

# *Resiliency*