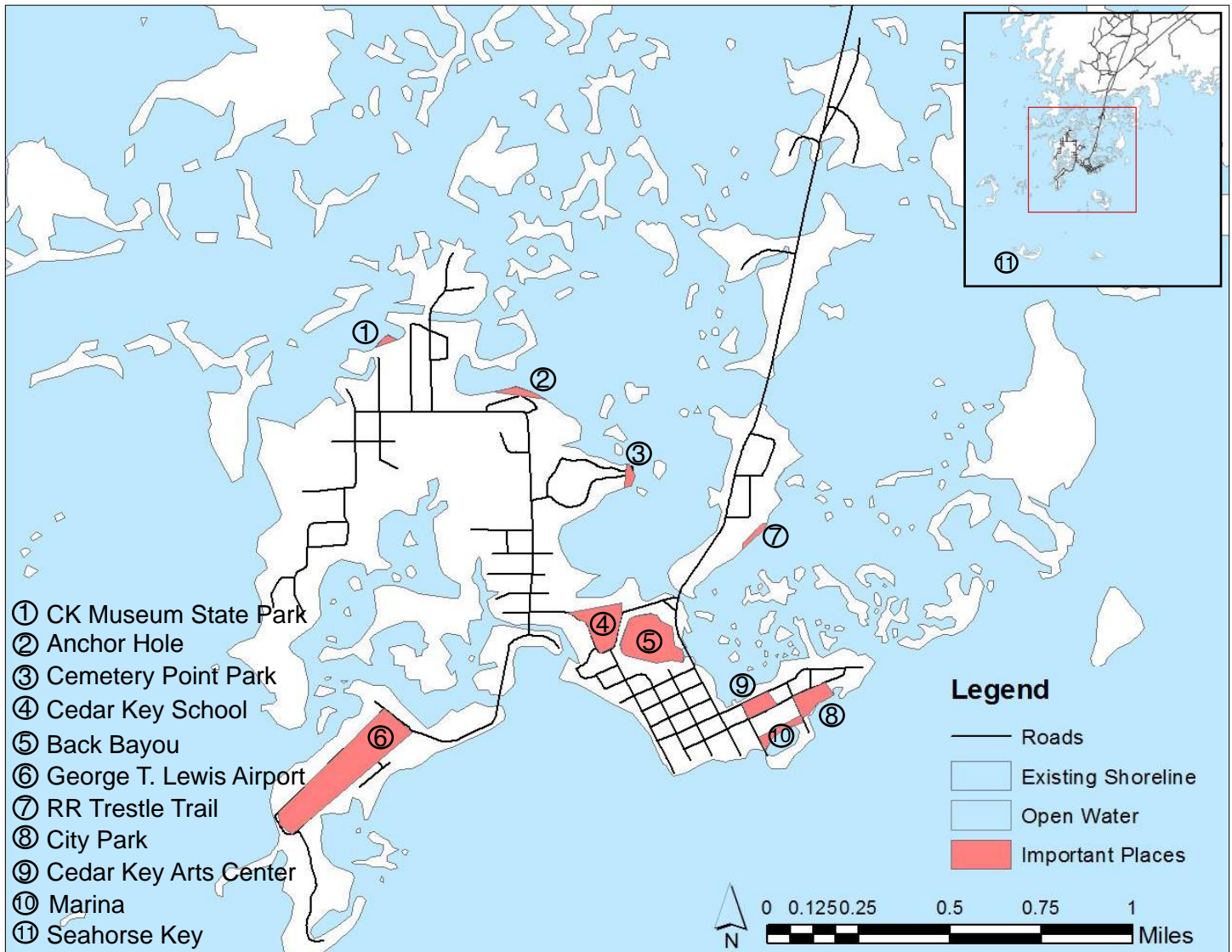


Figure 3.5: Important spaces and places in Cedar Key as identified by residents



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## Goal 2: Identify Areas Inundated by a 1 Meter Sea Level Rise

In order to understand the physical affects of sea level rise on Cedar Key, it was essential to identify what parts of the community and the study area will be inundated at high tide by a 1 meter sea level rise. For this research, a one meter rise in sea level was projected on the shoreline of Florida using a bath tub model. A bath tub model shows inundation from sea level rise occurring at a persistent elevation (DNREC, n.d.). Estimates in Florida most commonly correspond to a one meter rise in sea level by 2100. The result of a one meter rise in sea level (Figure 3.6) alters Cedar Key on a local and regional scale and is visible graphically when used as a tool for community participation. The data set for this model was obtained from University of Florida Center for Landscape Conservation Planning, Florida Natural Areas Inventory, and University of Florida GeoPlan Center (2013).

## Goal 3: Identify Areas Important for Protection

Parcel utility data was used in this study to determine the location of critical infrastructure (Figure 3.47 & 3.48) for Cedar Key. Land value, historical areas, and population density are also noted in the objectives as factors for determining and prioritizing areas most suitable for protection, but are not carried out in detail in this study. Public policy and land ownership must be addressed when exploring protection as a response but are beyond the scope of this research.

Critical infrastructure is essential to communities at a local and regional scale and due to the extensiveness of the service provided by these infrastructures, relocating them is not an easy task. Protecting critical infrastructures assures that as the community experiences sea level rise and must evolve in other ways, it will still be guaranteed power and water supply. Protecting these infrastructures is a costly matter but will most likely prove to be more economical than relocating them. However, a full economic feasibility study should be completed to validate the most cost efficient approach. Economic policy is beyond the scope of this study.

## Goal 4: Identify Areas Important for Accommodation

Identifying areas most suitable for accommodation is noted as a goal for the quantitative analysis, but is beyond the scope of this study. Identifying areas that are inundated by a 1 meter sea level rise at high tide, but are not inundated at low tide by a 1 meter sea level rise, is key to determining where accommodation should occur.

In areas that lack infrastructure or utilities, it is possible to accommodate the land for sea level rise. Locating open spaces using GIS can determine areas that have potential to be accommodated for in the face of sea level rise. These areas may be free to be inundated at times and dry at other times, depending on high tide. In such a scenario, the use of the land can accommodate for both dry and wet conditions by catering to different activities.

## Goal 5: Identify Areas Important for Relocation

For the purpose of this study, all areas that are at risk or will be inundated with a 1 meter rise in sea level, and were identified by the community as important (excluding major utility areas) were



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These areas were determined to better serve the community by having their function relocated to non inundated parcels, rather than protecting them in their current location. The difficulty and economic requirements for protecting non critical infrastructure rather than relocating them is not reasonable. Relocating these important areas allows for the vernacular landscape to evolve and the valued spaces, places, activities and characteristics of Cedar Key to be maintained.

Analysis based upon land value, historical areas, and population density are stated as objectives for identifying areas important for relocation and should be carried out when possible, but are beyond the scope of this study. My research identified important, upland non-conservation lands (excluding major utility areas) inundated at high tide by a 1 meter sea level rise as areas important for relocation.

## Goal 6: Identify Potential Upland Areas for Infill and Greenfield Development

Using GIS, noninundated, vacant and undeveloped parcels and greenfields were identified within Cedar Key and a surrounding five mile radius. Vacant or undeveloped parcels (Figure 3.53 & 3.54), which are identified at in this study as opportunities for relocation, are based off of Florida Land Cover Classification System (FLUCCS). For the purposes of this research, the categories considered as vacant or undeveloped parcels are:

- » Vacant commercial
- » Vacant residential
- » Other municipal
- » Other counties
- » Forest, park, and recreation
- » Grazing land
- » Timberland
- » Parcels with No Data

Based on the needs and policy of each community, these classifications may be narrowed down or expanded. Zoning and land value should also be taken into consideration, but are not observed in this study. These noninundated vacant or undeveloped parcels and greenfields should be located outside of flood zones where possible and have access to roads. Due to the vulnerability of my study area to storm surges and flooding, majority of the land is located in a 100 year flood zone, so this data set has been eliminated in the overlay process as to not skew the results.

## Combined Goal Analysis

The noninundated, vacant or undeveloped parcels identified in goal 6 were then overlaid with data gathered based upon goals 1, 2, 3, and 5. This data included:

- » Valued spaces and places as identified by the community
- » Areas inundated at high tide by a 1 meter sea level rise
- » Conservation lands
- » Critical infrastructure

The combined data set created two maps, one showing the upland areas and the other showing Cedar Key, that displayed all parcels within the study area available for relocation opportunities. These maps were used as the basis for identifying potential adaptive strategies for Cedar Key.





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The goal of the combined qualitative and quantitative analysis was to highlight opportunities (Figure 3.6) for relocating the functions of the spaces and places as well as the activities and characteristics that the residents of Cedar Key value most, and doing so in a manner that respects the way of life of the community. Highlighting opportunities for relocation in Cedar Key displays the how community's values and valued qualities can be maintained or evolved in the face of sea level rise.

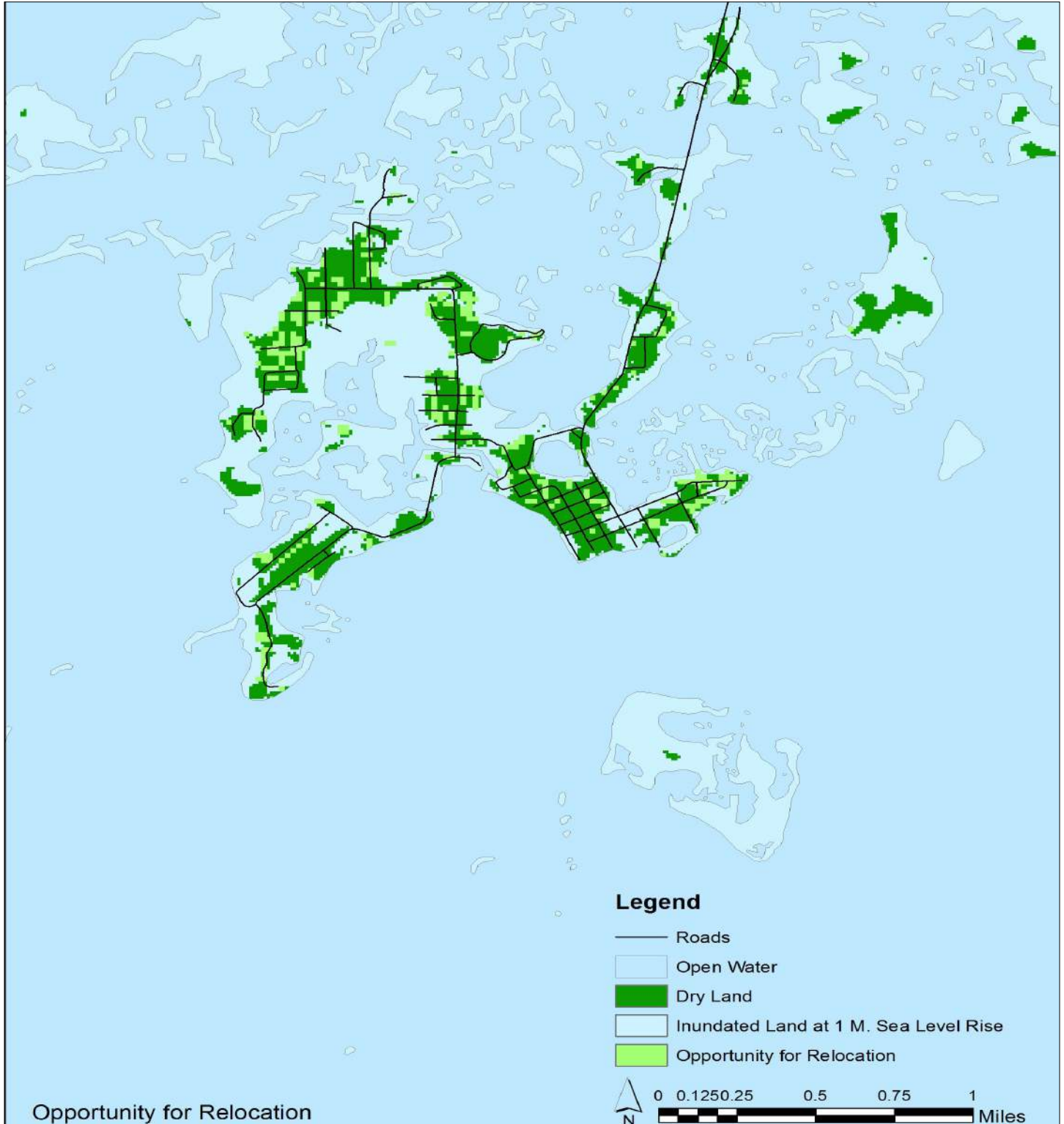


Figure 3.6: Relocation opportunities in Cedar Key



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Figure 3.7: View of buildings on Dock St. from pier



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## Valued Qualities of Cedar Key

### Overview

Following the procedure highlighted in my methodology for reading the landscape, I visited Cedar Key with no biases or previous impressions and recorded the observations I made during my initial site visit, paying special attention to the character defining features. From these observations, I delineated Cedar Key into six “zones” or “sections” based upon their characteristics and physical conditions. Subdividing the island into smaller parts allowed me to read further into what makes Cedar Key, Cedar Key as I analyzed the similarities and differences within the community. Fulfilling the role of the landscape architect, I combined my own observations with historical findings and the values of the community, as determined by the residents, to create a cohesive reading of the landscape. Further, I integrated this combined reading with GIS data illustrating the physical conditions of Cedar Key, which allowed me to fully understand the vernacular landscape of Cedar Key.

### Vernacular Landscape as Defined by the Outside Observer

#### What Is Seen

Water greeted me as my first indicator that I had arrived in Cedar Key, Florida. Driving over a bridge, I crossed marshlands that appeared to be experiencing high tide. Having exited the closest major interstate about 50 miles away suggested this coastal community would hold some values from its surrounding inland towns, but contain its own sense of uniqueness amidst the Gulf of Mexico.

Recreation displayed its role in the community from the get go. I immediately encountered a dock of several fisherman. Gazebos and abandoned docks further out in the water appear to be well on their way to inundation. As I drove along, I could see that pastel colored, older homes, many with white porches, have been converted into small businesses. This indicates, to me, the town’s resistance to major commercial enterprises. Seafood, fudge, and small cafes seemed to be the largest industries in the initial strip of businesses I encountered. There is a low traffic volume and slow speed limits (20-35 mph) throughout the island.

Transitioning into residential, the canopy appears to increase, providing lots with lush vegetation. The homes on these lots are older homes, many of which appear to have lacked maintenance over the years. Residents have large yards all around their homes, and many are on the water. Some homes have been elevated to accommodate floods and storm surges. The street structure in the first residential area I encountered does not lend itself to being easily navigable as it has many dead end streets that terminate with a resident’s home.

Crossing a canal, you enter into another “section” of Cedar Key. Here, the street grid becomes very strong and a downtown feel is sensed in the historic district. Businesses again occupy old homes maintaining a small town feel. Many of the businesses, as you transition into this “section”, are outfitter shops for kayaking, biking, and fishing. These businesses indicate the type of recreation preferred in the area for both tourists and residents. Cedar Key’s historical downtown is characterized



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by two story, zero lot line buildings. These buildings are old, wooden structures or concrete. There are sidewalks along these streets. Many people appear to enjoy the walkability of the downtown and its small shops. Many business owners were outside of their shops talking to other residents. A local gas station is located downtown and seemed to be a spot where everyone knows everyone.

At 6th St, the area becomes residential again, containing newer and larger homes. Many of these homes are 2 stories along the water with private docks. Majority of these homes have a facade of wood or slating. There are smaller homes in this area as well and the lots appear to be also be smaller with more manicured landscaping. The microclimate here is much hotter due to a lack of large tree canopy with mostly palms in this area. Sidewalks are sparse in this residential area.

To the east, still following the structured grid, a popular pier, called Dock Street, containing shops and restaurants creates a new character. In this area, there are condos and vacation rentals but no housing. The feel here is that this area is for tourists as it markets Cedar Key paraphernalia and differs from the small town feel of the shops used by majority of residents. Here, buildings are made of mostly wood and stand on pillars in the water. The community playground is located in a park, adjacent to the beach. This playground seems to be an important component for the younger residents judging by how active it was.

Traveling northwest, the street grid becomes looser and the canopy increases again with lush, vegetated lots. There are overgrown, non-developed lots in various places but none of it is used for recreation or any other purpose, it appears. Many of the non developed lots are for sale that I am assuming will be used for future development. There is some sidewalk and some curb in this area, but not everywhere. Both the cemetery and school are historical icons in this area. The school has a brick facade and I believe caters to all grade levels. Unorganized, stand-alone portables provide classrooms as well. The cemetery has water access and vacant land that was being cleared when I was there. I predict this is for future graves.

The western most section of Cedar Key is almost all residential. This area has no sidewalks and no curbs, throughout. There are no streetlights here, just stop signs indicating very little traffic volume. There are many golf carts used as vehicles around the island because of its small size. One and two story houses on large, heavily vegetated lots are found in this section with some homes on pillars here as well. Here, the driveways, as well as majority of driveways on the island, are gravel. Cedar Key's state museum is located on a large parcel of open land that provides great park space. Along the bridge to get to the park is an amenitized boardwalk. Another boardwalk is found along the open marshes bordering much of this area. These marshes provide habitat for wildlife and add an aesthetic and ecological value to the island.

## Interpreting What is Seen

From my initial observation and literature review, I was able to make informed assumptions as to why certain elements of the landscape appeared or functioned the way they did and the possible effects this could have on the community.

I discovered that Cedar Key, to a resident, is a place of its own in comparison to the Cedar Key a tourist or visitor would know. Frequent tourist activities, such trying Cedar Key's clams at the local restaurants and getting ice cream on the pier, often overshadow the qualities and characteristics of



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the residents' every day life. The island of Cedar Key has several "neighborhoods," each with unique characteristics that differentiate them from the more frequently visited areas. Culture; however, stitches the two perceptions of Cedar Key into the thriving community it is.

The ecotourism and long tradition of aquaculture are the main economic drivers of the town. Sea level rise will call for an evolution in both of these industries affecting the way of life for the residents as well as the visitors. It is said that due to the anticipated increase in water height, aquaculture make experience a shift in its procedure, requiring clambers to dive for their shellfish rather than use a net as they do now. Ecotourism will experience an increase in recreation opportunities, as more open water will become available as well as marshlands that can be amenitized for park space and trails. Planners and stakeholders should develop policies to guide these possible changes in order to maintain their economic advantage and cultural value.

Cedar Key has a drastic contrast in residential lot sizes which displays the varying lifestyles in the community. Many residents live on large, lush vegetated lots while others live on small lots with minimal vegetation. Homes reflect both older and modern building patterns, illustrating that the community has had growth at various times since its original development in 1859. Microclimate also varies radically in differing "neighborhoods" resulting in different types of character. Large tree canopy is common in some areas, providing a lot of shade and encouraging outdoor activities. The less vegetated areas have minor canopy and a greater presence of palm trees. Areas of this sort lend to the coastal character of the town. As sea level rise occurs and infill is necessary, lot size will be dependent upon the available acreage of vacant parcels and greenfields. Opportunities to relocate upland may result in larger parcels available for development, while the island may offer smaller and fewer parcels for development or relocation. Saltwater intrusion and changes in hardiness zones as a result of sea level rise and climate change will dictate the appropriate vegetation for the anticipated conditions; however, this is beyond the scope of this study.

Building facades found in Cedar Key are majority brick, wood, shingles, slate and concrete. These facades are in compliance with current Florida building codes and may be carried over into upland areas in the form of an over lay that mandates façade materials that are in concurrence with current Cedar Key buildings so that their character is preserved. Several of the current dock designs in Cedar Key are "grandfathered" in and would not be feasible under today's Florida building code. Dock construction that is compliant with current codes have the opportunity to fit the current character of Cedar Key and currently exist in several places on the island. Recreation may encounter an evolution in regards to fishing and boating, as dock and water access will be further away from infill that occurs upland. Water access on the island will be enhanced as more land will be converted to open water. Coastal Construction Control Lines are mandated by the State of Florida per county that regulate coastal building setbacks and building foundation requirements. Counties and municipalities have the authority to impose additional setbacks if they deem necessary. Due to these regulations, a change in the appearance of water front buildings as well as their setback requirements may occur as a result of adaptive strategies to sea level rise.

Roads that stray from the strict grid of the current urban core suggest that they developed unplanned or in response to specific conditions. Due to the nature of infill planning, future streets will be designed comprehensively and will all tie back to the urban core, causing a shift in road structure and increasing navigability.



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The urban core, or downtown, which plays an important role in the community and is strongly influential on the way of life, may see a change as well. Inundated parcels may need to relocate to the current downtown, increasing its density. As opportunities for relocation to upland areas are shown, there is the possibility of a need for an upland urban core to support the population growth. Currently Cedar Key has been able to maintain a “mom and pop shop” system, due to its small scale community. In order to preserve this, it is best to keep the downtown areas at a low density. Upland areas that may contain a greater population may experience a more commercial downtown feel but at a smaller scale than your typical city. Social and cultural norms, as a whole, will evolve due to the need for adaptive strategies, causing the vernacular landscape to remain dynamic and reactive.

## Cedar Key

Using my recorded observations, I divided Cedar Key into seven parts (Figure 3.8) based upon their characteristics and features. Looking at Cedar Key in smaller parts helped highlight the key features and show similarities and differences across the island.

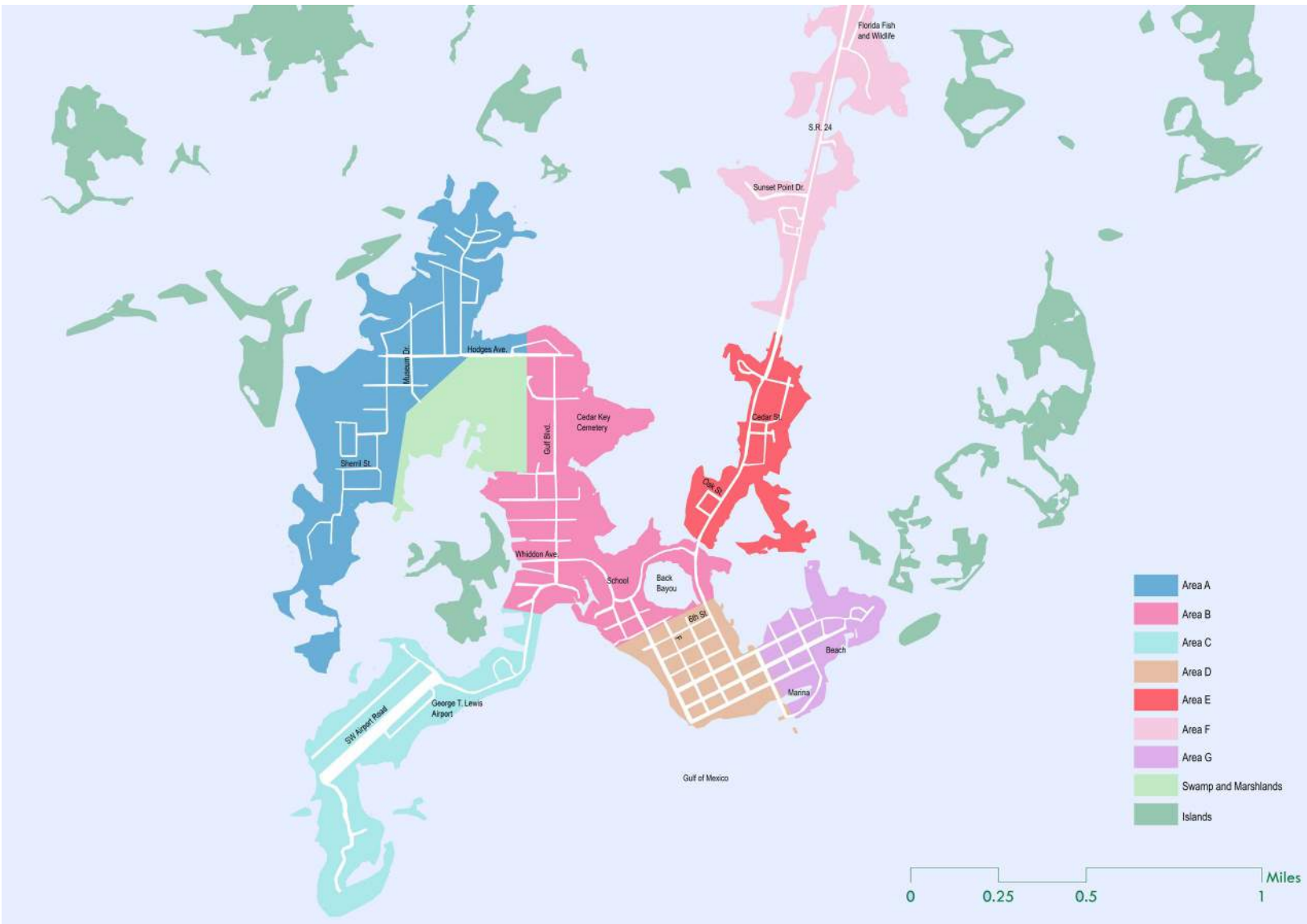


Figure 3.8: Map of Cedar Key divided into smaller parts based upon characteristics and features



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Figure 3.9: Street view of Area A



Figure 3.10: Street view of Area B



Figure 3.11: Bird's eye view of Area C



Figure 3.12: Street view of downtown CK in Area D



Figure 3.13: Street view of Area E



Figure 3.14: Street view of Area F



Figure 3.15: Street view of Dock St. in Area G

## Area A -

Lush canopy is characteristic of this area. Open marshland offers scenic roadside views and compliments the built environment around it. One and two story residential homes occupy large lots nestled in trees and shrubbery. Several homes sit atop pilings and many have gravel driveways. Undeveloped lots still remain in this area and have been taken over by lush vegetation. Although this area is majority residential, there is a lack of sidewalk throughout. There is also a lack of curb, which indicates the roads in this area may be older construction. The random organization of roads in this area reinforce that this area may have been built before urban planning strategies were implemented in the town.

## Area B -

Sidewalks begin to appear in this area, lending it a more residential feel. An amenitized boardwalk takes pedestrians from the road to the historical cemetery and Cemetery Point Park. Water



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is an appealing feature of this area which residents and tourists enjoy viewing from the park. Back bayou adds to this appeal by providing Cedar Key a natural amenity for kayaking and fishing. Dense canopy continues through this area, offering shade and a pleasant walking environment. The Cedar Key School is also located in this area and students can be seen enjoying the shade on their walks to and from school. The streets in this area begin to follow a more structured urban grid system, indicating they may be newer development.

## Area C -

George T. Lewis Airport, a staple of Cedar Key, accounts for the majority of this area. Residents and tourists fly small planes and jets to and from this small landing strip for weekend trips and even dinner for the night. Several local pilots house their planes here. A gorgeous but dangerous feature of this airport is the water surrounding it that makes for a beautiful takeoff and landing. A few homes are located in this area on large lots with significant vegetation. Several of the homes are situated across from the water with private wooden docks.

## Area D -

A structured grid allows for a navigable and walkable city core for the. This area contains the historic district and is iconic of Cedar Key. Many buildings here are from the original development of Cedar Key such as the Island Hotel. Frequented buildings in this area include the public library, city hall, historical museum, and Cedar Key Arts Center. Residential homes and condos also share this area occupying smaller lots than in the more rural areas. The water and native coastal vegetation provide a naturalistic but “beachy” feel in this area. This can be seen as the heart of Cedar Key.

## Area E -

As you get closer to the more familiar and frequented areas of Cedar Key, you pass through an area of early residential development that is also defining of Cedar Key. These homes are smaller in size but are located on large lots with very lush vegetation. Some homes are elevated implying they are newer than some of the surrounding homes. Sidewalk is lacking throughout. This area provides the only connection to the rest of Cedar Key.

## Area F -

As you enter Cedar Key on S.R. 24, residential and commercial development is present. Many old homes have been converted into businesses such as outfitter shops and cafes. These buildings are various colors and form a welcoming feel as you enter the community. Homes in this area are small and sit on lots with dense canopy. The drive in this area is very appealing with gorgeous viewsheds of water on both sides. This area provides an enchanting gateway into Cedar Key.

## Area G -

The most recognized area of Cedar Key is the famous Dock Street. A wooden pier with restaurants, ice cream shops and souvenir and clothing stores provides an appealing atmosphere for waterside dining and shopping. This area is a major tourist destination where visitors can try local clams and enjoy sunsets from the public dock. A large marina is located in this area that is frequented by boaters, kayakers and clammers at all times of day. The beach and City Park are adjacent to the marina as well as kiosks on the dock that offer kayak and boat rentals. Residents enjoy the recreational use of this area as well as the local post office and grocery store that can be found here.





# METHODOLOGY



Figure 3.16: Small boat meet in Cedar Key



# METHODOLOGY

## Upland

Onsite observations also led to an interpretation of the upland portion of the study area by noting the existing conditions in this area and a brief description of the surrounding environment. Six areas were observed in the upland area as well as the Cedar Key Scrub State Reserve.

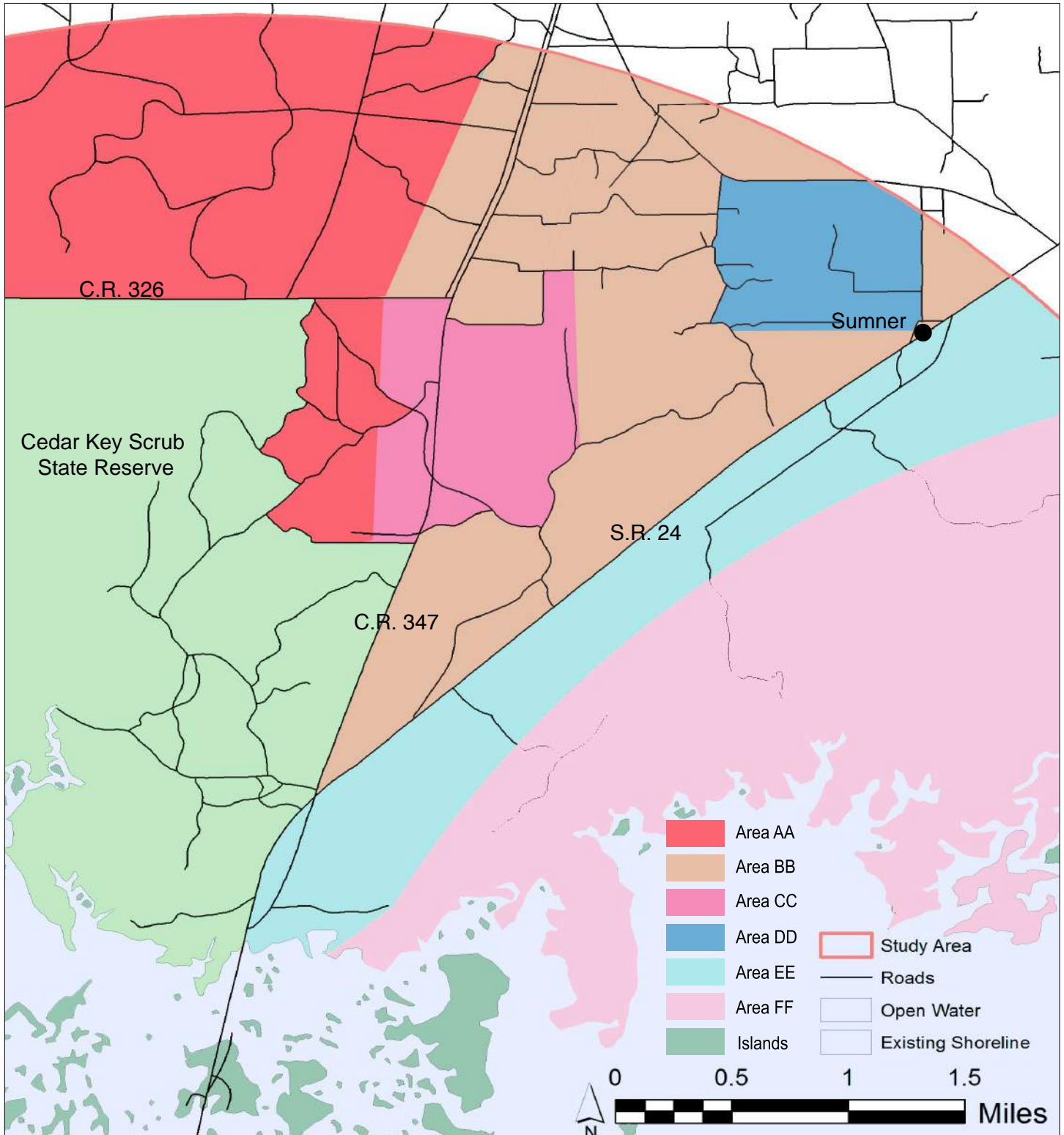


Figure 3.17: Map showing the upland portion of the study area divided into smaller parts based upon characteristics and features



# METHODOLOGY

## Area AA -

County Road 326 is bordered by forested areas on both sides. This area is highly vegetated and roads are used mainly for connections between cities and areas. These roads are not curbed and there are no streetlights or sidewalks in this area. The largest remaining shell mound on the central Gulf Coast is located here called Shell Mound. The mound is composed of oyster shells, turtle, fish, whelk, deer bones and house hold debris and is almost 6,000 years old. Shell mound provides minor hiking and camping for added recreation in this area.

## Area BB -

Residents are sparsely located in this area off of minor roads that branch from County Road 347. In this area, C.R. 347 is bordered by forested areas on both sides. This road lacks a curb, sidewalk and streetlights as well. A secondary path appears to have been made by vehicular traffic in the adjacent grassed areas. This organic path seems to be used for foot traffic as well.

## Area CC -

A strong city grid appears in the parcel layout of this area. A local fish market, Adkins Seafood is a staple of this area and sells Cedar Key shellfish. Homes and small businesses are located more densely along County Road 347 in this area. These are smaller and older homes with gravel driveways. Many residents have boats parked out front indicating their usage of the local waterways surrounding them.

## Area DD -

This area is located in Sumner, Florida, a rural community adjacent to Cedar Key. A strong grid of parcels also appears in this area located off of State Road 24. Homes in this area are nestled amongst dense vegetation on their large lots. Curb, streetlights and sidewalk are lacking in this area.

## Area EE -

State Road 24 is the only road access onto the island of Cedar Key. In this area, S.R. 24 is bordered by lush vegetation on both sides. This road is mainly used for commuting. There are a few minor roads that branch off of the state road in this area, one of which provides access to the Cedar Key Scrub State Reserve.

## Area FF -

Several creeks such as Dorset Creek, Wilder Creek, and Prodie Creek are surrounded by lush marsh vegetation and feed into the Gulf here. Live Oak Key is located in this area and provides a scenic opportunity for boaters and water trail users. No development occurs in this area as it is comprised of all natural habitat.



# METHODOLOGY

## Character Defining Features

After a few more site visits, my awareness of the vernacular landscape continued to increase and the character defining features became more apparent. I compiled a descriptive list of the elements that made up the vernacular landscape to me as an outside observer, or landscape architect. This list assisted in revealing what makes Cedar Key, Cedar Key.

### Circulation

#### Roads -

A strict grid provides vehicular circulation for the urban core of Cedar Key. Complimenting this formal grid is a much looser, informal set of roadways on the north eastern and western ends. The residential areas outside the urban core appear to be organically laid out to connect structures as they were built over time, giving them no predefined order to their roadways. All roadways allow for golf cart access as this is a frequently used method of transportation by residents.

#### Parking Areas -

Majority of commercial uses provide a typical, asphalt parking lot. These parking lots are small in size due to the small number of residents on the island. By the marina and the most visited access to water is a large parking lot for boats and cars that contains public rest rooms and free public parking. There is a mix of parallel parking and vertical spots on Second Street and most other roadways on the island. On Dock St., all parking spots are parallel alongside the shops. Majority of residents have shell or gravel driveways. For houses that are elevated on pilings, parking is located underneath the house.



Figure 3.18: Typical street in CK

Figure 3.19: Typical parking lot in CK

Figure 3.20: Parallel parking in CK

#### Parkways -

Cedar Key has a large amount of open space and parks. There have been efforts by the city and local organizations such as the Nature Conservancy to preserve natural spaces and create walkable connections to parks from areas outside of them. A boardwalk has been constructed along the adjacent road to the cemetery to provide access to Cemetery Point Park, a frequent visited area for residents and visitors. Although the parkways do not physically connect to one another, the distribution of open space and parks throughout the city is cohesive and assures park access in close proximity to all points of the island.

#### Sidewalks -

Sidewalks were not always a Cedar Key tradition as we can see by their absence in majority of residential areas. In the downtown and urban core, there are paved sidewalks throughout that make the commercial areas very walkable and pedestrian friendly. Sidewalks are located around the main water access to the Gulf and alongside the roadways adjacent to it. Due to the low traffic speed



# METHODOLOGY

throughout the residential areas and the rest of the island, the absence of sidewalks in various locations is not problematic to pedestrians.

## Water Access -

Water access is a main feature of Cedar Key. With private and public docks, a large marina, a public beach, and waterside parks, it is a guarantee that there is water access for all. Water access is key to Cedar Key's aquaculture industry with launching points specifically used for clamming boats. Tourists seek the accessibility to water that is offered in Cedar Key.



Figure 3.21: Public fishing pier in CK

## Vegetation

### Shrubs -

Cedar Key contains both manicured and free growing vegetation. Shrubs vary from well maintained in residential and commercial areas to very lush, naturally maintained shrubbery in residential and commercial areas as well. With a large amount of wetlands, there is a lot of natural shrubs that favor wet soils and are salt tolerable.

### Trees -

Mangroves are the most plentiful tree in Cedar Key as they line the banks of majority of the water as well as grow further out into the water. Mangroves are essential to the coastal ecosystem of Cedar Key. Mangroves provide habitat for a variety of species including endangered and threatened species. The large roots of mangroves stabilize shorelines, reducing turbidity from waves and acting as buffers from storm surge. Both the Red Mangrove, *Rhizophora mangle*, and the Black Mangrove, *Avicennia germinans*, are found in Cedar Key. Palm trees are also an iconic tree of Cedar Key, adding to its coastal Florida atmosphere. Coconut Palms, *Cocos Nuicfera*, and Sabal Palms, *Sabal Palmetto*, are amongst the most common type of palm trees found on the island. Larger shade trees also add to the atmosphere of Cedar Key. Large oak trees add a Northern Florida feel to the beach town, giving it context to its surrounding ecosystem.



Figure 3.22: Mangroves in CK

### Microclimate -

When soaking up the sunlight is not desired, there is lots of shade to be had in Cedar Key. Parks offer large canopy trees for shade alongside open space that allows sunlight in at a greater rate. In the urban core, palm trees and some large oaks provide minimal shade; however, in more residential areas, vegetation is very lush and shade is plentiful. With walkability as an asset to the community of Cedar Key, street trees provide resting spots for shade when needed. Downtown offers shaded walkways provided by building overhangs that makes this area a very pedestrian friendly environment

### Residential Vegetative Character -

The residential character of Cedar Key is a broad spectrum. Many residents who live near the urban core of the town, prefer a well manicured lawn which happens to coincide with the strict street



# METHODOLOGY

grid. As the street grid loosens and spreads further north east and west, the character of the vegetation becomes looser as well. In these areas, the vegetation is very lush, providing a very different type of residential vegetative character. In open spaces in these areas, the vegetation is also lush and in some cases, overgrown. In parks and open spaces closer to the urban core, the vegetation is well maintained.

## Bloom/ Seasonal Change -

There is minimal seasonal change in Cedar Key due to its subtropical climate. Flowering shrubs and trees show color in Spring and some in Winter based upon their species type. A major seasonal bloom in Cedar Key however, is a red algae found in the water called *Karenia Brevis*.

## Water Features

### Water as an industry -

Water serves a large role in the economy of Cedar Key. Aquaculture and the clamming industry specifically is the main economic driver for the island. People travel from all over to eat the clams found in Cedar Key waters. Boating is also an industry in Cedar Key as many people pay to charter fishing trips in and out of the marina. Fish caught on these boats are often brought back for personal food or sold to restaurants in the area.



Figure 3.23: Kayak rental shop

### Water as Recreation -

With a plethora of areas for water access, water plays a major role in the recreation of Cedar Key. Boating, fishing, clamming, kayaking, sailing, and diving are amongst the most popular activities in Cedar Key. There are several outfitters and kayak rental shops just steps away from the beach for both residents and tourists. Paddle boarding appears to be an up and coming recreational choice for many.

## Structures, Sight Furnishings, and Objects

### Lights -

Cedar Key is well lit throughout the urban core. In more isolated residential areas, it is up to the resident to assure their property is well lit. Streetlights in Cedar Key are fixed to telephone poles and are not visible at eye level. This type of lighting allows the fixtures to remain unnoticed and not obstruct street views.

### Signage/ Way finding -

Due to the small size of the town, way finding is pretty intuitive. On a frequented street corner is a community painted sign (Figure 4.15) that gives arrows to direct visitors to many key spots on the island. There is signage for all commercial businesses and public spaces. There is also signage that indicates the name of each canal, creek, key, or body of water as you pass it.



Figure 3.24: Artistic street sign



# METHODOLOGY

## Buildings -

Building typologies in Cedar Key do not exceed three stories. Commercial businesses downtown are small in comparison to typical downtowns. Residential houses are either one or two stories and many are elevated on pilings. Elevated homes and buildings are iconic to Cedar Key. “The honeymoon cottage” (Figure 3.28), now dilapidated, is a famous building icon for the island. Typical facades found in Cedar Key include wood, slatting, and concrete.



Figure 3.25: Buildings on pilings

## Property Boundaries -

Properties in Cedar Key range from small lots to large lots. It is not uncommon for a fence to act as a property boundary in Cedar Key, but many residents and business owners prefer open lawns with non delineated property boundaries which adds to the friendly and welcoming atmosphere of the community.

## Art -

Art plays a large role in Cedar Key’s culture. Downtown is the well known Cedar Key Arts Center, an artist co-op that has studio space upstairs with a gallery downstairs that sell pieces from a variety of local artists. Murals painted on buildings also add to the artistic atmosphere of the island. An iconic art piece is the painting (Figure 3.26) of the “Honeymoon Cottage”. Every year, Cedar Key hosts the Cedar Key Arts Festival that draws in visitors from all over. This arts festival showcases the community’s culture and provides a great deal of revenue for the island.



Figure 3.26: Mural of the “Honeymoon Cottage”



Figure 3.27: Cedar Key Arts Center

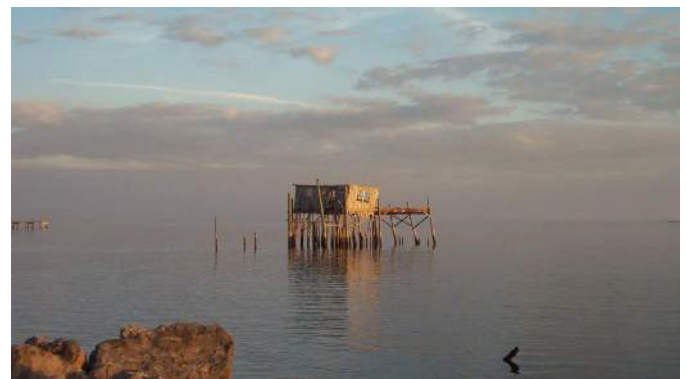


Figure 3.28: The “Honeymoon Cottage”



# METHODOLOGY



Figure 3.29: City Park & Beach





# METHODOLOGY

## Vernacular Landscape as Defined by the Community

Community participation was determined to be essential to this research as a tool for identifying the way of life of the residents. Using surveys and interviews, data was gathered that displayed the valued spaces, places, activities and characteristics of Cedar Key (Figure 4.20). For the purposes of this study, valued implies something that has high importance to the social and cultural ways of life of a particular community or area. These valued elements constitute the vernacular landscape as defined by the community. A map (Figure 4.21) graphically highlighting the valued spaces and places of the community begin to provide a framework for the way of life of Cedar Key.

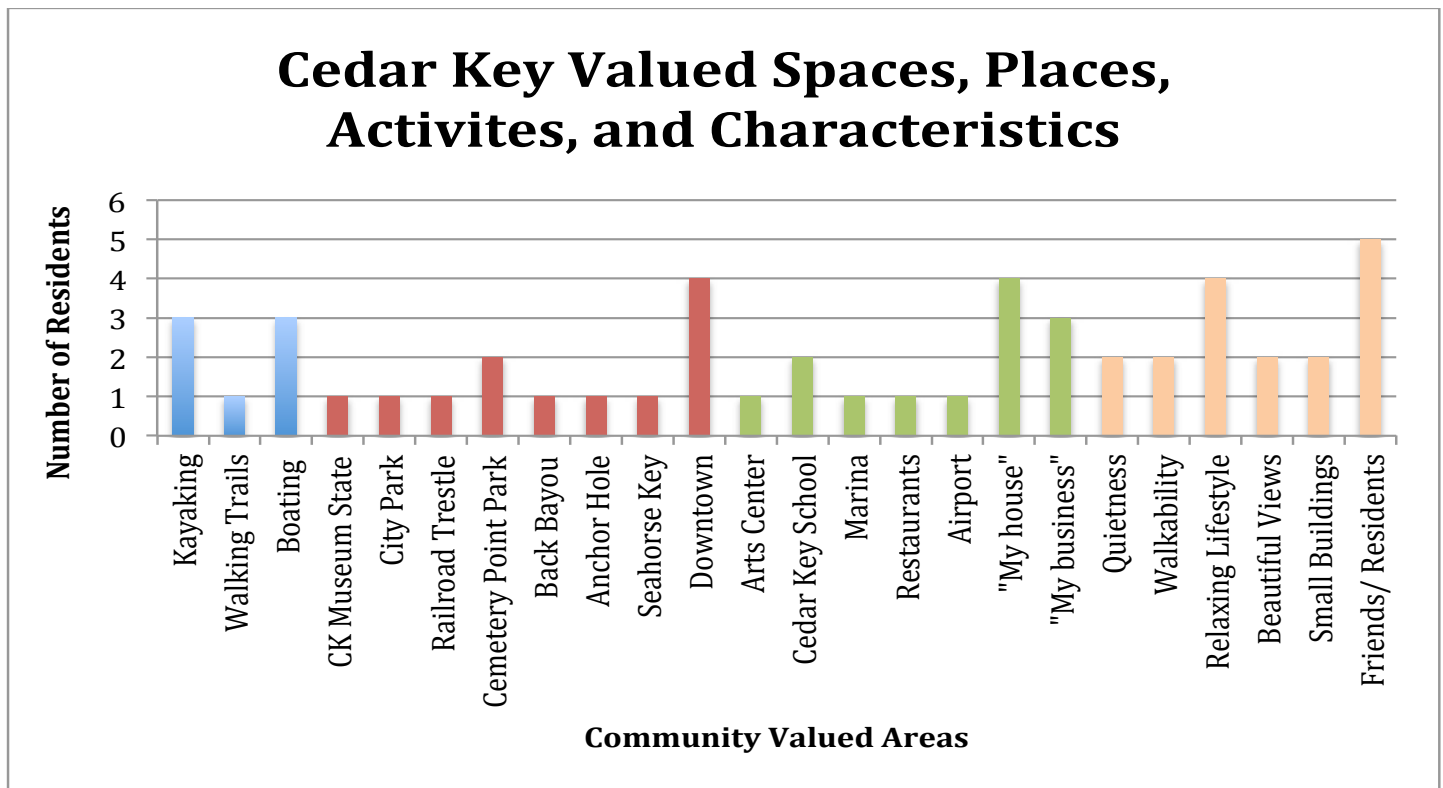


Figure 3.30: Graph displaying results of community input

## From Findings to Strategies

Due to the time limitations of this study, not all elements identified in the character analysis as important to Cedar Key could be considered for adaptation strategies. Opportunities for adaptation are illustrated in chapter five for six of the identified valued community elements, two from each category (spaces and places are joined in this scenario). Priorities identified for this study (Section 1.7- p.22) assisted in determining which valued qualities adaptation strategies were illustrated for.

- » Green space
- » Downtown
- » Arts
- » Trails
- » Connectivity
- » Building typologies



# METHODOLOGY

## Important Areas in Cedar Key

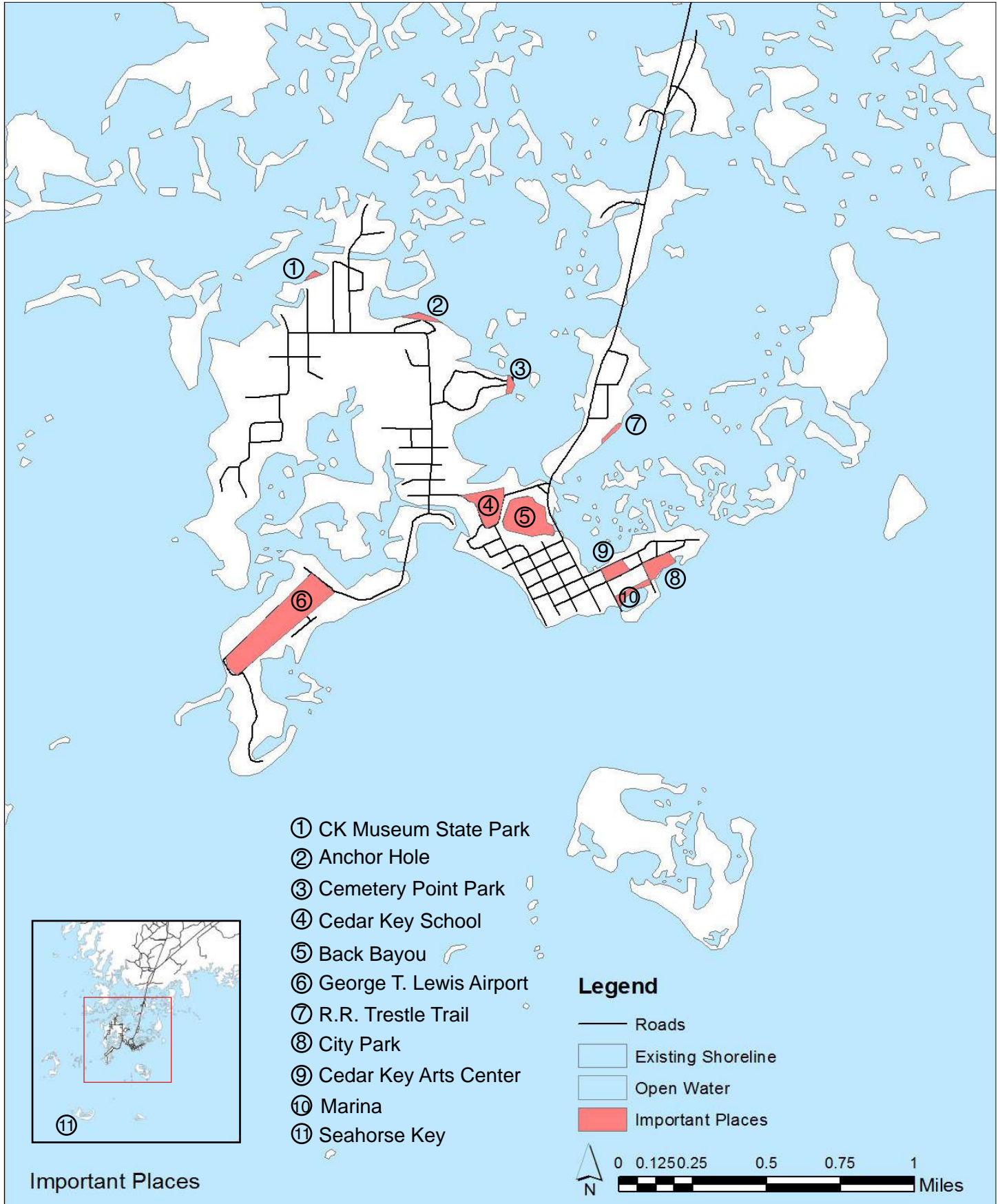


Figure 3.31



# METHODOLOGY



Figure 3.32: (1) CK Museum State Park



Figure 3.33: (2) Anchor Hole



Figure 3.34: (3) Cemetery Point Park



Figure 3.35: (4) Cedar Key School



Figure 3.36: (5) Back Bayou



Figure 3.37: (6) George T. Lewis Airport



Figure 3.38: (7) R.R. Trestle Trail



Figure 3.39: (8) City Park



Figure 3.40: (9) Cedar Key Arts Center



Figure 3.41: (10) Marina



Figure 3.42: (11) Seahorse Key



# METHODOLOGY

## Sea Level Rise and Existing Site Conditions

### 1 Meter Sea Level Rise Model - Study Area

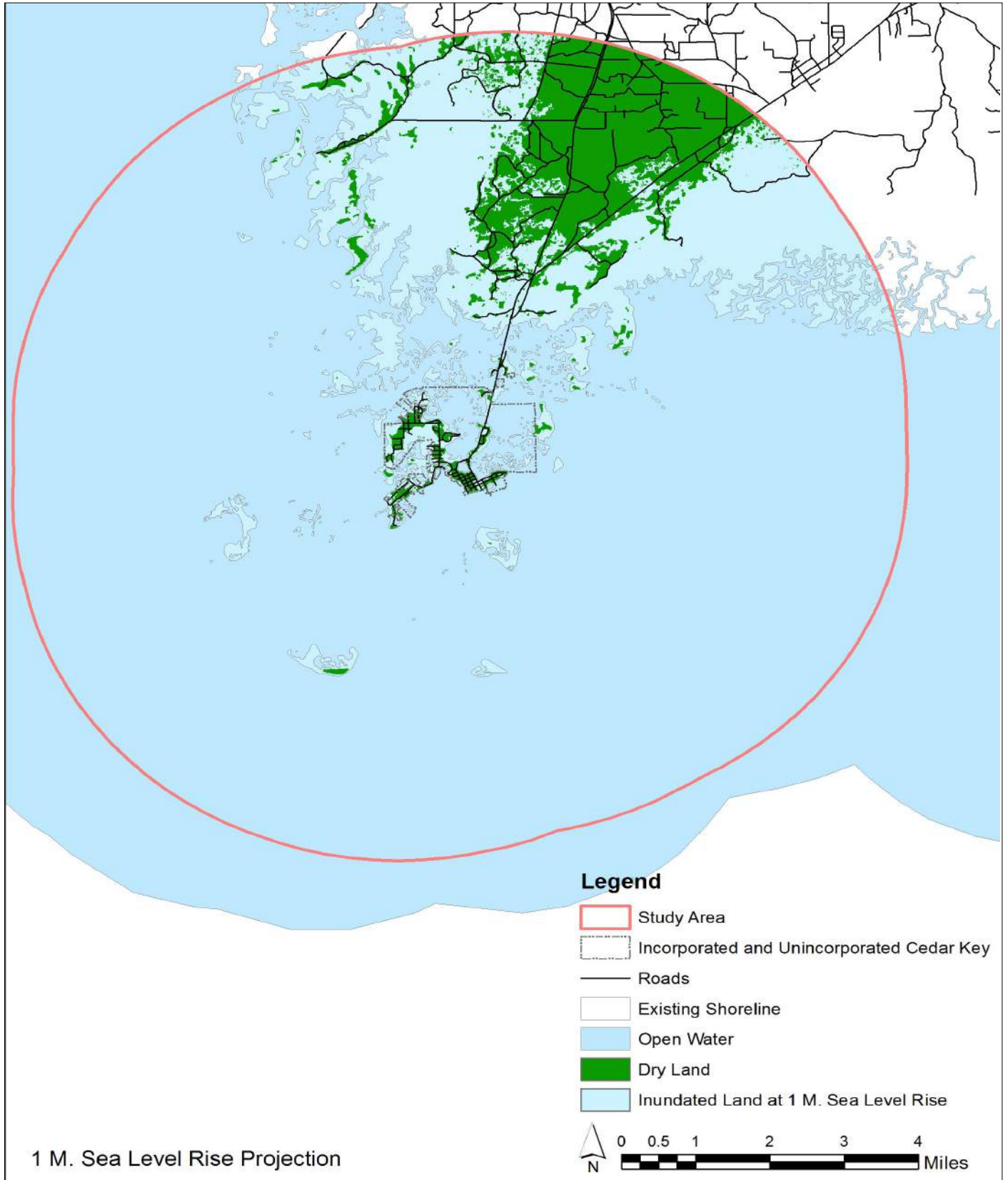


Figure 3.43



# METHODOLOGY



Figure 3.44: Weathered Dock in CK



# METHODOLOGY

## 1 Meter Sea Level Rise Model - Cedar Key

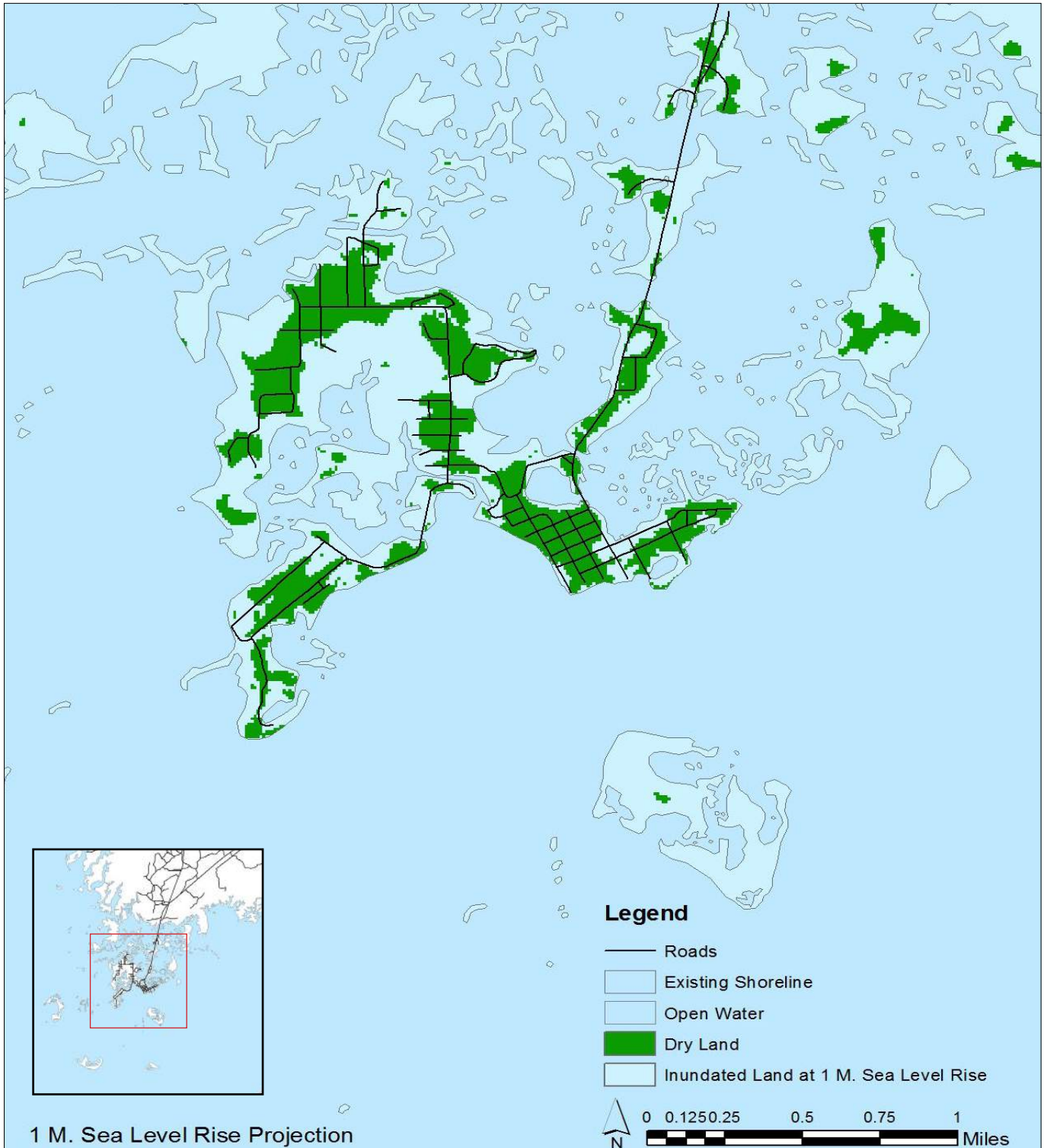


Figure 3.45

This bathtub model that illustrates a one meter sea level rise on the coastline of Cedar Key. The bathtub model shows all inundated land as converting to open water. This model was chosen for this study because it provides the “worst” case scenario for land conversion in the face of sea level rise and does not address land type, which requires policies that are beyond the scope of this study.



# METHODOLOGY

## SLAMM

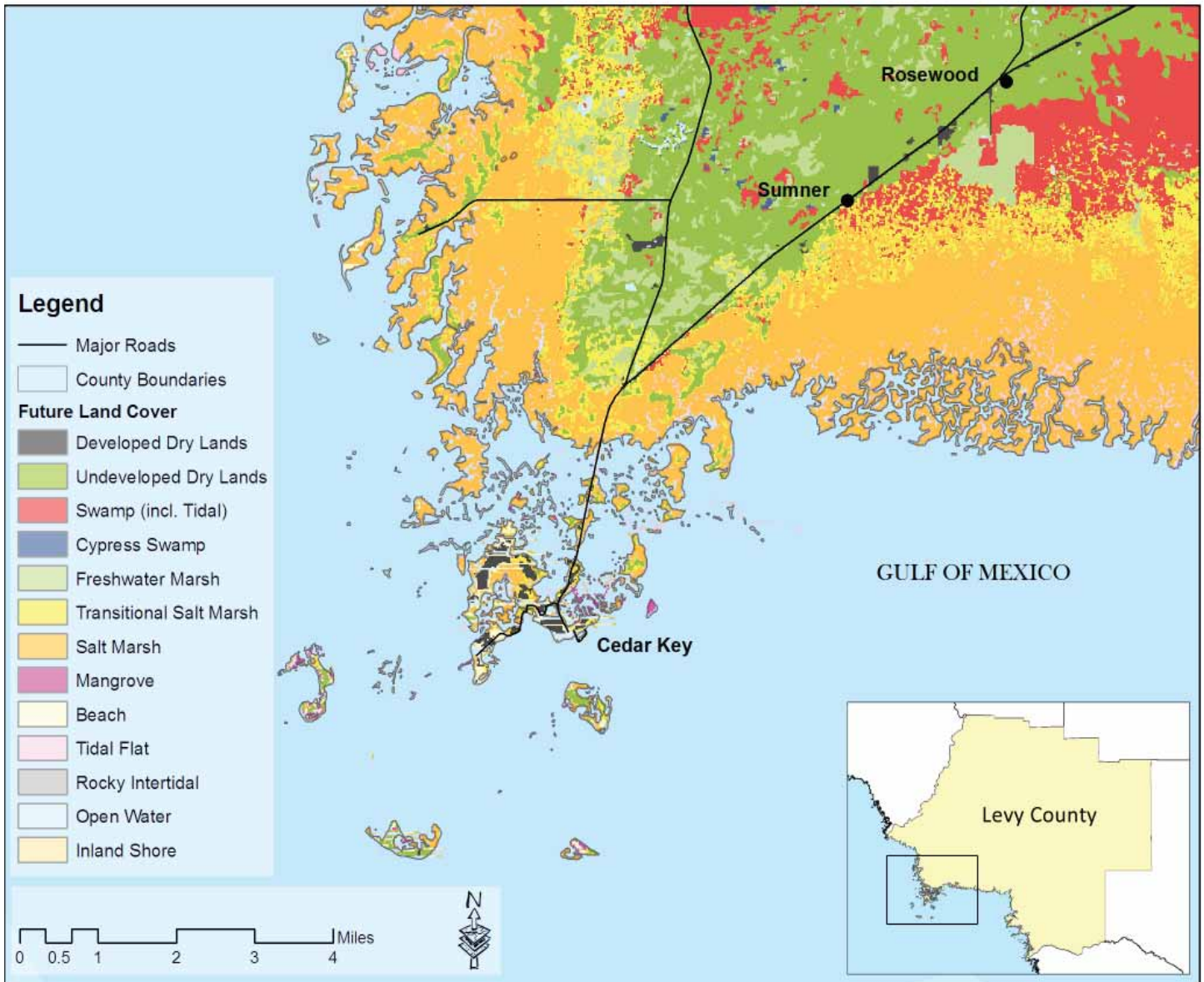


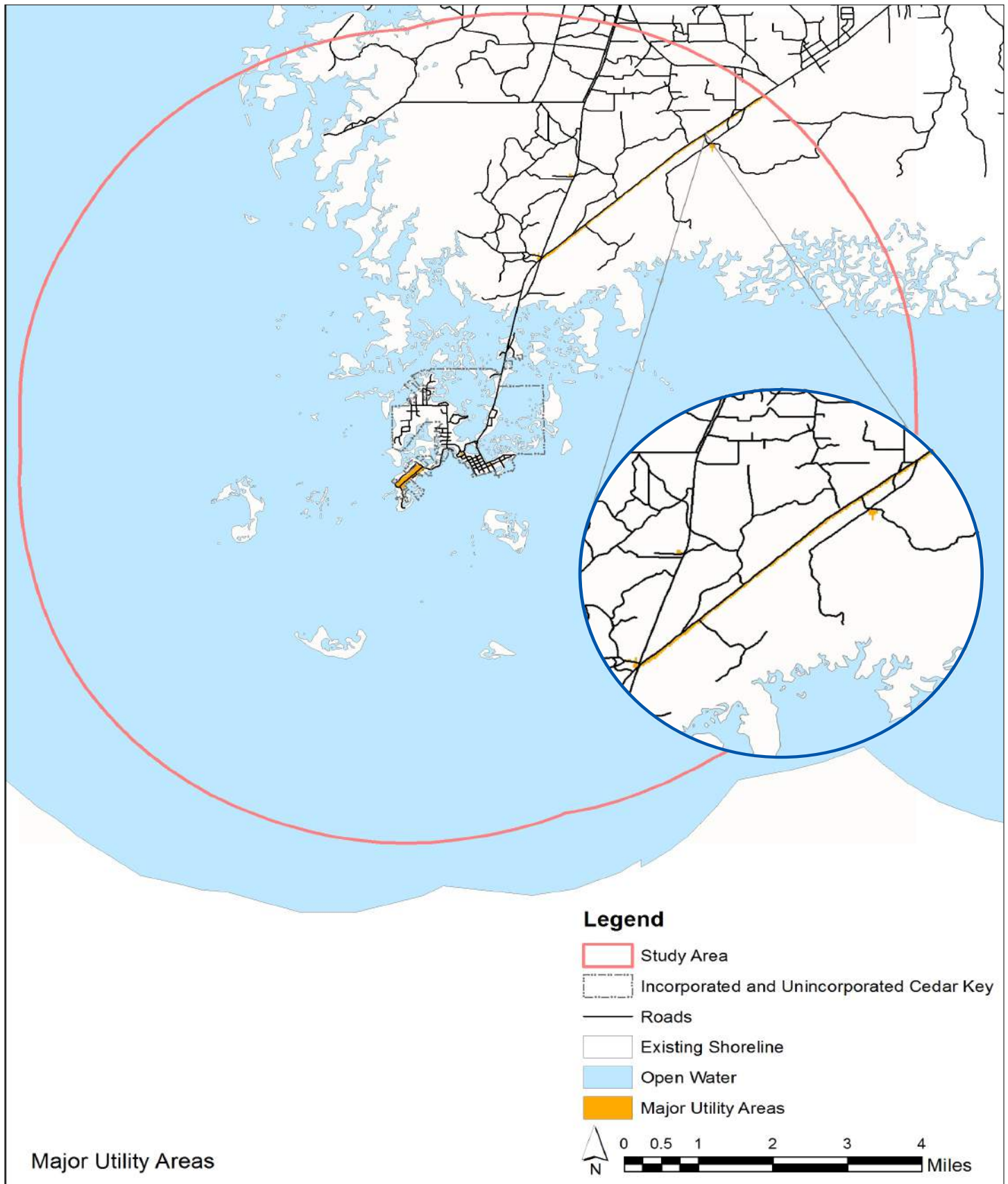
Figure 3.46: SLAMM model

Sea Level Affecting Marshes Model (SLAMM) utilizes digital elevation data along with other material to visualize the possible effects of sea level rise on shorelines and wetlands (NOAA, n.d.). SLAMM displays the potential of marshland and other land cover types to develop along the coastline, unlike the bathtub model (Figure 3.44 & 3.45) which shows all inundated land converting to open water. This model was not used for this study because of the complexity of ecosystems and policy it deals with; however this model is believed to be a more accurate representation of land conversion than the bathtub model.



# METHODOLOGY

## Critical Infrastructure - Study Area



Major Utility Areas

Figure 3.47





# METHODOLOGY

## Critical Infrastructure - Cedar Key

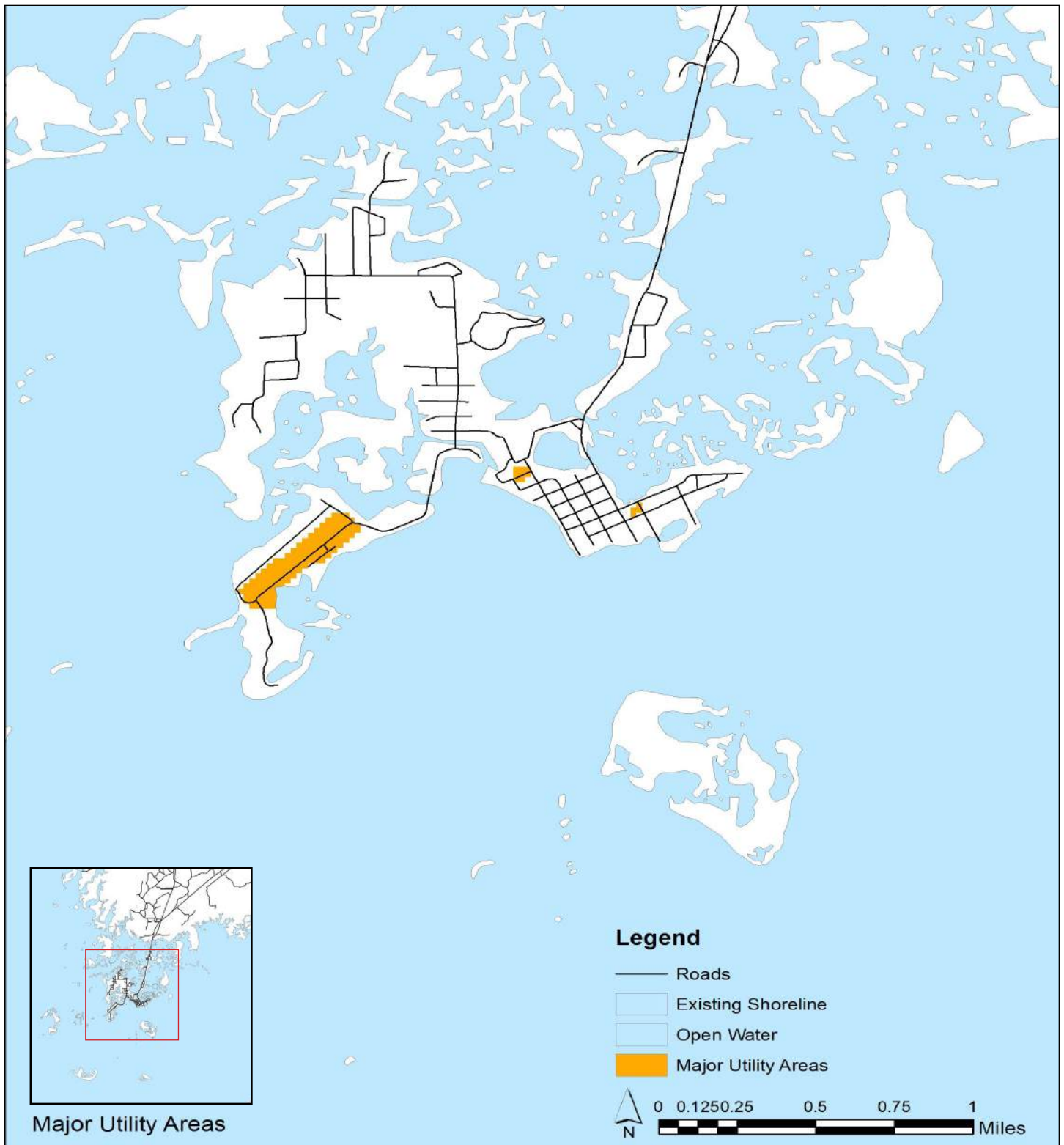


Figure 3.48

Critical infrastructure is identified in goal 3 of this study as an objective for protection. Cedar Key Airport, the local water supply plant, and the sewage treatment center are shown on the above map as areas in need of protection. Economic costs of relocating critical infrastructure are not reasonable when protection is feasible. However, access and public policy must also be addressed. Because of this, it is suggested that the Cedar Key airport be relocated rather than protected.



# METHODOLOGY

## Conservation Lands - Study Area

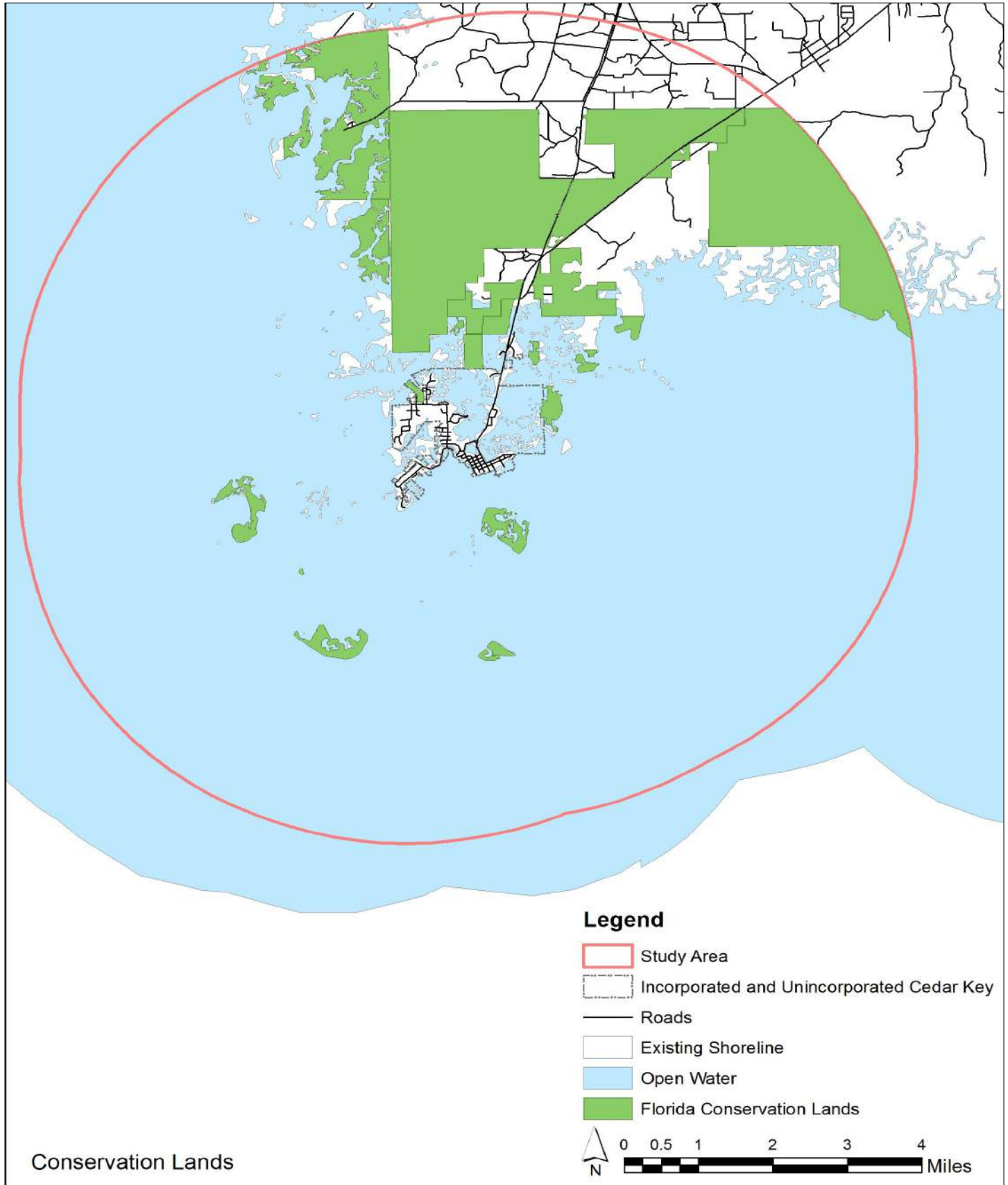


Figure 3.49



# METHODOLOGY

## Conservation Lands - Cedar Key

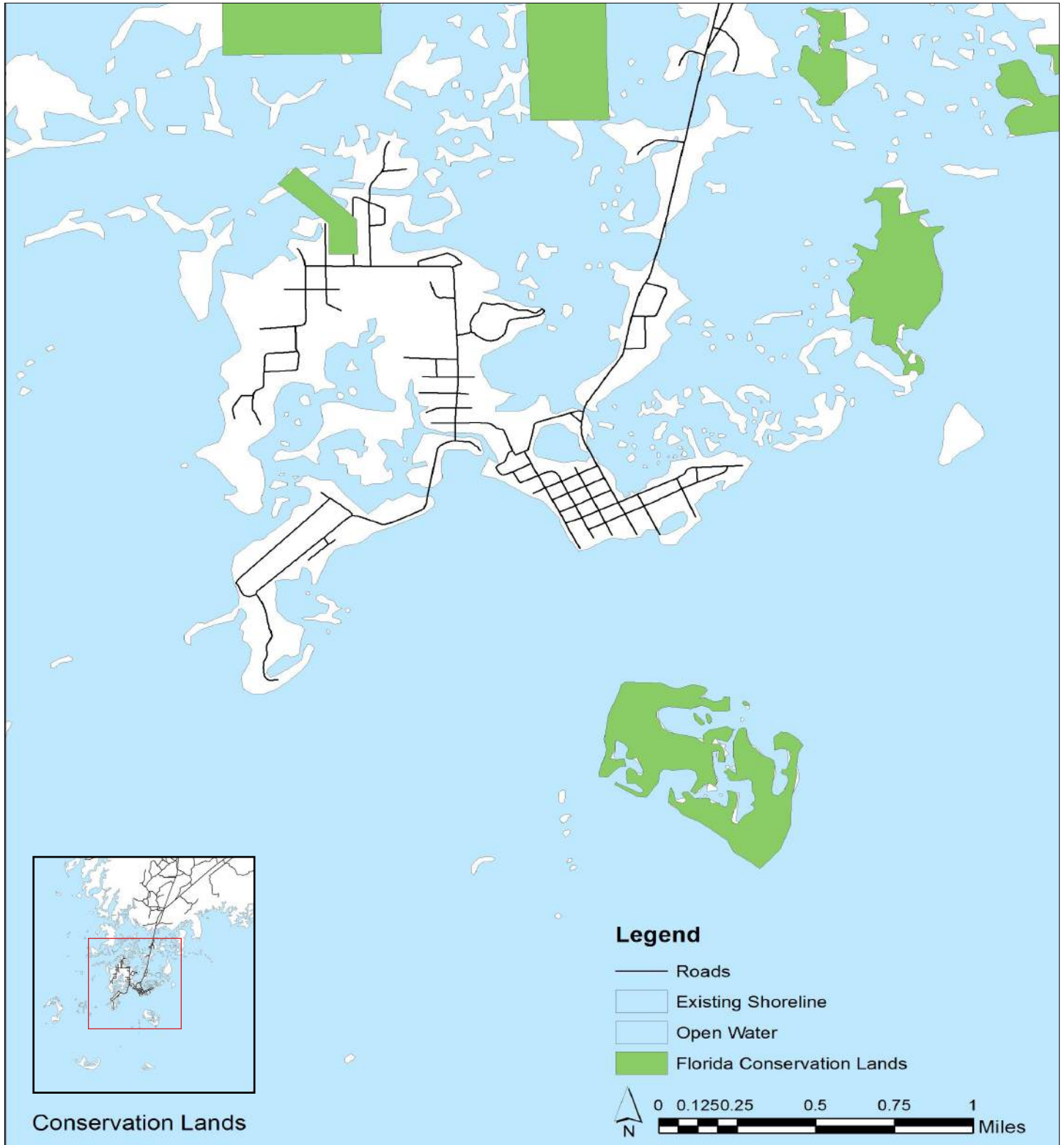


Figure 3.50

The Florida Natural Areas Inventory (FNAI) identifies Florida Managed Areas as land that contains natural resource value and is managed at least partly for conservation. Cedar Key's Nature Conservancy group manages a large portion of the conservation land in Cedar Key.



# METHODOLOGY

## Flood Zones - Study Area

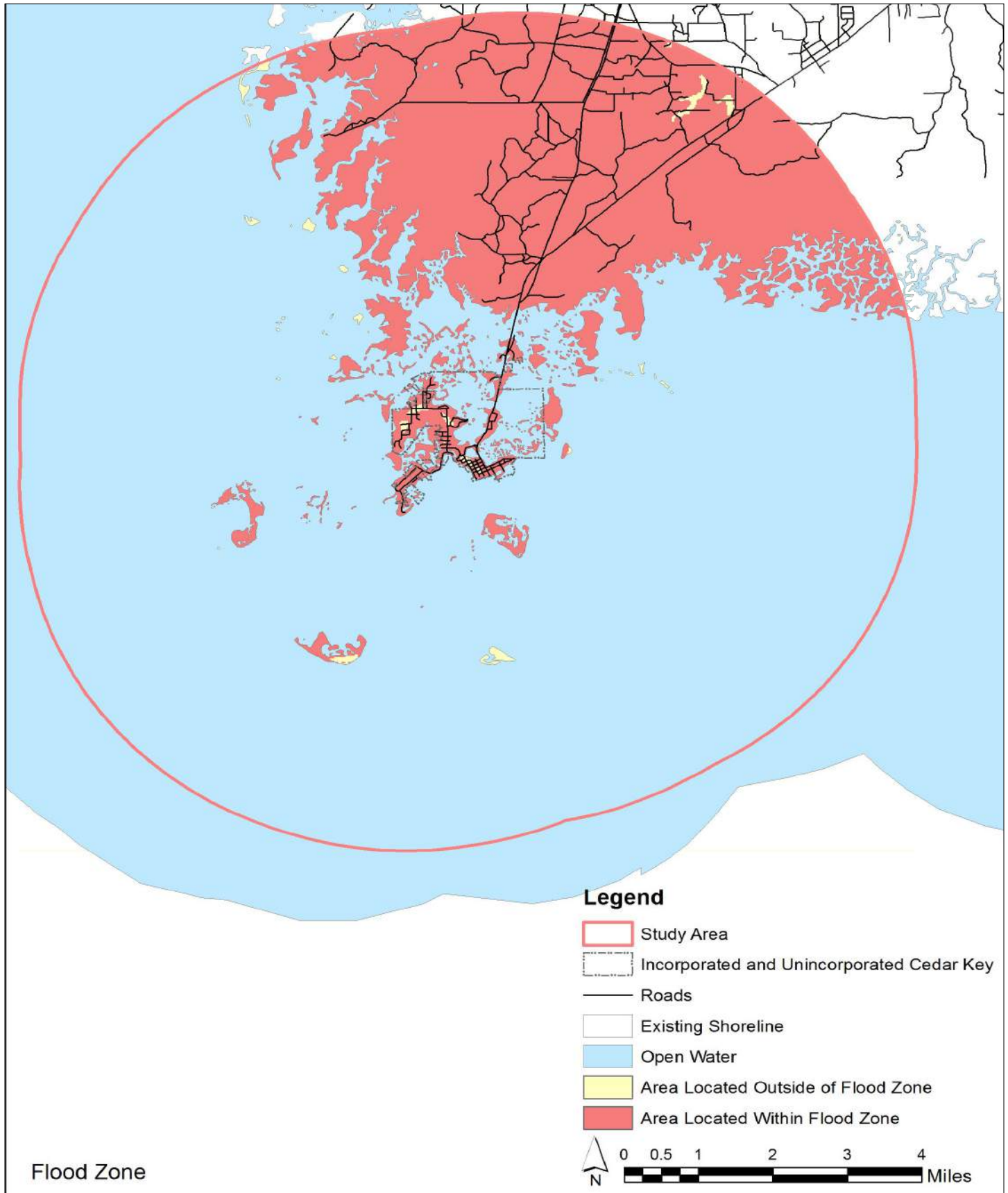


Figure 3.51



# METHODOLOGY

## Flood Zones - Cedar Key

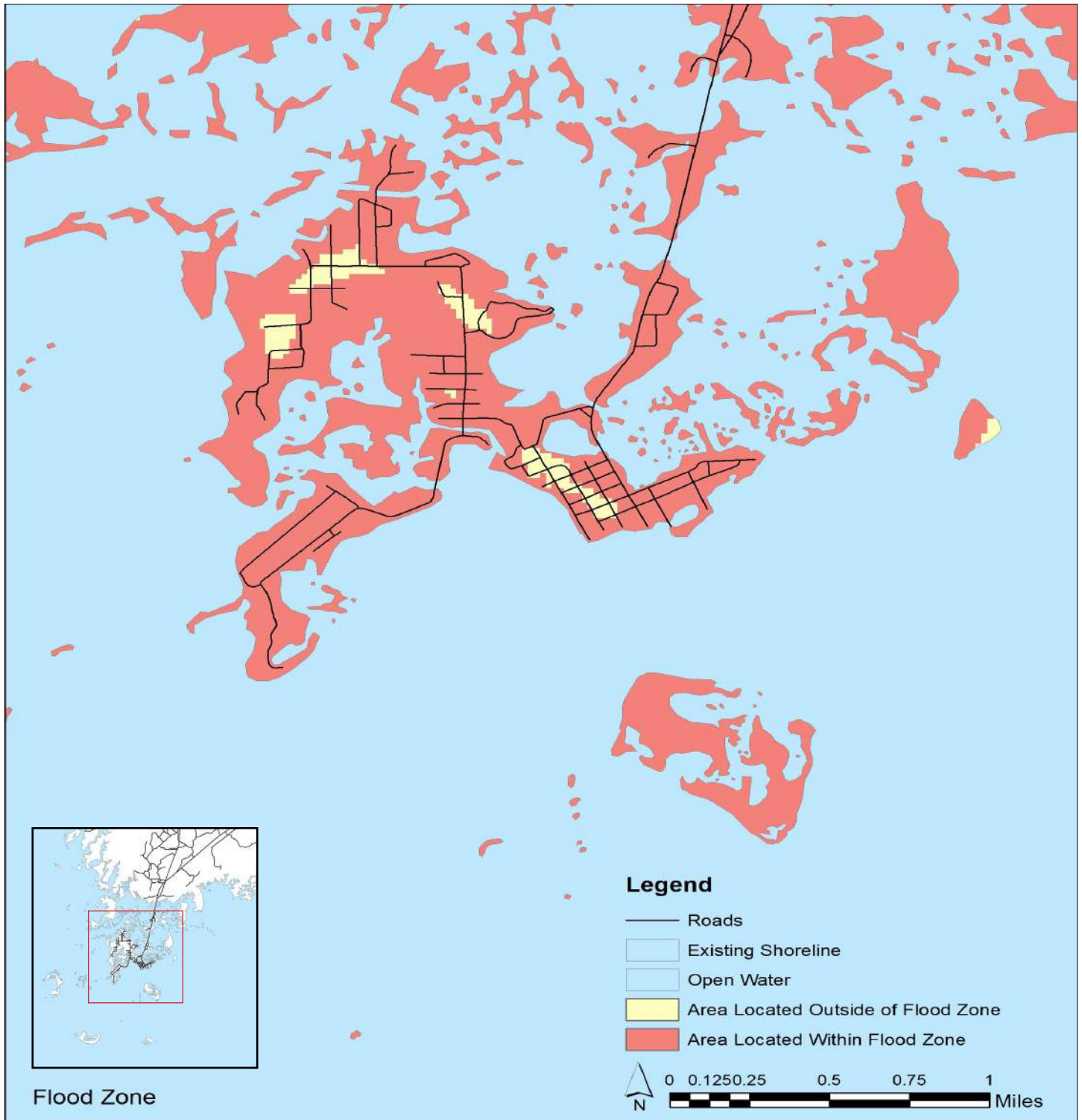


Figure 3.52

Flood zones are delineated by the Federal Emergency Management Agency (FEMA) and provide a digital representation of the approximate locations of Special Flood Hazard Areas (SFHA) and zones associated with possible inundation due to flooding. For the purposes of this study, 1% (100 year) and 0.2% (500 year) annual chance flood plain boundaries are observed. Due to the extent of the flood zone that Cedar Key is located in, this data set was not used in the final data overlay for adaptation strategies.



# METHODOLOGY

## Vacant and Non- Developed Parcels (Vector) - Study Area

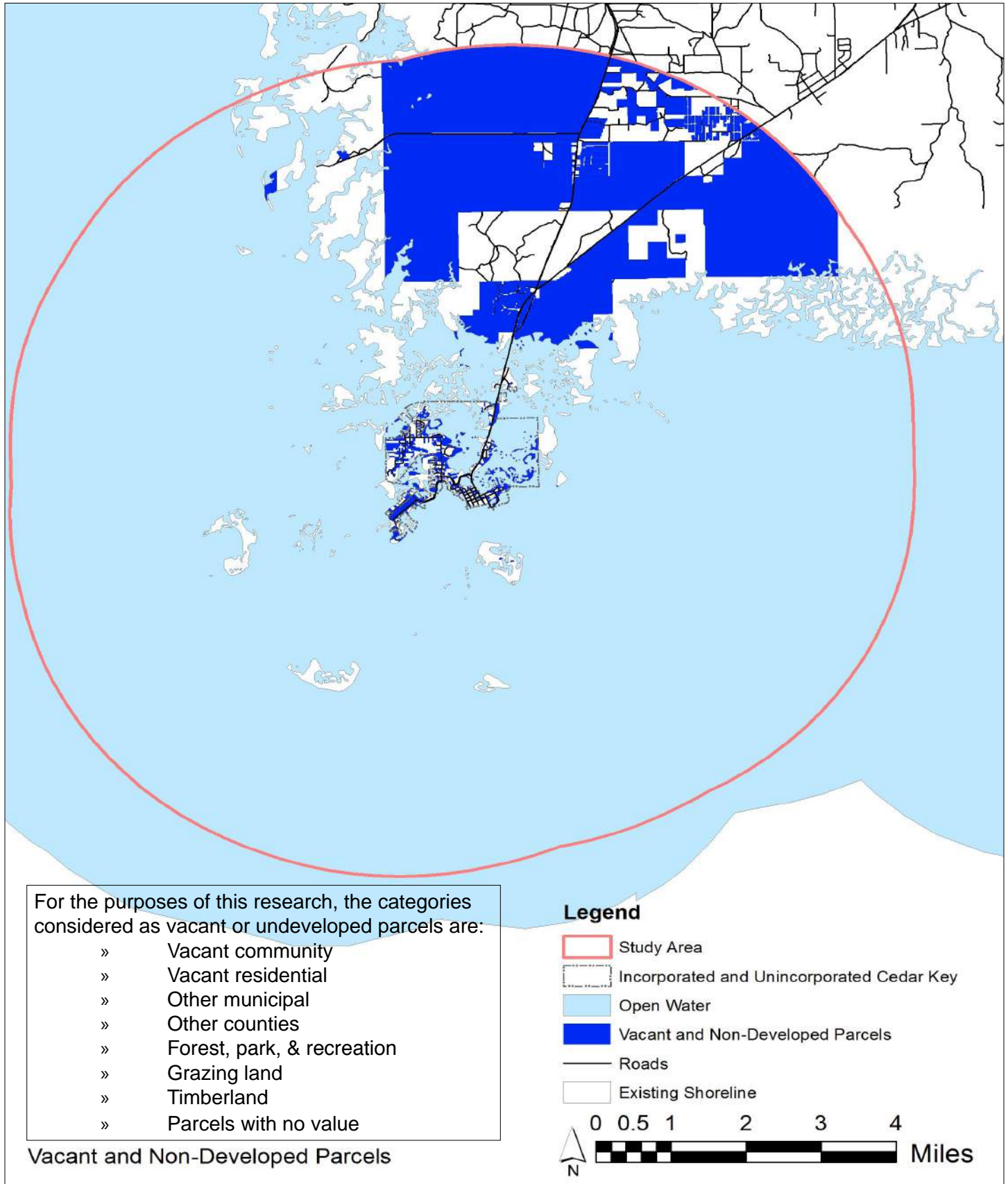


Figure 3.53



# METHODOLOGY

## Vacant and Non- Developed Parcels (Vector) - Cedar Key

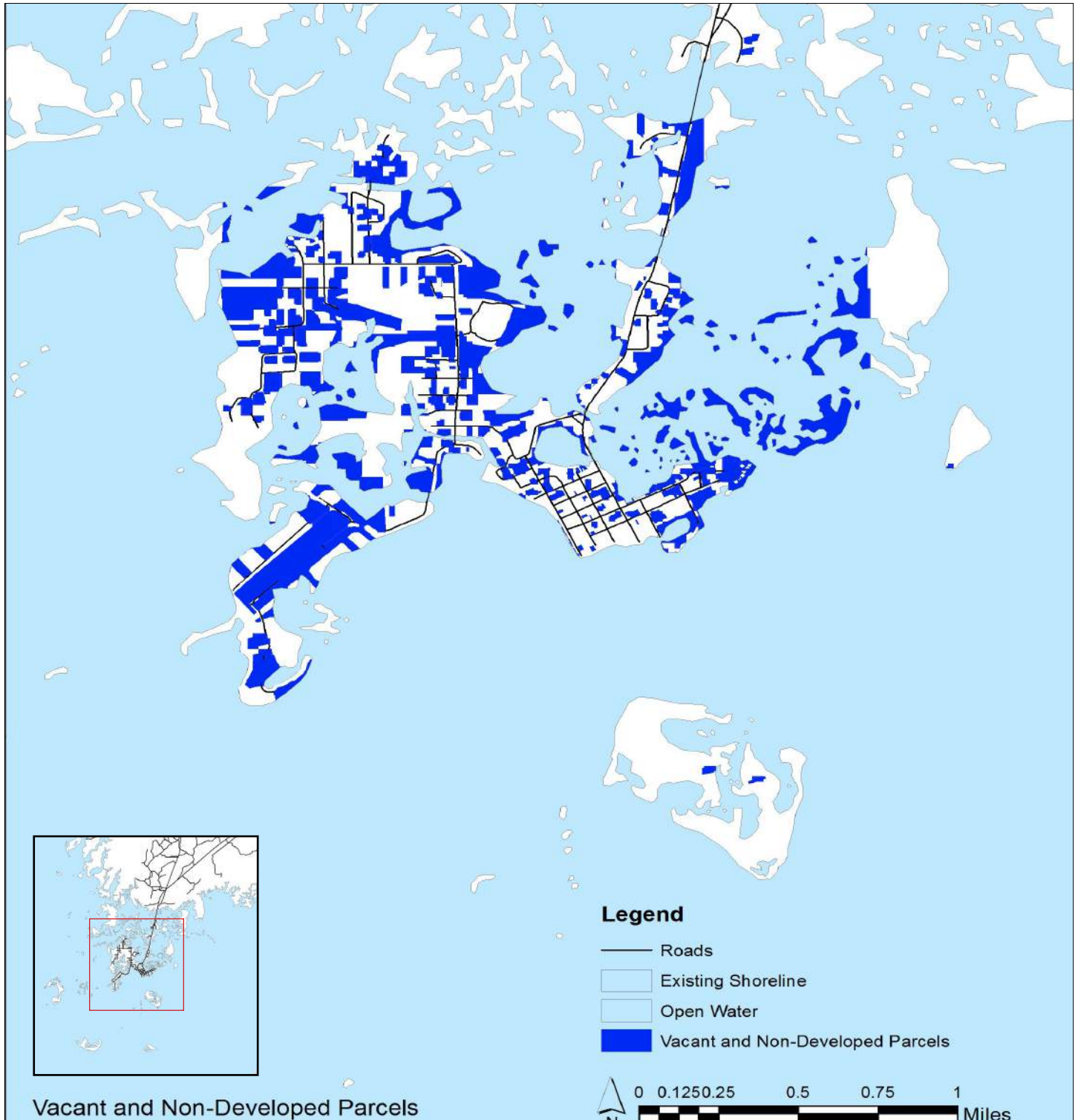


Figure 3.54

Noninundated, vacant and non developed parcels and greenfields were identified within Cedar Key and a surrounding five mile radius. Data may only display portions of vacant or non developed parcels such as on Atsena Otie Key. It is essential that the facilitator ground truths all data. Figure 3.53 and 3.54 are generated using vector data, unlike the other existing conditions maps shown in this chapter that use raster. Vector data was chosen because of its accuracy within parcel boundaries rather than cell based or raster data. Figure 3.55 and 3.56 display this same data in raster form for comparison.



# METHODOLOGY

## Vacant and Non- Developed Parcels (Raster) - Study Area

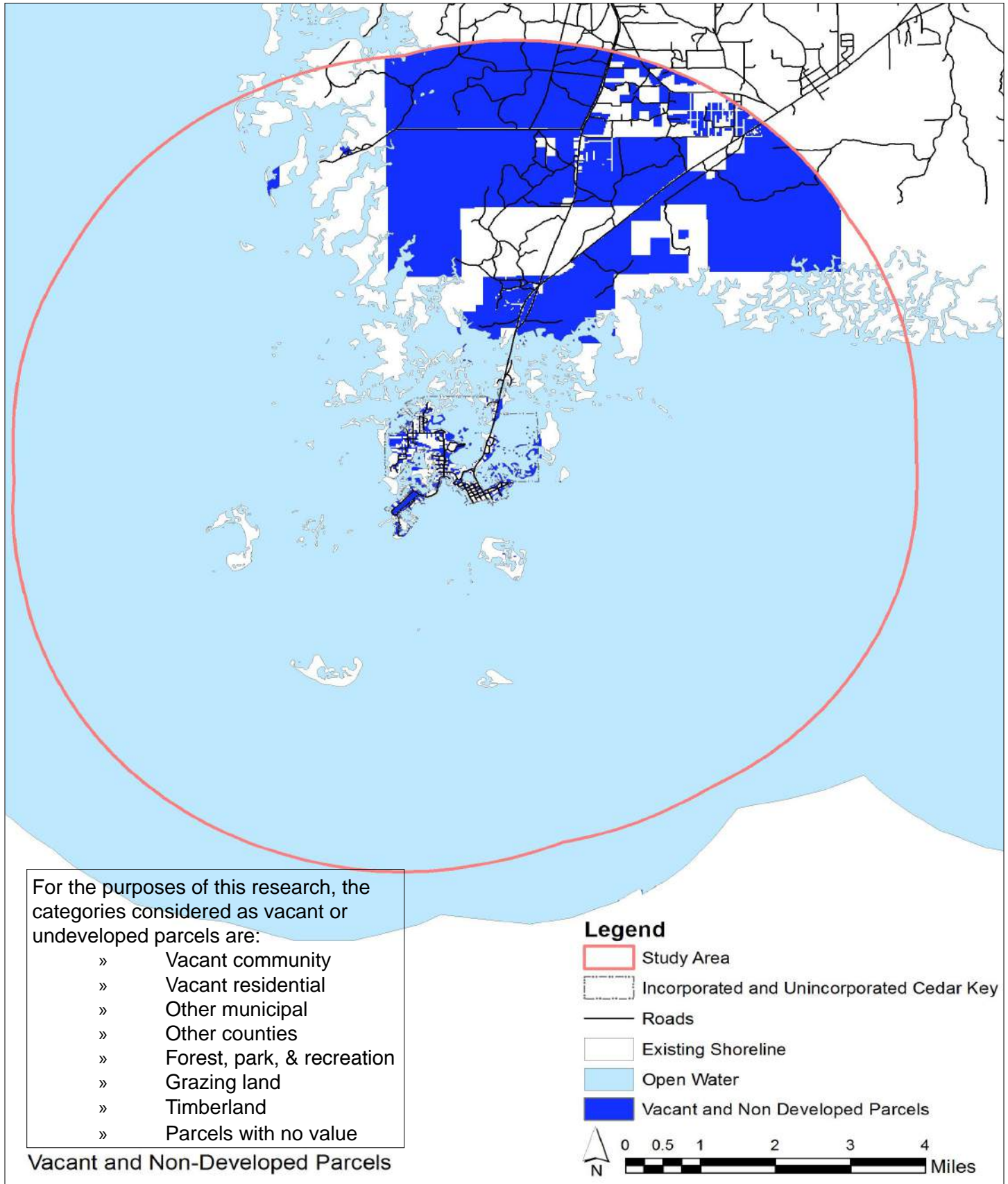


Figure 3.55





# METHODOLOGY

## Vacant and Non- Developed Parcels (Raster) - Cedar Key

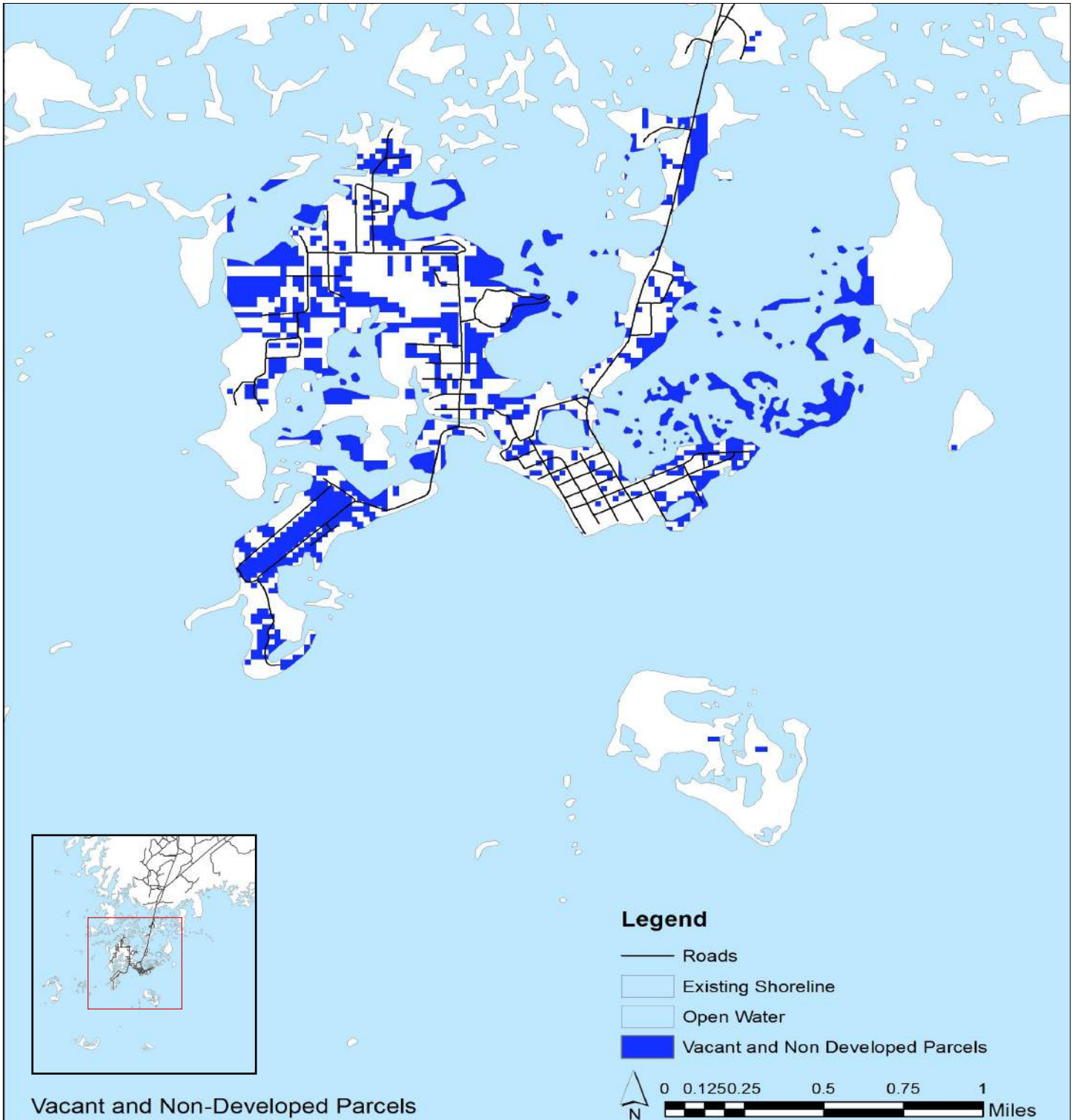


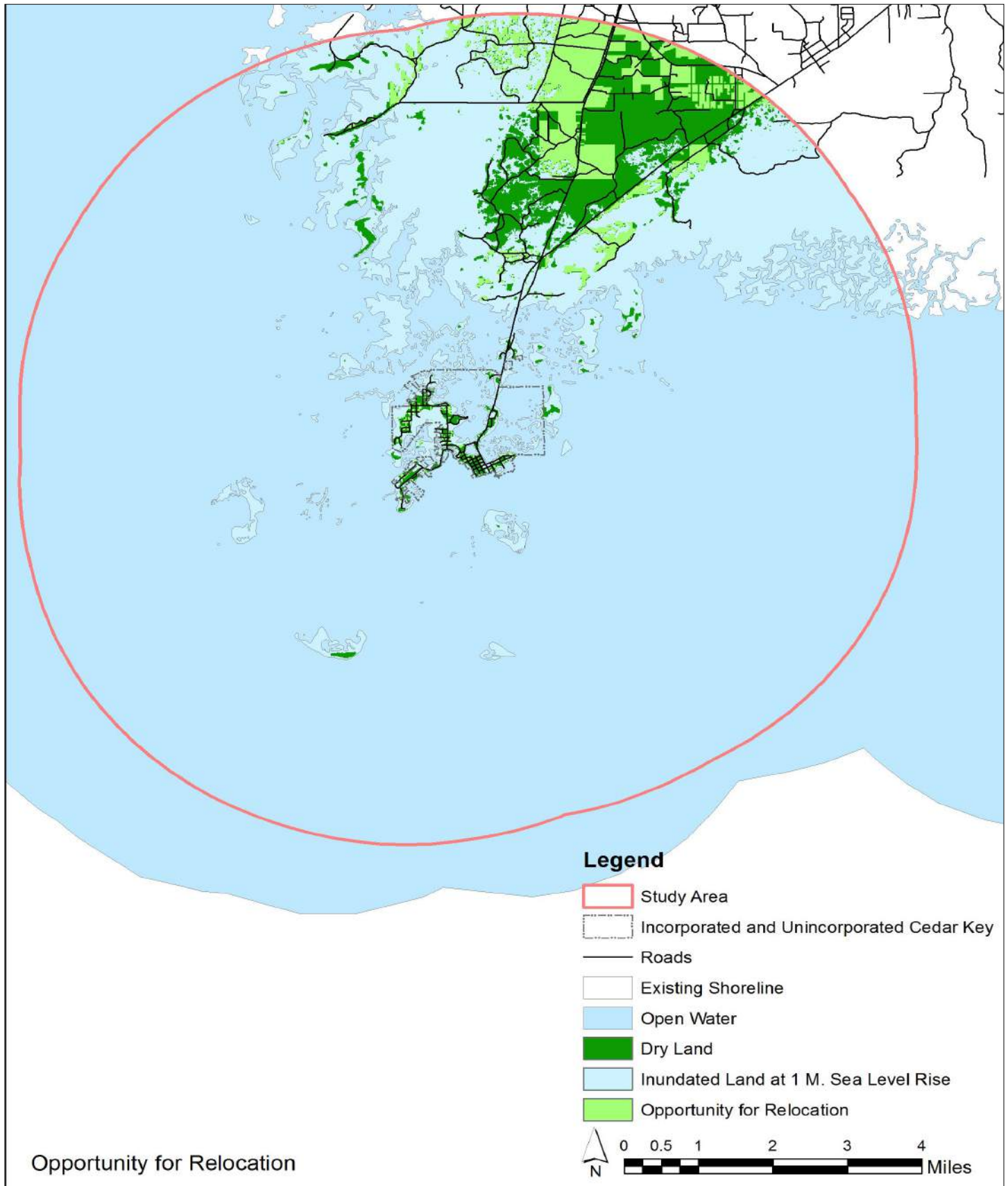
Figure 3.56

Raster data is displayed in figures 3.55 and 3.56 to provide comparison to the same maps generated using vector data in figures 3.53 and 3.54. It is essential that the facilitator of this study carefully examines the data format to assure the best possible accuracy is provided. The airport is highlighted in these maps as a vacant or non developed parcel; however, it is a developed and used space. Because the runway is a large stretch of land that in time has the opportunity for development, this area is listed here as undeveloped. Ground truthing data is also an essential task of the facilitator.



# METHODOLOGY

## Relocation Opportunities - Study Area



Opportunity for Relocation

Figure 3.57



# METHODOLOGY

## Relocation Opportunities - Cedar Key

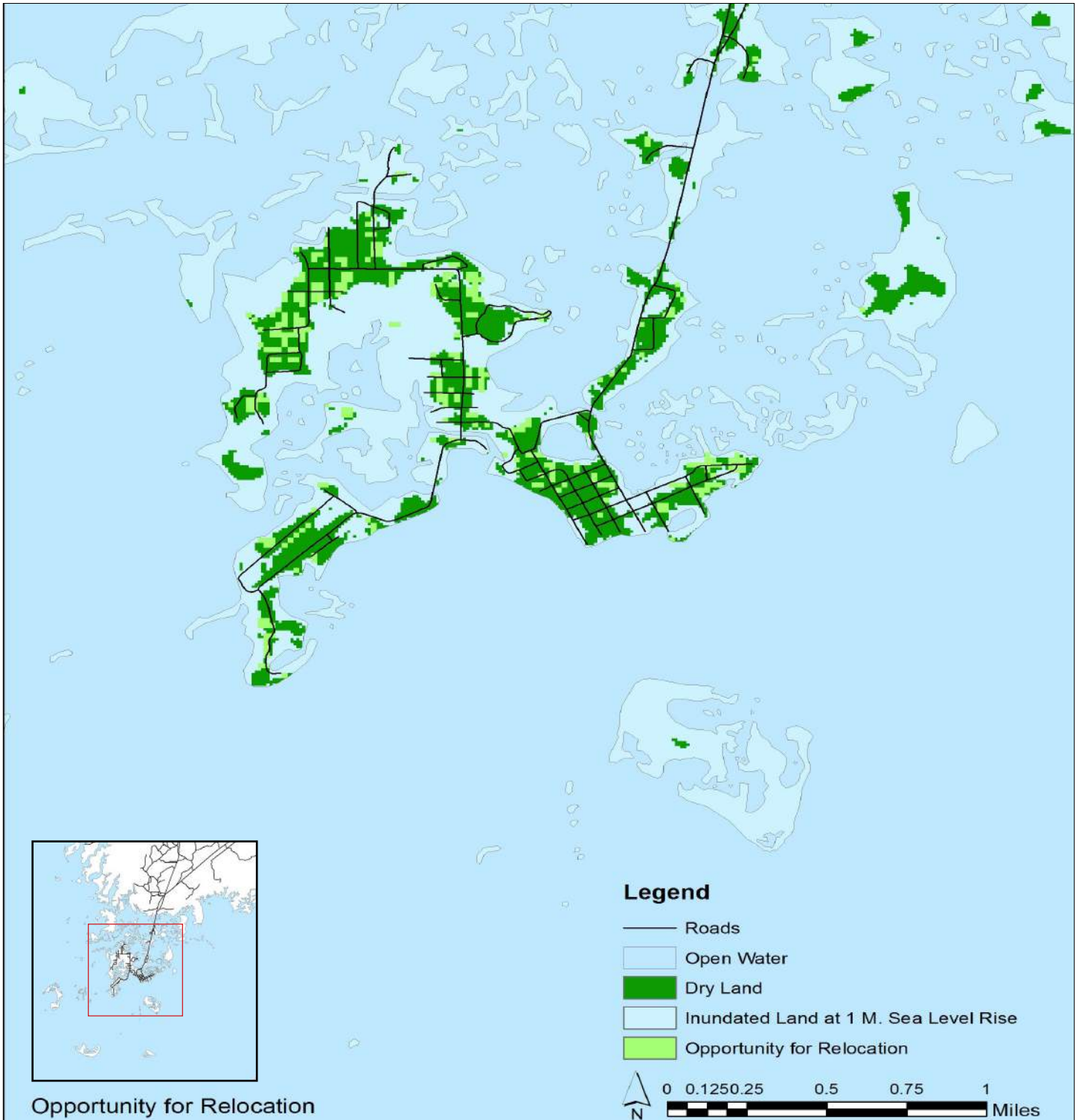


Figure 3.58

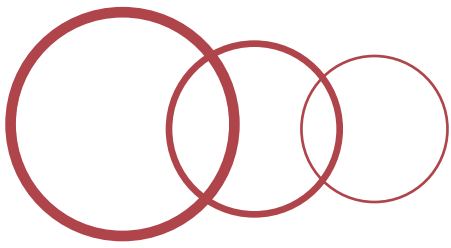
Using the data from the previous maps shown, an overlay analysis was done to determine the areas of no conflict. These areas are non-inundated, vacant or non-developed parcels that are not found within conservation lands or critical infrastructure. The highlighted parcels show opportunities for relocation to occur in Cedar Key. When adaptive planning measures are carried out, the indicated parcels should be considered for relocation opportunities.

# Chapter 4:

## Adaptation Strategies for the Evolution of Community Valued Spaces, Places, Activities, and Characteristics



“Cities have the capability of providing something for everybody, only because, and only when, they are created by everybody” – Jane Jacobs



# STRATEGIES

## The Vernacular Landscape

By seeking to carry out adaptive strategies in a way that is sensitive to their vernacular landscape, communities can maintain their way of life and cultural traditions. Adaptive strategies are proposed with the opportunity to maintain certain uses and functions in existing Cedar Key or to relocate these uses and functions upland. In order to illustrate the potential for relocation to occur in both of these areas, opportunities for the relocation of function and spaces are identified and annotated based on guiding principles and community needs. It is important to emphasize that decisions are not being made for the community nor are the proposed strategies a plan for Cedar Key. The suggested adaptive strategies simply display opportunities for the community that can be the basis for discussions about adaptive planning. The proposed adaptive strategies do not take into account economics and public policy as per the delimitations of this study. However, subsequent communities seeking to follow the methodology of this study should consider both of these factors in conjunction with the vernacular landscape.

## Adaptation Strategies for the Evolution of Community Valued Spaces, Places, Activities, and Characteristics

The integrated approach of community involvement and site specific analysis assures that the valued spaces, places, activities and characteristics of a community will not be lost in the planning process, but will be treated as a dynamic system that requires different treatments in different areas. Treatment is unique to the space, place, activity or characteristic that is being observed for adaptation, so there is no formula to fit them all, but suggestions can be made based upon the typologies specified below. Community input and on-site analysis from this study resulted in subsections that were further broken down according to the priorities of this study and assigned adaptive strategies as illustrated below. Six valued elements were chosen:

- » Green space
- » Downtown
- » Arts
- » Trails
- » Connectivity
- » Building typologies

## Spaces and Places

### Green Space

As a close knit community, parks and green space are used for gatherings in Cedar Key and as a means of connecting with nature, something that is highly valued by the residents. Parks identified in community outreach as valued by the residents of Cedar Key are (Figure 4.1):

- » Cemetery Point Park
- » City Park
- » Cedar Key Museum State Park



# STRATEGIES

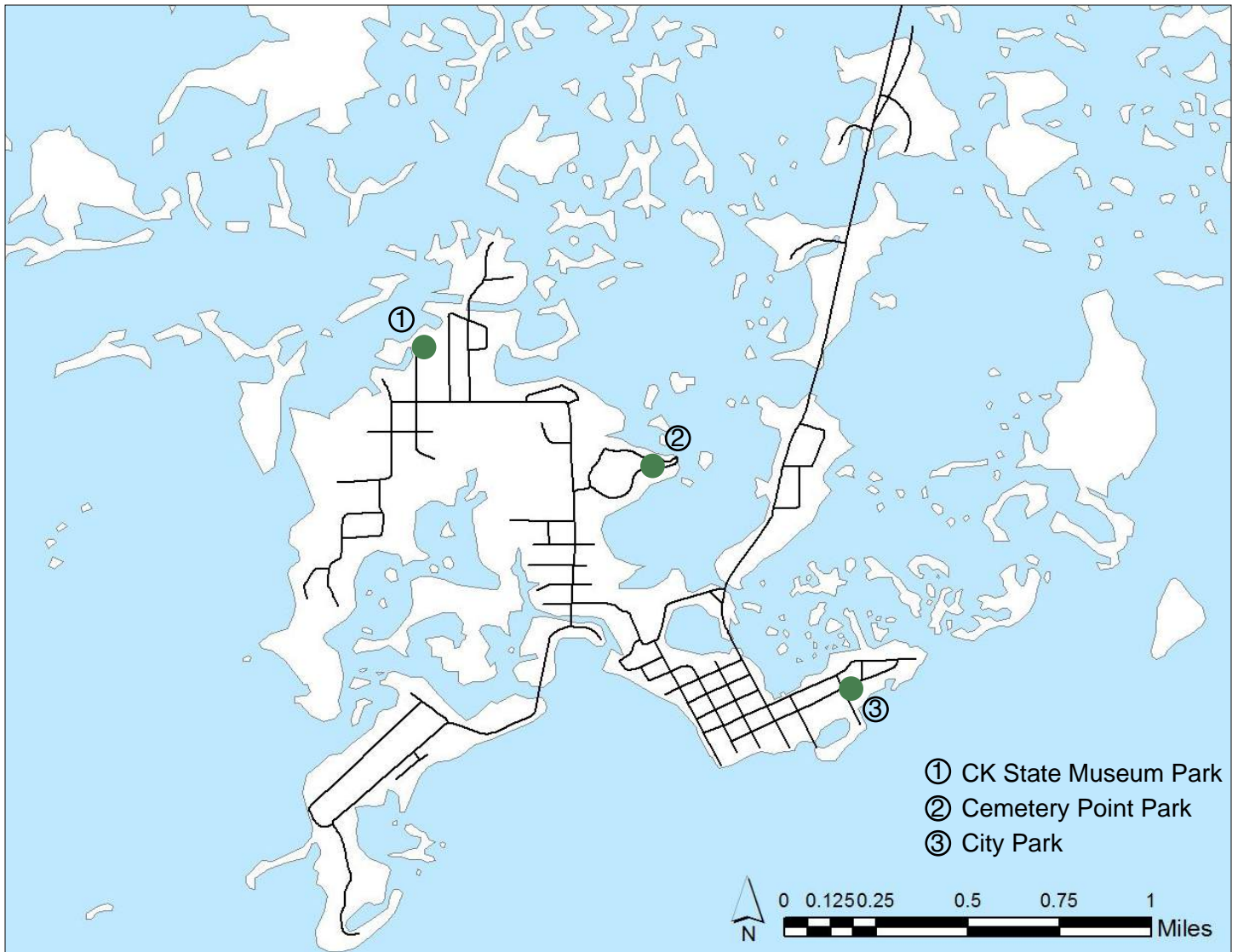


Figure 4.1 : Map of valued parks in Cedar Key as identified by residents

With a one meter rise in sea level, these valued parks will experience slight to severe inundation. This loss of green space should be accounted for in order to maintain the residents' ability to have outdoor gatherings and opportunities for connecting with nature. Where inundation is not too severe, the existing green spaces can remain where they are, surrendering a portion of their land to the sea, and expanding to adjacent parcels. Adjacent parcels should be identified based upon vacancy, parcel size, zoning, and ability of existing use for relocation. Based upon existing conditions, a one meter sea level rise projection, and the needs and values of the community, the green spaces identified as valued by the community are suggested to follow the adaptive strategies as shown in figures 4.5 and 4.6.

Road access, proximity to neighborhoods, safety, and connectivity to other green spaces are key considerations in planning for open space. Because Cedar Key is a fishing community, water and boat access play a dominant part in many of the open spaces. Highlighted in orange on figures 4.5 and 4.6 are options for locations for water access and recreational launch points to be considered in planning.



# STRATEGIES



Figure 4.2: (1) CK State Museum Park



Figure 4.3: (2) Cemetery Point Park



Figure 4.4: (3) City Park



# STRATEGIES

## Adaptation Strategies for Green Space - Cedar Key (Figure 4.5)

1. Water trail route allows for the connection to upland areas via boat.
2. An existing water trail located just North of Cedar Key provides the opportunity for a proposed connection from this trail to Cedar Key.
3. Water access opportunities are shown where land meets the sea due to inundation. Connections from terrestrial trails to water trails are made possible via these water access points allowing user to get in kayaks or canoes to continue their recreational experience. In areas where there is adequate space, a boat ramp may be provided for larger aquatic vehicles.
4. Green space opportunities are shown as “islands” that require boat transportation from Cedar Key. These islands may serve as recreational destination points for water trail and boat users. Connection opportunities are highlighted to display the potential for accessing several recreational islands along the delineated water trail. Public policy is beyond the scope of this study, however property rights and city code must be accounted for to determine the feasibility of this approach.
5. Currently, downtown Cedar Key is a very walkable area that is home to several historical buildings. Maintaining this same walkability, a terrestrial trail is proposed that takes users past all of the historical buildings and connects the downtown to other areas of Cedar Key via a trail. Green space opportunities are highlighted as destination and connection points for the historical trail. Water access opportunities are provided at the ends of this trail, enhancing its recreational and scenic abilities.
6. A water trail opportunity is sited so that users may experience the historical structures from the water. With a new shoreline, water trail users will be able to tour around the perimeter of the downtown and continue to green space and ecological destinations or dock at shore and see the historical buildings on land.

*Black text indicates information pertinent to green space; gray text is relevant to trails (Figure 4.24)*

### Further Considerations

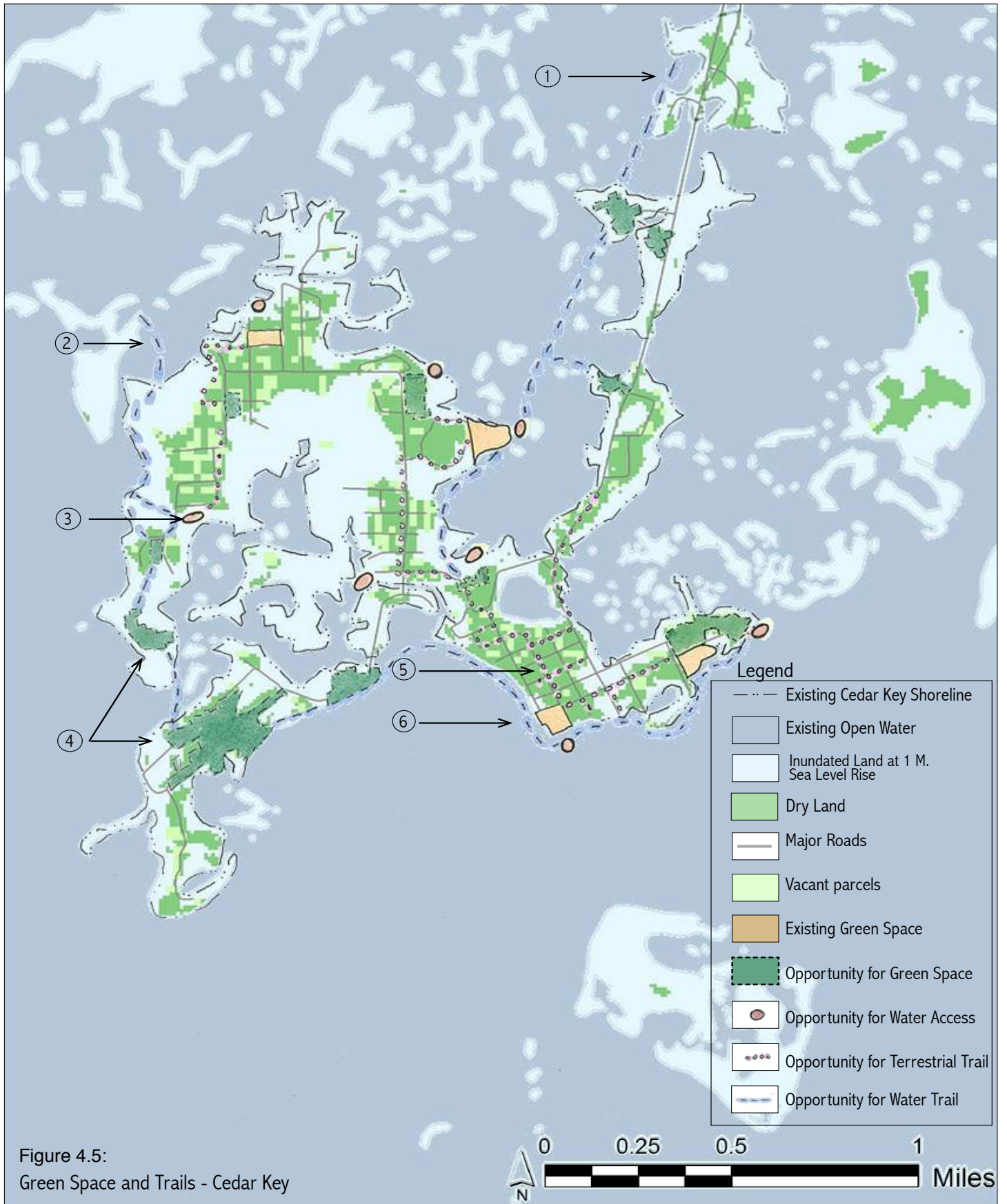
Highlighted opportunities suggest the formation of islands where road access is no longer feasible. If this approach is taken, will aquatic transportation such as a ferry be required in order to make these areas accessible to a more diverse group of users? How does the possible need for increased transportation fit into the financial feasibility of this approach?

In order to determine the demand for green space, a needs assessment should be carried out within Cedar Key and or Levy County. Providing ample green space is beneficial to the community and determining the amount required as well as program needs via a needs assessment can help further satisfy the community.





# STRATEGIES





# STRATEGIES

## Adaptation Strategies for Green Space - Upland (Figure 4.6)

1. An “urban” green space is proposed adjacent to an area of existing residential to serve the surrounding neighborhood. This proposed space is located between both of the highlighted opportunities for relocating downtown functions (Figure 4.13) or a “city center”. Allowing the open space to function alongside the urban environment encourages outdoor recreation and events. Green markets or annual festivals could be held in this space.
2. Green space is proposed in these vacant parcels to provide the opportunity for recreational destinations for existing and proposed trails. The opportunity for a terrestrial trail is shown as a connection between two ends of existing trails. This proposed connection will lead into one or several of the highlighted green spaces. These parcels are centrally located to the upland area and have ample space to serve multi purposes, as well as potential for use as community green spaces, such as a green market or public art exhibition space. Opportunities for green space do not take into account land value or property rights. Both of these factors must be accounted for to determine the most suitable and feasible parcel or parcels.
3. Green space that is located off of a road which is projected to be inundated or highly vulnerable in the face of sea level rise has the opportunity to serve as a recreational island or water trail destination. With a large amount of vacant land adjacent to this proposed green space, there is the opportunity for an outfitters shop or other recreational facility to accompany and enhance this green space. Another parcel with the opportunity to become a green space, or recreational island, is shown with a proposed water trail connection between the two green spaces that connects them back to land or an existing trail. Public policy is beyond the scope of this study, however property rights must be accounted for to determine the feasibility of this approach.
4. This connection allows for the opportunity to connect the upland water trail to Cedar Key. Trail users may have access to land or continue along in the water around the island.

*Black text indicates information pertinent to green space; gray text is relevant to trails (Figure 4.25)*

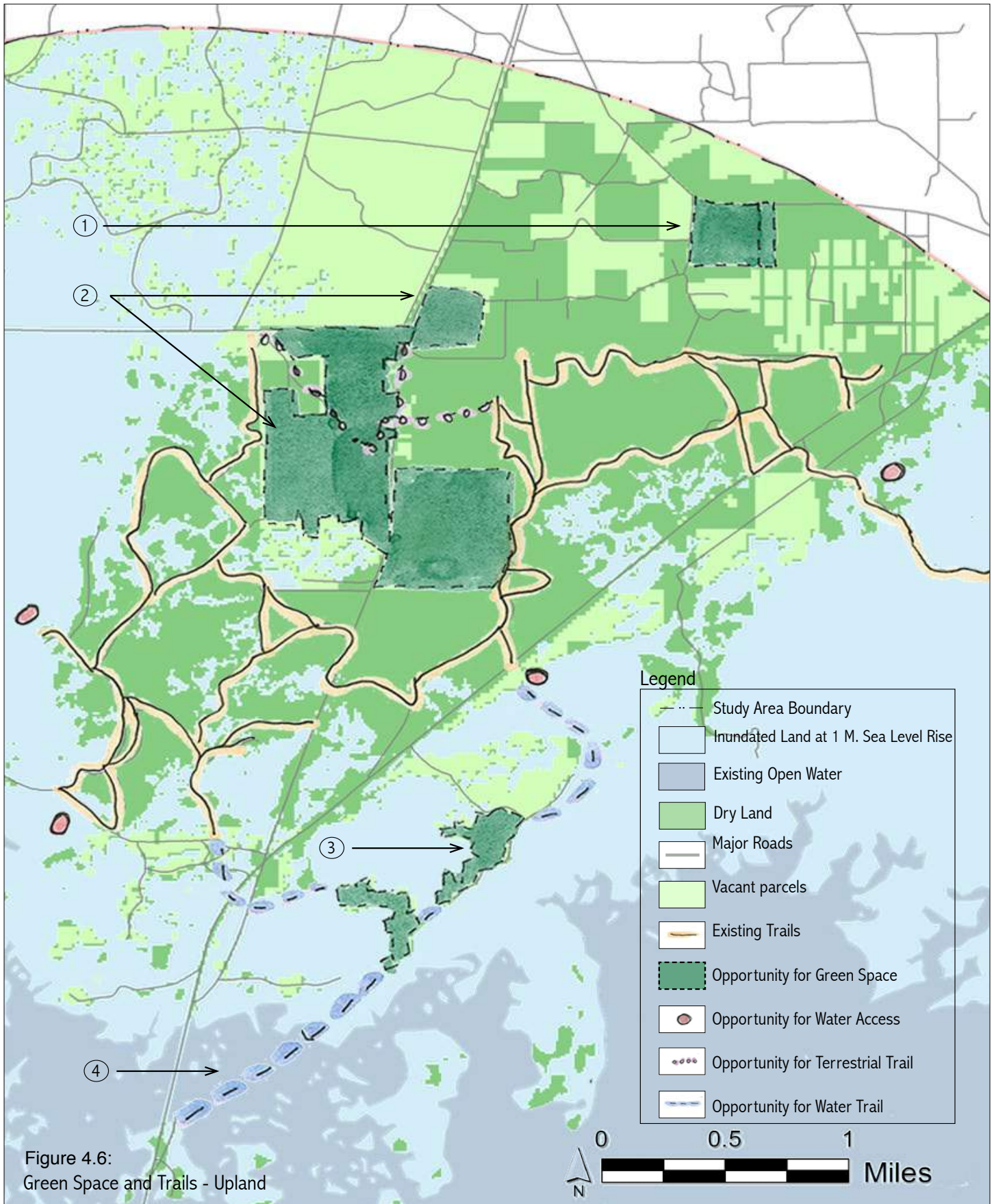
### Further Considerations

In order to determine the demand for green space, a needs assessment should be carried out within Cedar Key and or Levy County. Providing ample green space is beneficial to the community and determining the amount required as well as program needs via a needs assessment can help further satisfy the community.

Proposed water access points will require maintenance as well minor infrastructure to make them accessible to boats and other aquatic vehicles. A maintenance plan should be developed to further determine the feasibility of the highlight opportunities for water access. The type of infrastructure required and its cost should also be addressed in an economic study of this approach.



# STRATEGIES





# STRATEGIES

## Downtown

Cedar Key's downtown is approximately 1 square mile in size and comprises Cedar Key's Historic District. Historic buildings line the streets of the downtown and have been re-purposed as various shops. Iconic downtown Cedar Key locations are the community's library, City Hall, the Historic Museum, and the Cedar Key Arts Center. Residents favor their downtown for its pedestrian friendly environment, their relationships with the store owners, and the activity that occurs there. Ladies gather to quilt on the front porch of The Salty Needle Quilt Shop while others sit alongside on the other half of the porch enjoying coffee and pastries at Bake My Day, a local café. Community input informed the city's goals for their downtown which lead to the formation of design guide lines specific to the downtown of Cedar Key. The main goal for the adaptive strategies of the downtown was to maintain a cohesive and lively place with a variety of uses and a dominant pedestrian environment.

Guiding principles for downtown Cedar Key were adapted from the design guidelines of downtown Memphis (2013), Tennessee. The eclectic and unique nature of downtown Memphis is relevant to the characteristics of downtown Cedar Key and therefore has been used as a form of inspiration. Guiding principles have been amended and expanded upon to fit Cedar Key.

The following guiding principles are specified for downtown Memphis (2013):

- » Achieve excellence in design
- » Promote creativity
- » Design with authenticity
- » Design with consistency
- » Design for durability
- » Design for sustainability
- » Draw upon local design traditions
- » Honor the heritage of the city
- » Design to fit with the context
- » Enhance the public realm
- » Enhance the pedestrian experience
- » Provide signature open spaces
- » Keep the automobile subordinate
- » Celebrate the riverfront



# STRATEGIES

**Adaptive strategies for downtown Cedar Key were directed by the following guiding principles:**

## Design with Authenticity

Downtown Cedar Key clearly reflects the time period of its development. Construction techniques and style reflect a sense of authenticity, or specificity to their community, which can be seen in the materials and overall design. Two story, wood structures are typical of downtown Cedar Key. The building to street interaction of downtown Cedar Key allows for window shopping and sidewalk strolling with a road appropriate for golf carts and low speed vehicular traffic. Overhangs from the buildings provide a shaded pedestrian environment and are iconic of downtown Cedar Key. Current building styles and site layouts should be used as forms of inspiration when implementing new development in the existing downtown area. In instances where the current downtown functions must be relocated upland, these styles and layouts should be also used as inspiration but in a way that respects its surrounding context.

Ron Haase (1992), author of *Classic Cracker: Florida's Wood Frame-Architecture*, illustrates how the design of existing cracker homes can be adapted to current times and conditions (Figure 4.7). Existing forms are used as inspiration and expanded on to accommodate modern day household needs. These same principles can be applied to the existing vernacular architecture of Cedar Key.

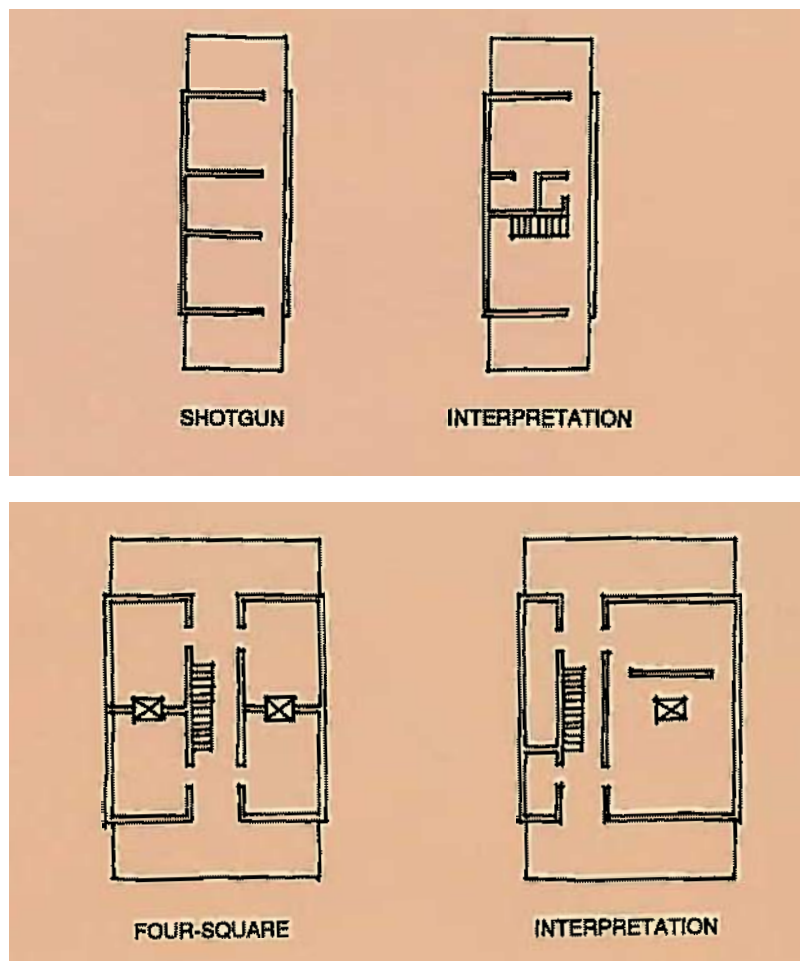


Figure 4.7: Ron Haase(1992) uses inspiration from existing cracker style architecture to provide modern day interpretations of their design and forms



# STRATEGIES

## Design with Consistency

Building scale, materials, design concept, and function are diverse throughout downtown Cedar Key. However, certain design elements remain consistent which provides a sense of cohesion. An example of this is the building overhangs (Figure 4.8) that provide coverage for the pedestrian environment. Although the buildings and or their function differ, a consistent sidewalk experience provides cohesion when walking down the street. As a historic district, many residents and visitors cherish the character of the downtown and the addition of unfitting buildings and or functions would disrupt this. Relocations of the downtown functions should look at the current or potential context for design principles in order to maintain a cohesive urban core. Relocations that occur in the existing downtown Cedar Key area should borrow principles and form inspiration from current downtown structures and landscapes while relocations that occur upland should look to existing development in those areas for their inspiration. Although architecture is beyond the scope of this study, it can be noted that contemporary architecture has the potential to coincide with historic structures if done so in a way that accent one another. Remaining true to the surroundings is essential in achieving a sense of cohesion.



Figure 4.8: Building overhang

## Design for Sustainability

Cultural, environmental, and economic sustainability is reflected in the current downtown Cedar Key. Sustainability is apparent in the materials, uses, location, walkability, and microclimate. Located centrally to the island of Cedar Key with wooden facade buildings, catering to a variety of needs, the downtown is livable and walkable place. A diverse mix of functions found within downtown Cedar Key allows residents and visitors to partake in multiple activities in one location. Relocations of the downtown functions should be carried out in close proximity to one another so that the same sense of walkability and multi functionality may be maintained. A sense of value for sustainability as it relates to the urban environment should be reflected when identifying and implementing adaptive strategies.

## Draw Upon Local Traditions

As the heart of the historic district and the community, downtown Cedar Key portrays the local traditions of the community. Two traditions that are iconic to the community and cherished by its residents and visitors are the annual Cedar Key Arts Festival and Cedar Key Seafood Festival. The Cedar Key Arts Festival is an annual gathering that exemplifies the artistic values of the community. Ample space for exhibits and art sales close to the downtown and the arts center are required for this event. The Cedar Key Seafood Festival is another annual gathering near the downtown area. This festival portrays the aquaculture industry that is essential to the community and its economic and social being. Adequate space is provided when identifying relocation opportunities so that the ability for traditions of this sort to continue to occur is maintained. Local traditions can also be found in the features, forms, and materials of the downtown. Traditional building methods are seen in buildings that have existed since Cedar Key's original time of development. These buildings have informed the style and forms of succeeding architecture as well. Continuing to use historic buildings and existing site layouts as forms of inspiration allow local traditions and techniques to be reflected in modern day interpretations.



Figure 4.9: Cedar Key Arts Festival



# STRATEGIES

## Honor the Heritage of the City

Beyond the scope of this study but pertinent to Cedar Key is the sufficient amount of historical buildings, sites, and elements that should be protected. Figure 4.10 illustrates the location of the historic structures in downtown Cedar Key. Where relocation opportunities are carried out, historic brick paving, site features, and building materials can be dismantled and reused. Allowing the history of the urban fabric to remain and be reused where appropriate is essential to maintaining the vernacular landscape. By preserving and honoring historical materials, the story of the community can live on.

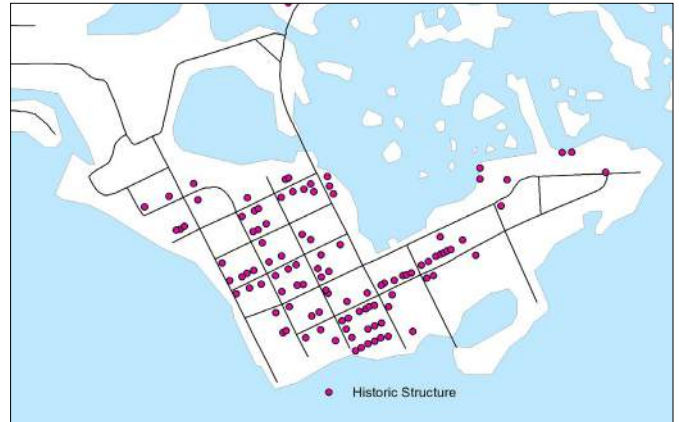


Figure 4.10: Map of historic structures in downtown CK

## Enhance the Pedestrian Experience

Pedestrians play the leading role in the downtown of Cedar Key, as well as most other areas in the community. A shaded walkway formed by building overhangs creates a pleasant pedestrian experience in downtown. Relocation opportunities identified in this study honor the pedestrian as the dominant force by noting the presence of or need for sidewalks and highlighting parcels in close proximity to one another to maintain a walkable environment. Walkability within and close to the downtown is highly valued by the residents as a means of easing the way of life of the community. Low speed limits and pedestrian oriented environments also drastically decrease vehicular use, providing for a healthier environment.

## Provide Signature Open Spaces

Open spaces and parks provide great opportunity for community interaction. These spaces also draw residents to the downtown area and allow them to interact outdoors with other members of their community. Natural and highly vegetated green spaces are characteristics of existing open spaces in Cedar Key. City Park is a highly frequented park located within walking distance from the existing downtown. The beach is also an iconic open space located near the downtown. Hardscape and courtyard style open spaces are sparse in Cedar Key however may be considered in future development. Relocations of downtown functions will be most beneficial when ample open space is provided and active use is encouraged.

## Incorporate Water Access

Unique to the city of Cedar Key is its location on the Gulf of Mexico. Currently, the downtown is located somewhat inland, away from the water but a waterfront shop, dine, and stroll environment is provided on Dock St. With inundation occurring on Dock St., the opportunity for water to be incorporated as a component of the downtown is identified. Water access is a unique feature that engages users and allows for a variety of uses to play into the downtown activities. There is a suggested water access point located within the downtown (Figure 4.24) to provide the opportunity for added recreation. When adaptive strategies are carried out in further detail, view sheds of water should be optimized with seating and open space alongside of it for user purposes. Pedestrian circulation and building positioning should be carried out in a way that celebrates the water.



# STRATEGIES

## Adaptation Strategies for Downtown Functions - Cedar Key (Figure 4.11)

1. Existing downtown functions and uses that are not inundated may remain where they are. Inundated and vulnerable areas of the existing downtown are shown in orange. These uses have the opportunity to move to the highlighted location located in the northern part of Cedar Key indicated in blue. This area is in close proximity to existing residential uses and has the framework for a structured grid of streets and parcel layout to match the existing downtown organization. Vacant parcels adjacent to this highlighted area provide the opportunity for more downtown uses and functions to relocate here as see fit or as growth is needed. The new shoreline allows for this area to have a downtown waterfront, adding to the character of the coastal community.
2. The opportunity to maintain the existing downtown Cedar Key in the area that it is now are highlighted here in blue. Inundated and vulnerable parcels at the southern end of the current downtown can relocate their uses and functions to the highlighted parcels in the northern part of Cedar Key's downtown. This opportunity allows for Cedar Key to maintain existing downtown uses in close proximity to their current location by redeveloping and adding infill in nearby vacant parcels.

## Further Considerations

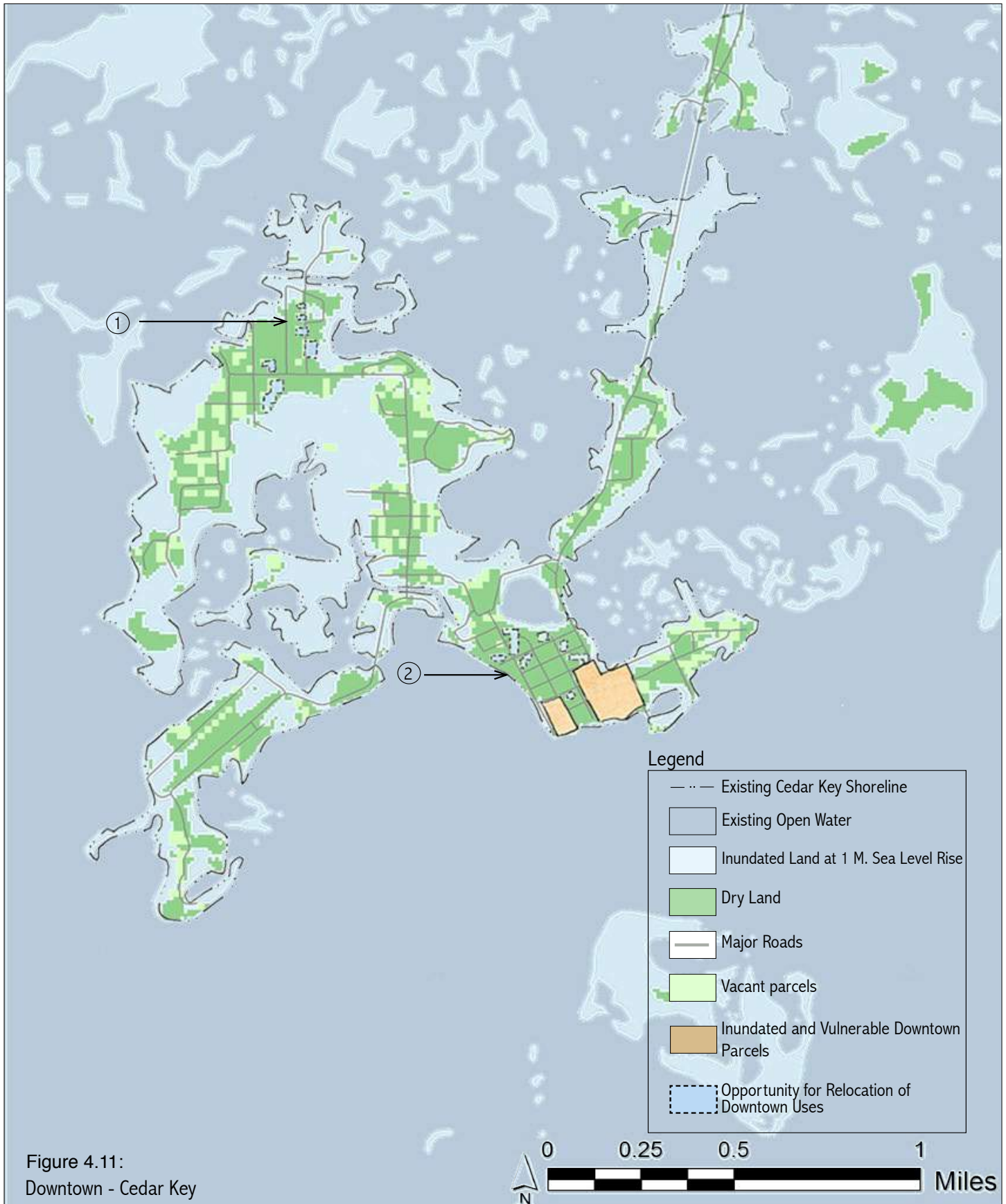
Opportunity number one is located in an area of existing residential development. The character in this area appears to be more rural with larger lot sizes creating a more private home environment. Will the residents in this area be receptive to developing a city center with commercial uses in this area? How will this effect their current lifestyle? Existing zoning and future landuse should also be looked at in this situation.

Highlighted in orange are inundated and vulnerable downtown parcels. These areas will allow for a new relationship of the downtown area with water access. How will this translate into the existing downtown and future uses?





# STRATEGIES

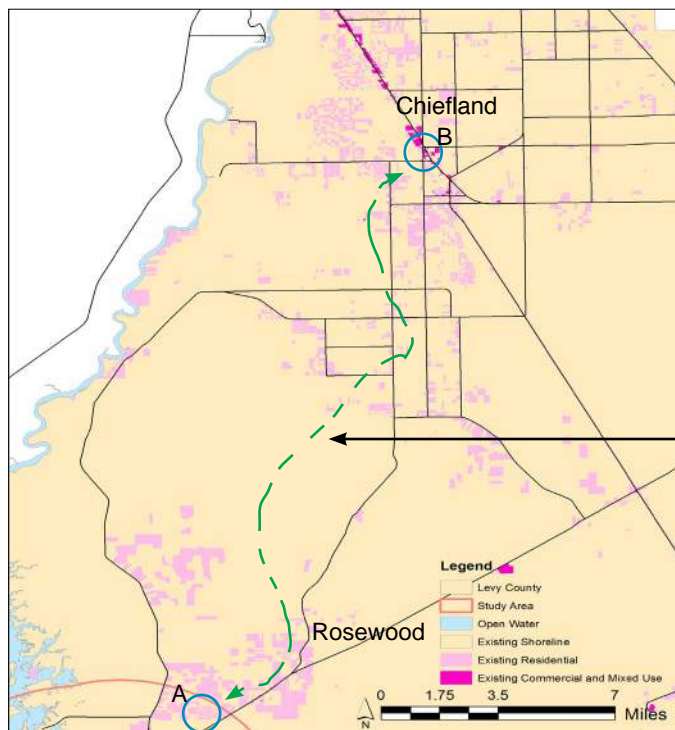




# STRATEGIES

## Adaptation Strategies for Downtown Functions - Upland (Figure 4.13)

1. A large, vacant parcel in proximity to a major road, S.R. 24, and existing residential development, provides the opportunity for the relocation of Cedar Key's downtown functions. This piece of land can be divided into multiple parcels to accommodate multiple uses and functions. Existing roads provide access from S.R. 24 into the proposed "city center". Adjacent, vacant parcels offer the opportunity for new commercial development to occur to extend the proposed city core or for residential development to occur for those that want to relocate from Cedar Key to the upland area and still maintain a lifestyle that is conducive to walkability.
2. Various vacant parcels in close proximity offer another opportunity for the relocation of Cedar Key's downtown functions. These parcels provide the ability to integrate multiple uses and functions in a close area. Existing roads also provide access to this area from S.R. 24. Existing residential development is highly concentrated in this area and just north of it which can be serviced by this proposed "city center". Currently, this area lacks a commercial or city center in close proximity. The closest area of high density commercial and mixed use functions is approximately 25 miles away (Figure 4.12). Developing a "city center" in this area provides the opportunity to create a unique environment for residents and tourists and serves as an economic driver for the community. Vacant parcels adjacent to this area afford the ability for the city center to grow if needed or residential development to occur for those that want to relocate from Cedar Key to the upland area. Walkability (Figure 5.27) has a very high potential in this area, allowing residents in the area to walk to the proposed city core from their own home or business. Due to projected shoreline, this area has the potential to become a water front "city center" in the future. Relocation opportunities for Cedar Key's downtown functions must take into account land value, property rights and size; however, these factors are beyond the scope of this study



### Further Considerations

The opportunities highlighted in blue on Figure 4.12 suggest the relocation of existing Cedar Key downtown functions to a new, upland "city center." How will a somewhat urbanized mixed use area fit in with this existing community in this area? Existing zoning and future land use should also be looked at in this situation.

Distance from proposed "city center" (A) and existing "city center" (B) is approx 25 mi.

A - Proposed location for relocation of downtown functions or "city center."

B- Existing high density commercial and mixed use development

Figure 4.12: The closest existing "city center" to the upland study area is approx. 25 mi. away



# STRATEGIES

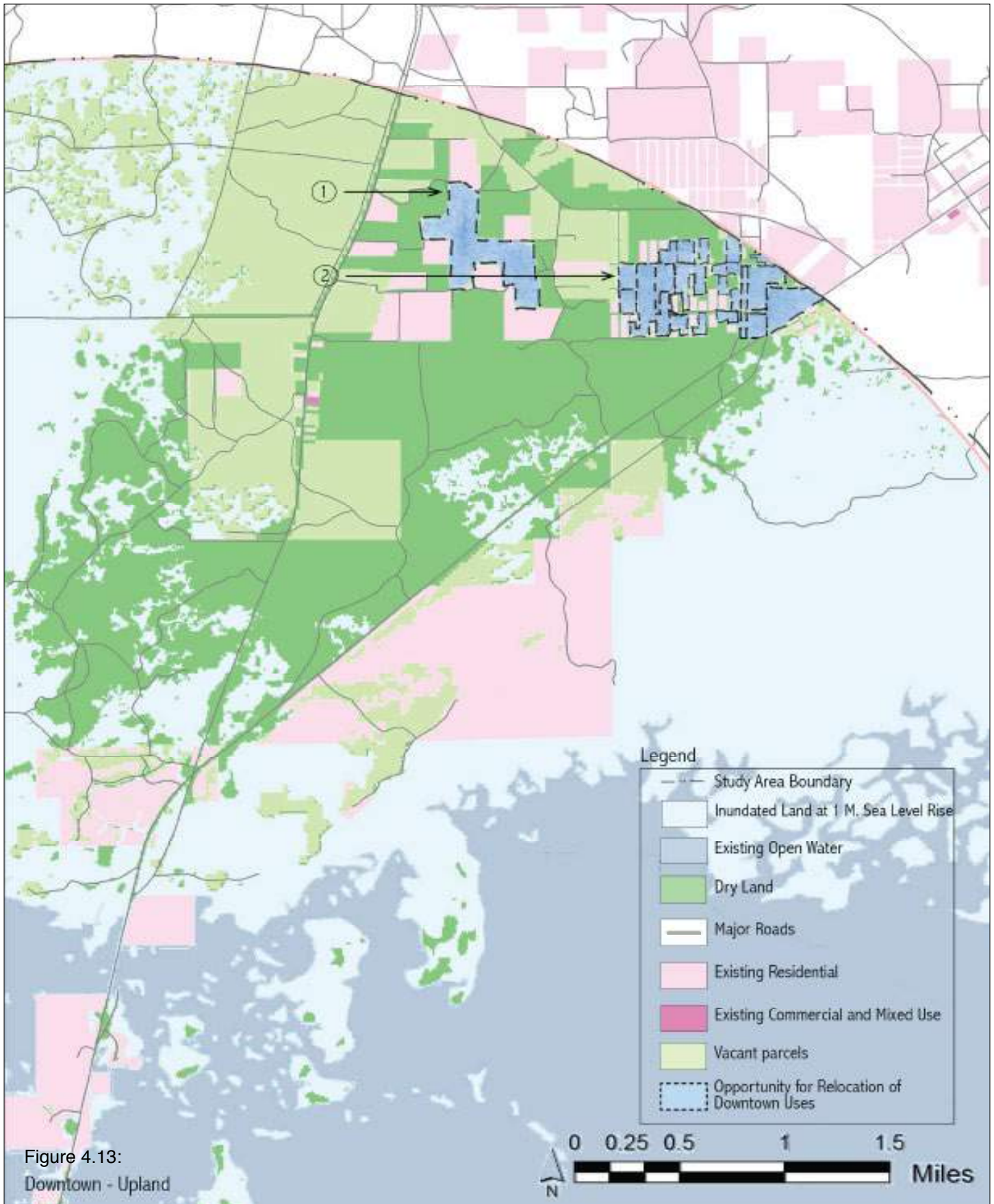


Figure 4.13:  
Downtown - Upland



# STRATEGIES

## Activities

### Arts

At the heart of a community is a unique quality that sets it apart from the rest. In Cedar Key, art is a strong element of their vernacular landscape. Artists congregate in a local co-op, sharing studio space and a gallery, called Cedar Key Arts Center. This building is located in the historical downtown area and is classified as a historical building, adding to its community value. Unfortunately, with a one meter sea level rise, the current location of the Arts Center will be inundated. Due to the high value of the center to the community and its role as an art staple in Cedar Key, it is essential that the function of the Cedar Key Arts Center be relocated. Currently, there is a pottery studio further upland off of S.R. 24 that may benefit from expanding its use into a larger art center to counteract the loss of the existing arts center downtown. However, residents of Cedar Key would still like to maintain an arts center on their island. Figures 4.15 and 4.16 display opportunities for relocation of the existing function of the Cedar Key Arts Center. The Cedar Key Arts Festival is an annual tradition that exhibits the work of local and other artists. The requirements needed to maintain the tradition of the festival are accounted for and opportunities for alternate locations are presented. Requirements for the festival were determined to be:

- » Proximity to arts center
- » Space for 150+ vendor booths
- » Adequate parking in close proximity
- » Park or green space for event food

Expanding on the current artist community found in Cedar Key, suggestions are made for the location of a work-live artist village. Local and visiting artists could rent studio space, with living quarters on top, as a means of enhancing the role of art in the community and providing another unique asset to the island. Opportunities for public art are shown indicating the potential for art pieces as a tool for “way finding” and making visual connections from the artists village to the arts center.



Figure 4.14: Cedar Key’s Annual Arts Festival



# STRATEGIES

Art can also be incorporated into the community through partnerships, education, and creative collaboration. Guiding principles specified below are suggested to be used for Cedar Key when expanding art in their community and community efforts.

Guiding principles for art in Cedar Key were adapted from the design guidelines of a policy brief on art and culture in communities carried out by The Urban Institute (Jackson, Herranz, & Kabwasa-Green, 2003). The information found in this brief is pertinent to the art and artistic values of Cedar Key and therefore has been used as a form of inspiration. Guiding principles have been amended and expanded upon to fit Cedar Key.

The following guiding principles are specified by the Urban Institute (2003):

- » Definitions depend on the values and realities of the community
- » Participation spans a wide range of actions, disciplines, and levels of expertise
- » Creative expression is infused with multiple meanings and purpose
- » Opportunities for participation rely on arts-specific and other resources

**Adaptive strategies for art in Cedar Key were directed by the following guiding principles:**

## Community values and realities are at the basis of what defines each art feature

Art in the community should represent community values by bringing them to life. Using community values as inspiration for art helps reinforce these unique values and makes them known to visitors. By living amongst aesthetic representations of values, the community becomes a more thriving environment.

## Participation and collaboration of community art reaches a broad spectrum of disciplines, actions, and level of expertise

Multiple disciplines should be incorporated in the collaboration of art. Although some artists and art forms works best when created by one individual, there should be a large amount of collaborative art to compliment this. By combining various disciplines and expertise, the art is more representative of the community as a whole and speaks to a greater audience. When people can take part in the making of or relate to art in their community, a sense of ownership is formed, and a greater cohesion is achieved.

## Expression via community art incorporates multiple meanings and purposes

Art has the ability to speak to people. By infusing meaning and purpose in art, the community is able to relate to and have conversations about the art. These meanings and purpose should support the community as a whole and compel people to better their community. Art can be used to drive home messages of environmental or cultural standpoints. Art is a great tool for advocacy in a community.

## Participation opportunities are driven by art, as well as alternate resources

Art should not be restricted to the materials or skills of its field, but should incorporate resources from outside disciplines. By having an intermixed set of resources, art is able to reach a greater audience and provide a wide range of meanings or benefits. Alternative resources can add cultural, environmental, and social benefits to the art and the community it is apart of.



# STRATEGIES

## Adaptation Strategies for Art Related Functions - Cedar Key (Figure 4.15)

1. The opportunity to relocate the function of the arts center amongst a proposed artist village is shown. All of the highlighted parcels provide the opportunity for an arts center or live-work studio space. Cedar Key's artists' village would allow local and visiting artists to live and work in the same space, adjacent to the arts center. Artwork can be shared and sold in the arts center co-op gallery. Artists could hold monthly exhibition nights where they showcase their art and their studios. These opportunities would enhance the art culture of Cedar Key and introduce a live work space environment to the community. The opportunity for the relocation of the Cedar Key Arts Festival is shown adjacent to the highlighted parcels so that the festival location can be maintained in proximity to the arts center.
2. Although the arts center must be relocated, the opportunity to have its function remain downtown Cedar Key is highlighted. The four highlighted parcels all serve as potential spots for the relocated arts center. The opportunity to keep the Cedar Key Arts Festival downtown is also highlighted, adjacent to the proposed parcels for the arts center. Allowing the arts festival to remain in front of the arts center allows the festival to interact with the artists and the co-op gallery in the same way as it does now.

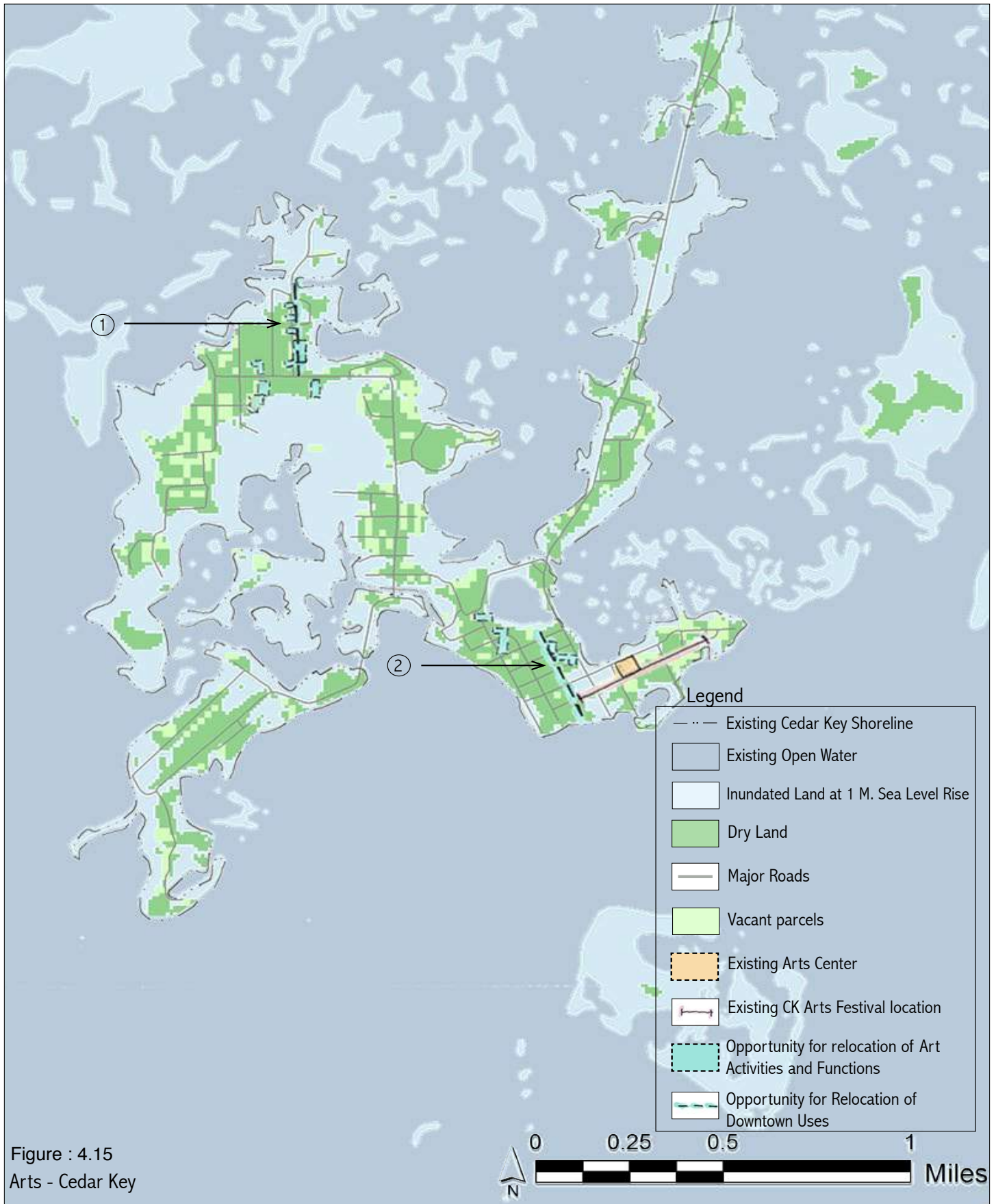
## Further Considerations

Introducing an artist village to Cedar Key will create a new dynamic in the community. Is this type of environment desired by the community or would they prefer to maintain existing housing prototypes that do not combine a work-live culture? Community feedback on the proposed strategies can assist in determining the community's thoughts on this idea.

With the need for the Cedar Key Arts Center to be relocated in the face of sea level rise, are there current unmet desires that could be addressed to further determine the most suitable location? A possible increased demand for gallery space or more artist studios could be considered in choosing a new location for the arts center. Parcel size and city codes should be addressed to determine the most suitable relocation area.



# STRATEGIES





# STRATEGIES

## Adaptation Strategies for Art Related Functions - Upland (Figure 4.16)

1. In close proximity to both of the highlighted opportunities for the relocation of Cedar Key's downtown functions, this group of vacant parcels has the opportunity to include an arts center that is in walking distance to the proposed "city centers". All of the highlighted parcels have potential to provide for an arts center based upon its current size. The highlighted parcels that are not used for the arts center have the ability to become an artist village. Having an artist village would enhance the culture of the arts in this area, embrace the arts of Cedar Key, and allow local and visiting artists to live and work in the same space while show casing their work at the local art center co-op.
2. The opportunity to relocate the Cedar Key Arts Festival is highlighted, allowing the festival to be located in close proximity to the proposed arts center or artist village. This location is based upon Cedar Key's current arts festival location that occurs in front of the Cedar Key Arts Center. Maintaining this relationship will allow the upland area to take on characteristics and attributes of Cedar Key's existing culture and activities.

## Further Considerations

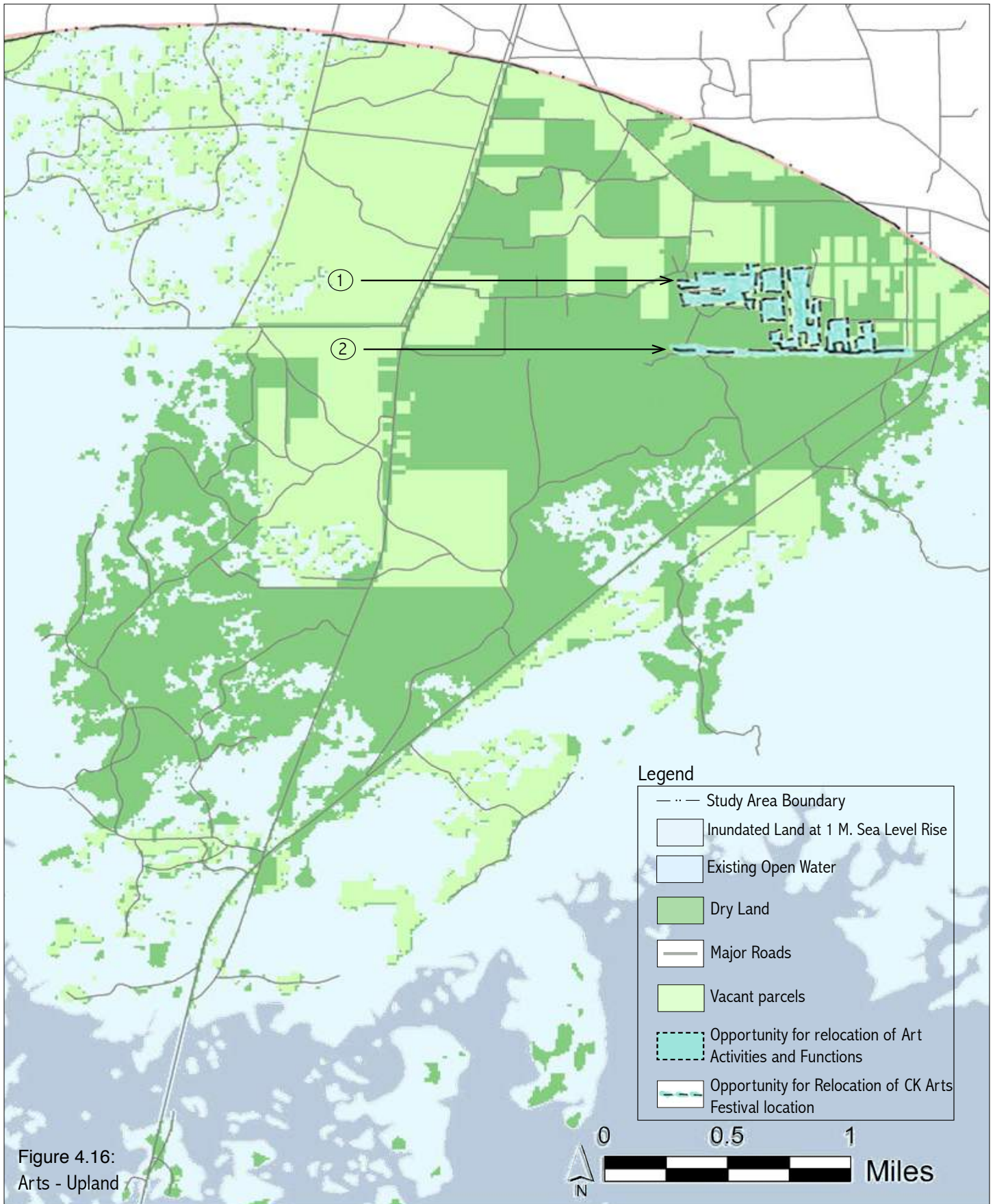
Introducing an artist village to the upland portion of the study area will create a new dynamic in the surrounding community. Is this type of environment desired by the community or would they prefer to maintain existing housing prototypes that do not combine a work- live culture? If artists are currently living in Cedar Key, would they want to relocate off of the island? Community feedback on the proposed strategies can assist in determining the community's thoughts on this idea.

With the need for the Cedar Key Arts Center to be relocated in the face of sea level rise, are there current unmet desires that could be addressed to further determine the most suitable location? A possible increased demand for gallery space or more artist studios could be considered in choosing a new location for the arts center. Is there a large enough demand for art and studio space that would make it feasible to have an arts center in Cedar Key as well as the upland area? Parcel size and city codes should be addressed to determine the most suitable relocation area.





# STRATEGIES





# STRATEGIES

## Activities

### Trails

Cedar Key Railroad Trestle Trail, Cemetery Point Trail, and Whitman Trail, along with trails as a whole, were identified as valued trails to the community of Cedar Key. Trails such as the Trestle Trail hold cultural and historical significance, adding to the vernacular landscape. Trestle Trail follows the 1861 rail line that ran from Fernandina Beach to Cedar Key. Remnants of old trestle posts still remain at the trail's end. Trails in Cedar Key offer lush, native vegetation and wild life sightings as well as a place to enjoy the tranquility of nature. These characteristics are valuable to the community and are accounted for when demonstrating opportunities for trail enhancements. Due to the strong role of golf carts in the community, they have been considered as a mode of transportation to be incorporated in trail design. The benefits of accommodating golf carts along side pedestrians on trails are allowing multi functionality to occur in one location and offering the same user experience to all types of recreational transportation. However, a safer and more serene environment is offered on trails that are inaccessible to golf carts.

Trail type defines the predominant surface type of a trail and its general mode of travel. According to the USDA Forest Service, there are three trail types: Terra, snow, and water trails. For the purposes of Cedar Key, the following types of trails were considered:

**Standard/Terra Trail** - A trail that has a predominant surface of the ground and is designed and managed to service ground travel. To add to this, a standard trail can be a paved trail which contains a paved surface and is designed and managed for various uses mechanized wheels (DCR, 2014). This type of trail is beneficial to Cedar Key as walking trails are a key component of the community's value activities. Due to the extensive use of golf carts in the community, a trail that allows for mechanized wheels is also advantageous.

**Water Trail** - A trail that has a predominant surface of water (but can include land portions as well) and is designed and managed to service water use. Currently, water trails exist around Cedar Key for kayaking and boating to exterior islands. Water trails allow for the integration of several valued activities: trails, kayaking, boating, fishing, and the engagement of nature. Delineating routes for enhanced water trails in Cedar Key increases the opportunity for aquatic recreation and creates connections to potential new "islands".

Other, more specific types of trails have been identified and considered for Cedar Key as well (DCR, 2014):

**Bikeways and Rail Trails** - A trail with a hard surface for multiple uses, but specifically for bike usage. These trails are a tool for connecting the community and providing a developed trail type experience. Currently, trails in Cedar Key are not fully conducive to bike riding so the addition of this trail type can increase recreation opportunities for the community and its visitors. Where possible, these types of trails can be made wide enough to also cater to golf carts.

**Historic Trails** - A trail that runs along or past historical and culturally significant features. Existing roads, sidewalks and walkways are typically included in the route of this trail type. Cedar



# STRATEGIES

Key's historic district provides the perfect opportunity for this type of trail as users can pass by historical buildings and continue on to the historical Cedar Key Cemetery, connecting to existing trails along the way. Historic sites are considered as destination opportunities for Cedar Key trails.

**Interpretive/Nature Trails** - A trail that is designed specifically for educational or cultural interpretation. Signage, brochures and other graphic and written information is included along this type of trail. With the extensive amount of native and coastal plant species found in Cedar Key, trails can be used to educate residents and visitors about the types of plants found in their community. This type of trail embraces the love of nature that so many residents of Cedar Key value.

**Accessible Trails** - A trail that is designed to enable an accessible trail opportunity. This type of trail is surfaced with materials necessary to make it accessible to all. Accessible trails are sited, sized and constructed for the purpose of accessibility. With a large amount of elderly residents in Cedar Key, providing accessible trails can encourage the elderly to interact with the outdoors and enjoy the trails alongside their family and friends. Accessible trails can also service golf carts due to the terrain.



Figure 4.17: Example of standard trail



Figure 4.18: Example of water trail



Figure 4.19: Example of biking trail



Figure 4.20: Downtown CK provides the opportunity for a historical trail



Figure 4.21: Example of interpretive trail signage



Figure 4.22: Example of accessible trail



# STRATEGIES

Trails play a strong role in connecting recreation to nature and conservation, all of which are identified values of Cedar Key. The above trail types can be combined to cater to multiple purposes and users. It is essential that trails are designed, re routed, and constructed in a way that is ecologically sensitive. The setting of a trail is very important as well as users seek certain experiences. A natural setting should allow the trail to be formed by natural limitations and opportunities. A more urban trail, such as a historical trail through the downtown, should emphasize local landmarks and encourage a more social atmosphere. The following guiding principles are suggested to be used for Cedar Key:

Guiding principles for trails in Cedar Key were adapted from the Trails Guidelines and Best Practices Manual of Massachusetts' Department of Conservation and Recreation (DCR, 2014). The general information found in this manual is applicable to the trails of Cedar Key and therefore has been used as a form of inspiration. Their guidelines have been amended and expanded upon to fit Cedar Key.

The following guiding principles are specified by Massachusetts' Department of Conservation and Recreation:

- » Avoid Sensitive Ecological Areas
- » Develop Trails in Areas Already Influenced by Human Activity
- » Provide Buffers to Protect Sensitive Ecological and Hydrologic Systems
- » Develop Appropriately when Trails Do Intersect with Sensitive Areas
- » Use Natural Infiltration and Best Practices for Stormwater Management
- » Limit tread erosion through design and construction
- » Provide Ongoing Stewardship of the Trails
- » Ensure Trails Remain Sustainable
- » Formally Decommission and Restore Unsustainable Trail Corridors



Figure 4.23: Trestle Trail



# STRATEGIES

**Adaptive strategies for trails in Cedar Key were directed by the following guiding principles:**

## **Avoid Ecologically Sensitive Areas**

Development, re-location, and maintenance of trails should be carried out in a way that is sensitive to the ecological systems around it. If the ecologically sensitive area cannot be fully avoided, the path that causes the most minimal impacts should be chosen. Ecological systems in Cedar Key include wetlands, conservation areas, cultural and historic resources, public water supplies, and natural communities.

## **Located in Areas Influenced by Human Activity**

Areas that are currently or previously influenced by human activity provide an accessible and creative trail opportunity. Existing trails in Cedar Key can be enhanced to provide new experience opportunities. Abandoned railroad corridors, as enhanced by Trestle Trail, or historic roads and buildings, such as Second Street, can provide a cultural setting for new or relocated trails.

## **Provide Adjacent Use Buffer for Ecological and Hydrological Systems**

Trails should maintain a buffer to the adjacent use if it is an ecologically sensitive area or part of a hydrological system. A buffer allows for ecological diversity and habitat value. Buffers can provide other benefits such as soil compaction, erosion control, and water management. Trails should not cause habitat fragmentation. Recommended width of buffers for Cedar Key is between 50 – 200 feet, and varies depending up trail site conditions.

## **Connect Users to Destination**

Trails should lead users to an appealing destination. A destination does not have to be a built structure but can be a viewshed or vista. Historic sites and features such as Cedar Key's historic district and its buildings as well as the historical cemetery are shown as opportunities for trail destinations and settings. Water features such as the Gulf of Mexico and Back Bayou are also highlighted as opportunities for trail destinations. Landforms and facilities can also considered as trail destination spots or stops.

## **Maintain Viewsheds**

To keep the user engaged and to add to their desired experience, proposed trail opportunities take advantage of surrounding viewsheds and vistas. Due to the lush and native species of Cedar Key, vegetation may get in the way of views in which case proper vegetation management should be carried out to avoid or lessen the degree of conflict. Main views considered in Cedar Key are the Gulf of Mexico, spots visible for sunsets, natural marsh and wetlands, and ecological habitat.



# STRATEGIES

## Adaptation Strategies for Trails - Cedar Key (Figure 4.24)

1. Water trail route allows for the connection to upland areas via boat.
2. This proposed connection shows the opportunity to connect Cedar Key to an existing water trail located just North of Cedar Key via a water trail. Users can travel via water to get from the island to areas upland.
3. Water access opportunities are shown where land meets the sea due to inundation. Connections from terrestrial trails to water trails are made possible via these water access points allowing user to get in kayaks or canoes to continue their recreational experience. In areas where there is adequate space, a boat ramp may be provided for larger aquatic vehicles.
4. Green space opportunities are shown as “islands” that require boat transportation from Cedar Key. These islands may serve as recreational destination points for water trail and boat users. Connection opportunities are highlighted to display the potential for accessing several recreational islands along the delineated water trail. Public policy is beyond the scope of this study, however property rights and city code must be accounted for to determine the feasibility of this approach.
5. Currently, downtown Cedar Key is a very walkable area that is home to several historical buildings. Maintaining this same walkability, a terrestrial trail is proposed that takes users past all of the historical buildings and connects the downtown to other areas of Cedar Key via a trail. Green space opportunities are highlighted as destination and connection points for the historical trail. Water access opportunities are provided at the ends of this trail, enhancing its recreational and scenic abilities.
6. A water trail opportunity is sited so that users may experience the historical structures from the water. With a new shoreline, water trail users will be able to tour around the perimeter of the downtown and continue to green space and ecological destinations or dock at shore and see the historical buildings on land.

*Black text indicates information pertinent to trails; gray text is relevant to green space (Figure 4.5)*

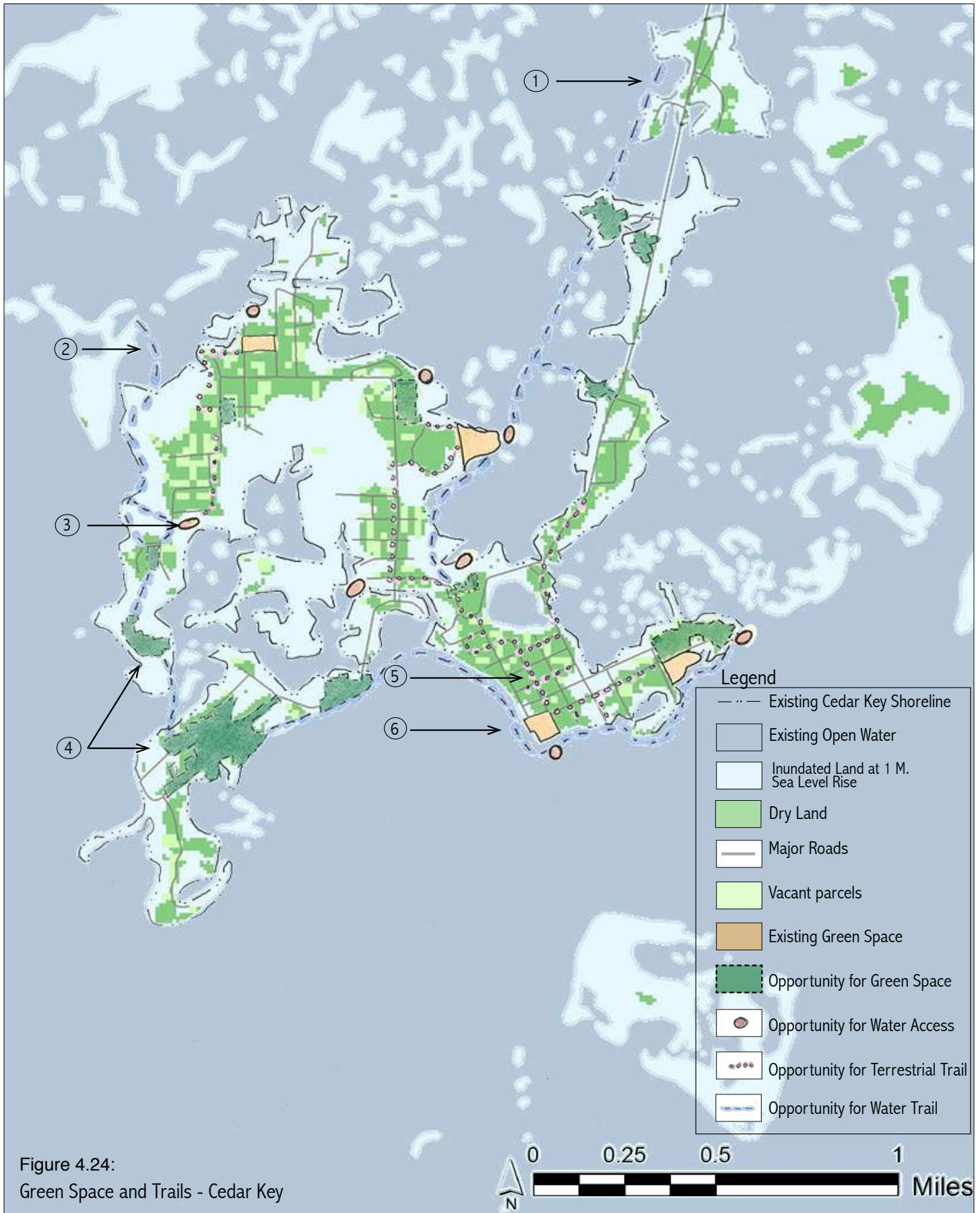
## Further Considerations

Proposed water access points will require maintenance as well as minor infrastructure to make them accessible to boats and other aquatic vehicles. A maintenance plan should be developed to further determine the feasibility of the highlight opportunities for water access. The type of infrastructure required and its cost should also be addressed in an economic study of this approach.

With an increased opportunity for water trails, there is the potential for aquatic recreational activities to expand. New businesses may be needed in order to provide additional recreational opportunities. Boat tours may develop as a niche in the community to provide access to some of these trails.



# STRATEGIES





# STRATEGIES

## Adaptation Strategies for Trails - Upland (Figure 4.25)

1. An “urban” green space is proposed adjacent to an area of existing residential to serve the surrounding neighborhood. This proposed space is located between both of the highlighted opportunities for relocating downtown functions (Figure 4.13) or a “city center”. Allowing the open space to function alongside the urban environment encourages outdoor recreation and events. Green markets or annual festivals could be held in this space.
2. Green space is proposed in these vacant parcels to provide the opportunity for recreational destinations for existing and proposed trails. The opportunity for a terrestrial trail is shown as a connection between two ends of existing trails. This proposed connection will lead into one or several of the highlighted green spaces. These parcels are centrally located to the upland area and have ample space to serve multi purposes, as well as potential for use as community green spaces, such as a green market or public art exhibition space. Opportunities for green space do not take into account land value or property rights. Both of these factors must be accounted for to determine the most suitable and feasible parcel or parcels.
3. Green space that is located off of a road which is projected to be inundated or highly vulnerable in the face of sea level rise has the opportunity to serve as a recreational island or water trail destination. With a large amount of vacant land adjacent to this proposed green space, there is the opportunity for an outfitters shop or other recreational facility to accompany and enhance this green space. Another parcel with the opportunity to become a green space, or recreational island, is shown with a proposed water trail connection between the two green spaces that connects them back to land or an existing trail. Public policy is beyond the scope of this study, however property rights must be accounted for to determine the feasibility of this approach.
4. This connection allows for the opportunity to connect the upland water trail to Cedar Key. Trail users may have access to land or continue along in the water around the island.

*Black text indicates information pertinent to trails; gray text is relevant to green space (Figure 4.6)*

## Further Considerations

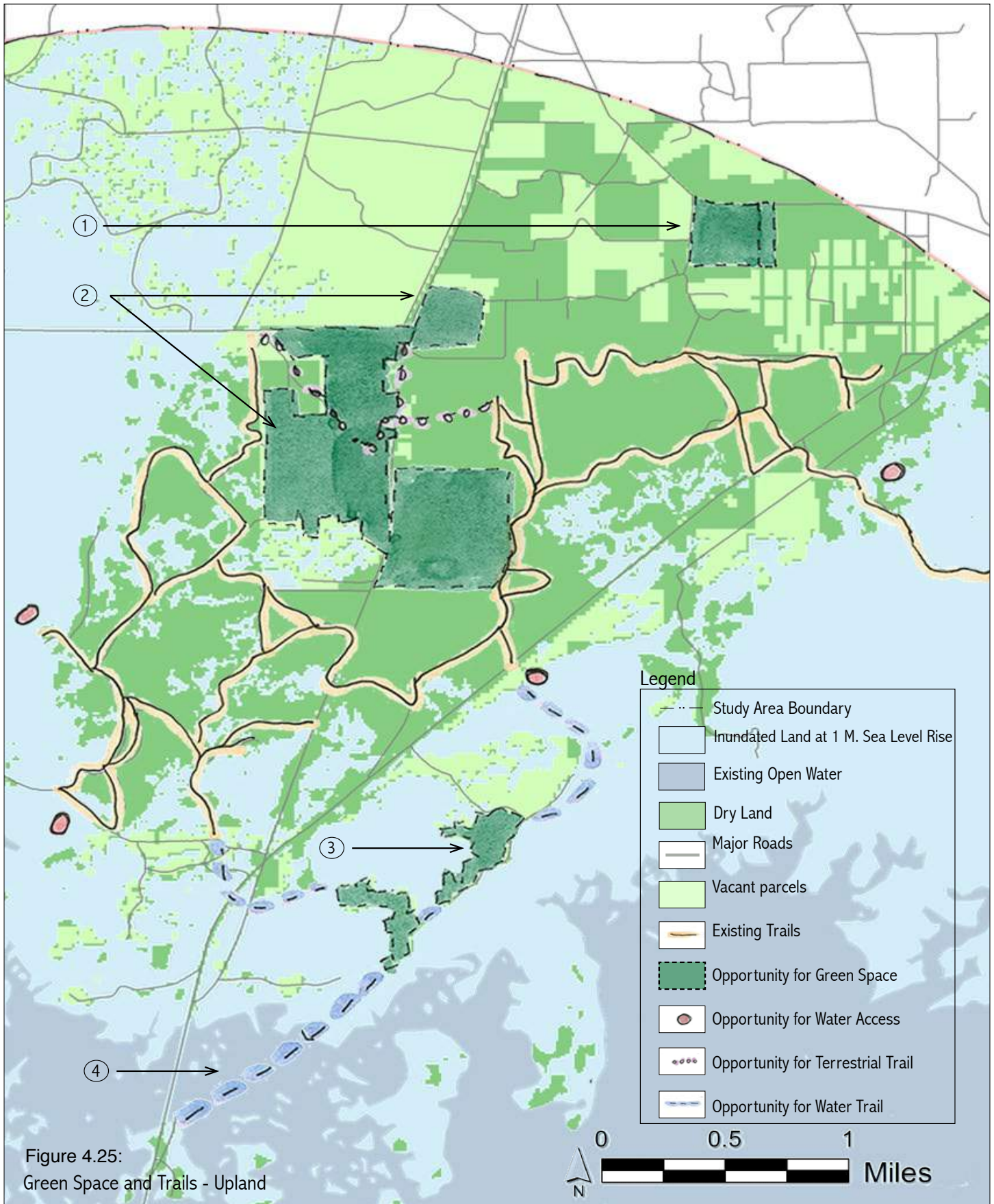
Existing trails were located based upon the best available GIS data. Ground truthing these trails and examining their characteristics is a key next step in determining the achievability of the proposed trail connections.

With an increased opportunity for water trails, there is the potential for aquatic recreational activities to expand. New businesses may be needed in order to provide additional recreational opportunities. Boat tours may develop as a niche in Cedar Key to provide access to some of these trails. A ferryboat that caters to the public is another possible outcome of additional water trails. The ferry could be use to transport users from the upland area to the island of Cedar Key or vice versa.





# STRATEGIES





# STRATEGIES

## Characteristics

### Connectivity

Existing connectivity in Cedar Key was observed for vehicular connectivity as well as pedestrian connectivity, or walkability. Residents of Cedar Key acknowledged the ability to walk from places such as the local grocer, post office, library, and friend's house from their own home as something of great value to their community. Due to the small size of the island and a centrally located downtown, almost all areas of Cedar Key are within walking distance to one another. Being able to walk from place to place increases resident contact with one another and therefore, adds to the character of the close knit community. Golf carts are also a popular mode of transportation in Cedar Key that benefit from increased connectivity in roadways. Deficits in connectivity were identified and opportunities for alternate routes are shown. The goal of the adaptive strategies for connectivity was to provide access, either by foot or vehicle, to all parts of the island in the face of sea level rise. Walkability was stressed more so in areas of high commercial use. Maintaining connectivity as a whole is key to the active, social and outdoor oriented way of life of Cedar Key.



Figure 4.26: Downtown Cedar Key buildings have shaded walk ways which enhance the pedestrian experience



# STRATEGIES



Figure 4.27: Dock Street is shared by cars, golf carts, and pedestrians



# STRATEGIES

## Adaptation Strategies for Connectivity - Cedar Key (Figure 4.28)

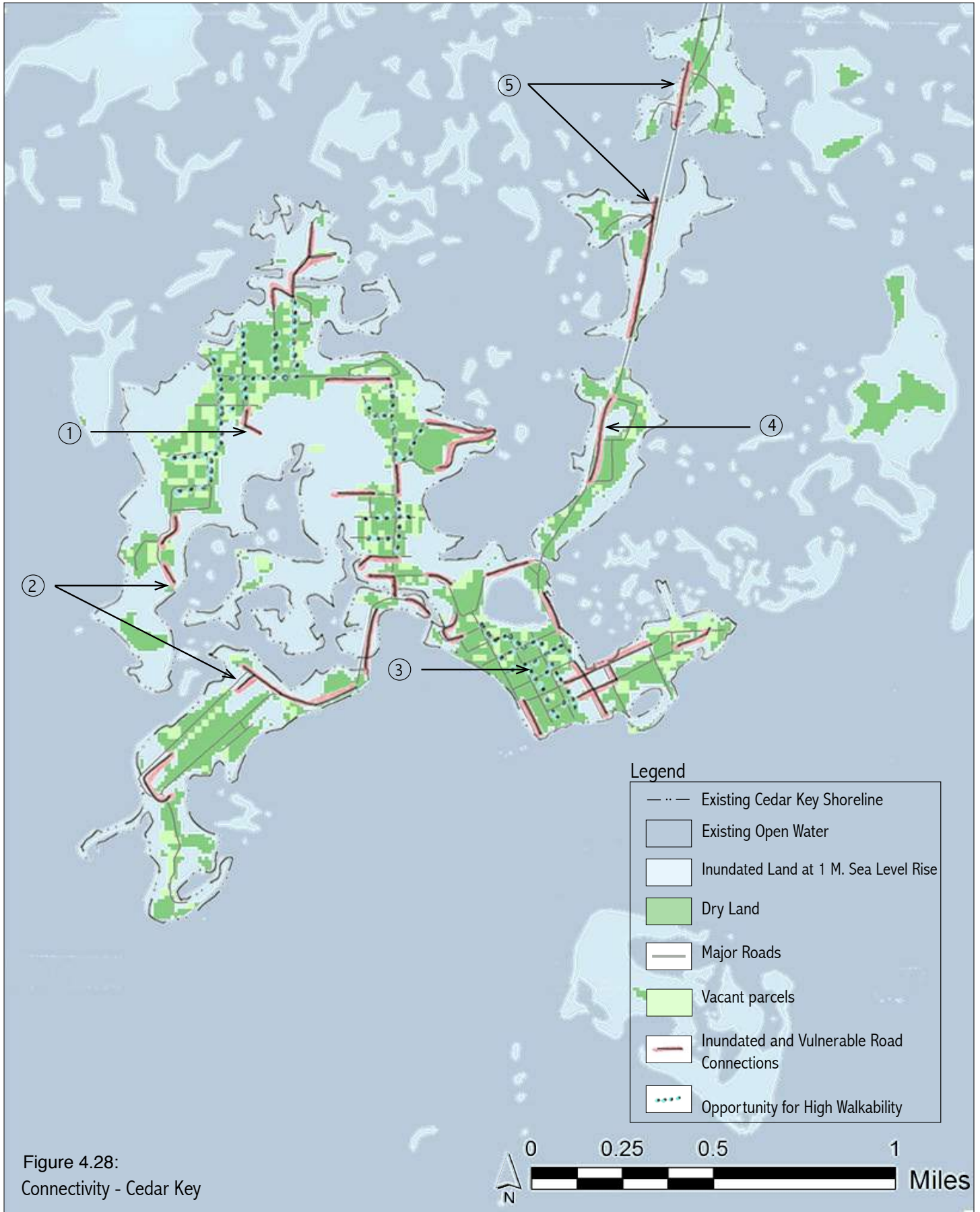
1. Where inundated land is the end point of an inundated or vulnerable road, the road is suggested to be abandoned. However these scenarios may provide the opportunity for waterfront access points. When this approach is taken, management is a key consideration. It is suggested that management practices are looked at from a hazard mitigation, infrastructure, stormwater, and or shoreline erosion standpoint. Public and economic policy must be accounted for to determine the feasibility of this approach, however these factors are beyond the scope of this study.
2. Inundated or vulnerable roads that lead to small portions of dry land are suggested to be abandoned and water trails are to be used to access the newly formed “islands”. The current uses on these land parcels are to be relocated inland. However, private property rights must be acknowledged when taking this approach. Public policy is beyond the scope of this study but it should be noted that political and legal barriers exist in this proposed solution. Possible solutions include rolling easements and land acquisition so that abandonment of the road infrastructure would be permitted. Transfer of development rights for the parcels that lose access should also be considered as a potential solution to the legal barriers that exist.
3. Existing downtown Cedar Key is a very walkable area and it is suggested that this be maintained where inundation does not occur downtown. With roads projected to be inundated in this area, walking will increase as a form of transportation. The highlighted walkability allows residents and visitors to walk from downtown to Back Bayou. Other highlighted areas indicated as opportunities for high walkability provide users the ability to walk easy from several uses including residential and commercial. Maintaining walkability in Cedar Key enhances its cultural and social values.
4. Roads that are projected to be vulnerable or inundated in the face of sea level rise should seek alternative routes where possible. This area displays an opportunity for another route just to the East of it that can be used as the gateway into Cedar Key.
5. Currently bridges and hard infrastructure are used to allow drivers to cross water and access Cedar Key via S.R. 24. The highlighted inundated roads are suggested to be converted into bridges as well as this is the only entry way into Cedar Key. Extending the current infrastructure will allow for a feasible solution to maintain access to Cedar Key in the face of sea level rise. Public policy and economic feasibility must be accounted for when considering infrastructural improvements and development, however these factors are beyond the scope of this study.

### Further Considerations

Where inundated land is the end point of an inundated or vulnerable road, the road is suggested to be abandoned. These scenarios offer potential water access points which will require maintenance as well as minor infrastructure to make them accessible to boats and other aquatic vehicles. A maintenance plan should be developed to further determine the feasibility of the highlighted opportunities for water access. The type of infrastructure required and its cost should also be addressed in an economic study of this approach.



# STRATEGIES





# STRATEGIES

## Adaptation Strategies for Connectivity - Upland (Figure 4.29)

1. Road connections, that are inundated or highly vulnerable in the face of sea level rise, and provide access to parcels that are also vulnerable, are suggested to be abandoned. If viewed as financially feasible, inundated roads can be converted to bridges and continue to serve the parcels around them as well as offer a connection to other upland areas. These scenarios also may provide the opportunity for waterfront access points. When this approach is taken, management is a key consideration. It is suggested that management practices are looked at from a hazard mitigation, infrastructure, stormwater, and or shoreline erosion standpoint. Public and economic policy must be accounted for to determine the feasibility of this approach, however these factors are beyond the scope of this study.
2. With inundated land as the end point of this road, and the roads projected inundation, this road is suggested to be abandoned. The land that is currently serviced by this road has the opportunity to become an “island”. Due to the vulnerability of the island, the functions currently on this land are suggested to move inland and the island has the opportunity to become an ecological destination. Public policy and access abilities must be accounted for to determine the feasibility of this approach, however these factors are beyond the scope of this study.
3. Plentiful vacant parcels in close proximity provide the opportunity for high walkability from either proposed “city center,” A or B. Walkable connections that are within 1/2 mile of one of the proposed “city centers” are shown. These connections lead users from the major roads into the currently developed areas and the proposed locations of a “city center”. Walkability is highly valued by the residents of Cedar Key and it is essential to maintain that quality in an urban context. A highly developed residential area (Figure 4.13) exists just north of proposed “city center” B. This area also would benefit from this opportunity because it provides walkable connections to and from existing and proposed uses. These walkable connections may extend into the adjacent existing development.

## Further Considerations

Where inundated land is the end point of an inundated or vulnerable road, the road is suggested to be abandoned. These scenarios offer potential water access points which will require maintenance as well as minor infrastructure to make them accessible to boats and other aquatic vehicles. A maintenance plan should be developed to further determine the feasibility of the highlight opportunities for water access. The type of infrastructure required and its cost should also be addressed in an economic study of this approach.

Developing a pedestrian oriented city center will increase convenience in the ways of life for the residents surrounding this area. Will golf carts become a favored mode of transportation for residents in this area as it is currently in Cedar Key? How can opportunities for connectivity further cater to golf carts and other modes of transportation?



# STRATEGIES

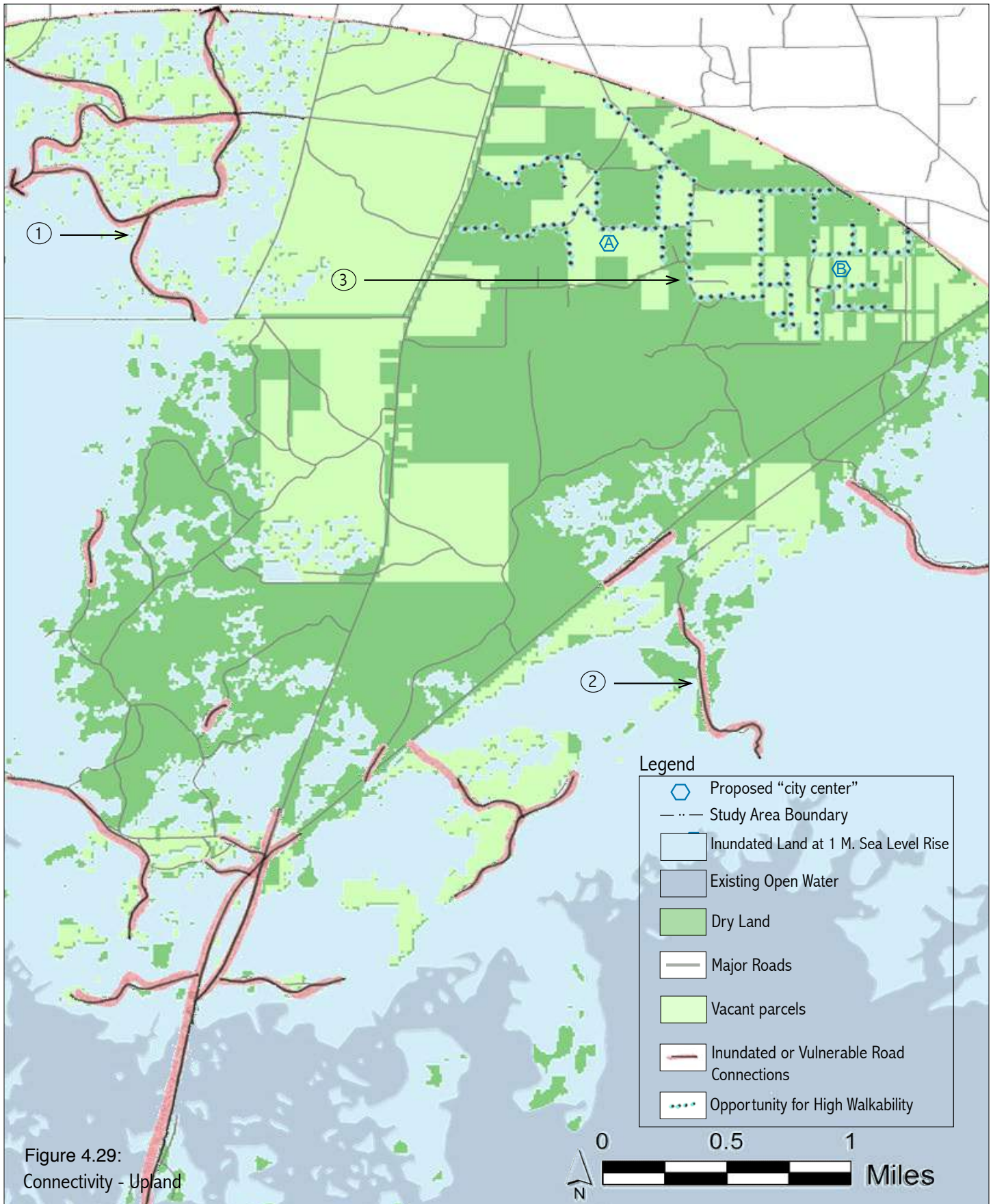


Figure 4.29:  
Connectivity - Upland



# STRATEGIES

## Building Typologies

The built environment and architecture of Cedar Key is one key element that contributes to the overall character and feel of the vernacular landscape. As a historic and coastal community, the architecture of Cedar Key is very distinguishable and unique. Wood, slating, and concrete are common building materials used throughout Cedar Key. Pastel colored facades are characteristic of the community. Many buildings are elevated on pilings per building codes. You can distinguish these from the historical buildings that remain on the ground because of their presence before the new building codes were implemented. An example of an iconic historical building in Cedar Key is the Island Hotel dating back to 1860 when development first occurred in Cedar Key. Buildings remain at a low height throughout the island, majority do not exceed three stories. It is stated in the city ordinances that “buildings shall not be out of scale with documented historic development patterns and surrounding contributing structures” (History: Ord. No. 415, 418, 419). Ordinances enforced by the City of Cedar Key ensure that enhancements to existing development and new construction occur in a way that respects the characteristics of the community. A review process is suggested for proposed relocation efforts in order to maintain an aesthetic and cohesive community character.

The photographs below illustrate existing building forms, styles, materials and characteristics found in Cedar Key. These conditions should be used as inspiration for future development.



Figure 4.30: Local Grocery



Figure 4.31: One story CK residence



Figure 4.32: Low Key Hideaway motel an RV resort in CK



Figure 4.33: 1880s CK home that has since been converted into a bed and breakfast





# STRATEGIES



Figure 4.34: Residences elevated on pilings in Cedar Key



Figure 4.35: Cedar Key downtown historic buildings

# Chapter 5: Transferability and Future Considerations



“There is no logic that can be superimposed on the city; people make it, and it is to them, not buildings, that we must fit our plans.” – Jane Jacobs



# TRANSFERABILITY

## Transferability of Strategies to Other Communities

Findings and lessons from this study provide the opportunity for transferability to other coastal communities concerned about adaptation strategies that are sensitive to the vernacular landscape. The methodology developed for this study is applicable to any community interested in using community participation as a research and planning tool. However, the means of receiving community input may vary depending on the needs and existing lifestyle of the community. Surveys and one-on-one interviews were identified and used as the outreach tools for Cedar Key because of the accessibility to several local organizations, such as the Nature Conservancy and the Cedar Key Arts Club, that provided the opportunity to reach a diverse group of residents. Reaching a broad demographic in the community assures that the data collected is reflective of all users and lifestyles in the community and no areas or activities appear as biased. Community workshops and focus groups are additional examples of community participation tools that may be considered by other communities. All means of community outreach should include a map for the residents to identify with. This method assists in reaching the subconscious attachment people have to their community as discovered by Randy Hester. In addition to this, the surveys in this research included a prompt scenario in attempt to further trigger the minds of the participants so that they would really consider what they valued and loved about their community. Using a prompt scenario pertinent to the community being observed is an effective tool but should be stated in a way that respects the community and its values.

Aside from community participation, it is key that the landscape architect or researcher take time to get to know the community on their own. An initial site visit consisting of a walk around the town is recommended as a first step for getting to know the area, but several site visits are essential in achieving a clear “reading” of the landscape. Partaking in community activities, such as kayaking in Cedar Key, and indulging in the culture, such as eating clams fresh out of the water, serve as enjoyable and “hands-on” ways to begin to understand the lifestyle of the community being observed. Sketches of existing conditions and photographs of the community and its surrounding context are also effective tools for developing a greater understanding of the community. One-on-one interviews are a great way to not only receive community feedback, but to establish relationships with the residents so that a greater insight into their every day lives and values is obtained. Talking a walk around the town with a resident provides a perspective that is unattainable as an outside observer.

Community feedback resulted in a long list of valued spaces, places, activities and characteristics as displayed in the results of this study. Relocation strategies were carried out in full detail for only a few of these items based upon priorities specified for this study. Where adequate time and budget allows, adaptation strategies should be identified for all of the valued spaces, places, activities, and characteristics of the community. If delimitations exist or the community and/or landscape architect wish to develop adaptive strategies for fewer community valued qualities than identified in participation efforts, priorities are a successful way to determine the qualities that should be further observed for adaptation strategies.

# TRANSFERABILITY

Delimitations have been placed on this study due to time constraints. These limitations include the inability to explore protection and accommodation as means of adaptation methods and a lack of exploration of public policy and economic feasibility. When applying this research methodology to other communities with no time constraints, these limitations should be lifted and explored in full detail. Public policy and economic factors are essential considerations in planning that should be carried out in conjunction with explorations of the vernacular landscape. Land ownership and land value are examples of public policy and economic principles that should be considered by other communities applying this research methodology. Economic studies should also be done to determine the most financially feasible adaptation method for a community. If protection or accommodation are identified as the most suitable adaptation method for a community, this research can still serve as a framework for obtaining community participation and aid in identifying goals and objectives for these methods.

The findings of this research were informed by precedents and a literature review as well as a character analysis. These tools should be applied in the inventory phase of this methodology. This study may be used as a precedent for subsequent communities. Guiding principles were identified in the analysis phase of this research and assisted in the development of adaptation strategies for Cedar Key. Existing communities with similar qualities to Cedar Key were observed for their guiding principles which were amended and expanded upon for Cedar Key. Communities concerned about adaptation strategies that are sensitive to their vernacular landscape should look to existing communities that have similar traits and values as them to aid in developing their own guiding principles.

Adaptation opportunities are most universally understood when shown via a visual. Overlaying graphics that display opportunities over a community map helps residents identify with the proposed strategies. Because the community will have been so involved in the data gathering process, residents often desire to see the research results. Community workshops may be held as a way to share findings and start conversations with residents about their feelings on the highlighted opportunities.

## Future Considerations

Findings and conclusions drawn from this study indicate the opportunity and need for further research. Delimitations placed on this study hindered the ability to explore public and economic policy, two major factors that must be accounted for in adaptive planning. Conducting feasibility studies for the proposed adaptation opportunities is a key element that can be added to this research in order to determine achievability and assist Cedar Key in selecting the most suitable relocation opportunities. Feasibility studies should include, but are not limited to: parcel size, land value, land ownership, zoning, access legality, city code and economic policy. Subsequent communities concerned with the methodology of this research should also carry out feasibility studies when exploring adaptation strategies for their own town.

Gathering community feedback is also a notable next step to help Cedar Key determine the most suitable relocation strategies for the community. Due to the time limitations of this study, it was



# TRANSFERABILITY

not feasible to take the proposed relocation strategies back to Cedar Key for a community workshop in order to gain feedback from the residents. However, further refinements could be made to the strategies proposed in chapter 5 based upon comments and possible unmet desires of the community. Community feedback is strongly encouraged for subsequent communities concerned with the methodology of this research.

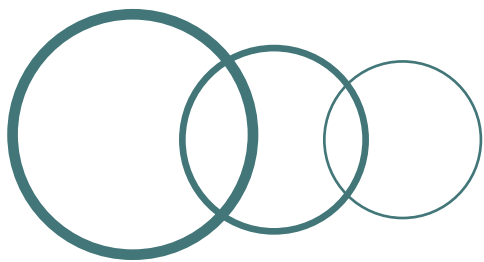
Protection and accommodation are spoken about and defined in this study but are not explored as adaptation strategies for Cedar Key. Goals and objectives that are listed in the methodology but are beyond the scope of this study should be carried out in full detail by those looking to further this research or by subsequent communities. Economic benefits of protection, accommodation and relocation should be identified in order to determine the most suitable approach for each community and valued element of the landscape. Public and environmental policy should also be addressed when identifying the most beneficial approach.

While vernacular landscape is the overlying inspiration for the research carried out in this study, addressing the valued qualities of the community is only a piece of fully defining what the vernacular landscape of a place is. Historical data provided in this research revealed some of the societal and cultural values that shaped the formation of Cedar Key's ways of life and offered information and inspiration about building materials and architectural styles. However, a more thorough investigation of Cedar Key's history may offer further explanation and information about the historical development of the community and its influences today. An extensive historical investigation can enhance the ability to define the vernacular landscape in full.

As the landscape evolves, new landscape typologies may come about. An example found in this research is the anticipated relationship of the new shoreline with existing and future development. Although this study uses a bath tub model that converts all inundated land to open water when looking at the effects of sea level rise, Sea Level Affecting Marshes Model (SLAMM) projects several types of future land cover as a result of the effects of sea level rise on shorelines and wetlands. SLAMM can be used to address the expected type of shorelines that will be present after the sea level rises. Observing the type of anticipated land cover and how it will interact with the built environment is crucial to the ways of life of a community. Opportunities may include new "marsh front" communities and ecological recreational activities such as "tidal parks", or parks that provide different events and activities based upon the tidal level.

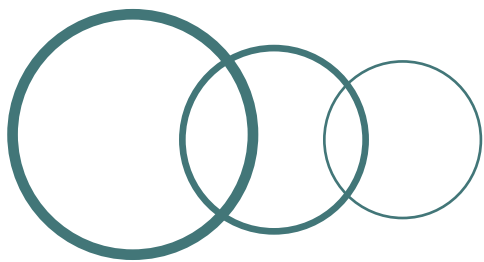
Design and forms of all elements in the landscape, as well as the landscape itself, will inevitably evolve. Developing modern day interpretations of existing and historical functions and characteristics can assist in maintaining the ways of life of the users and residents of a landscape or community. Ron Hasse's method of adapting cracker style architecture to suit modern day needs, as discussed in chapter five, should be looked to as inspiration for how to interpret and facilitate an evolution of the vernacular landscape.

*Communities are all unique according to their context, demographic, and ways of life.* Because of this, subsequent communities concerned with the methodology of this research should investigate these factors and integrate them into their adaptation approach.



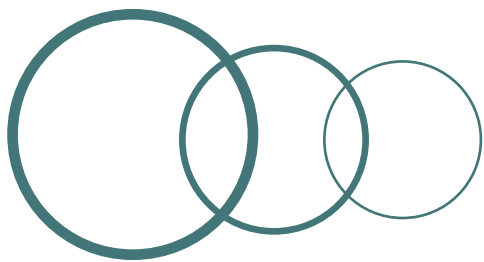
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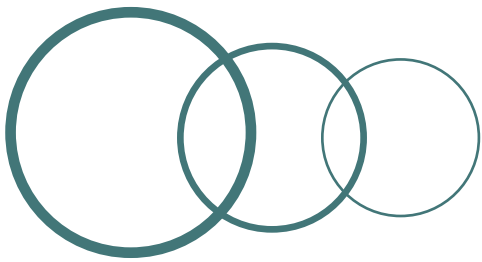
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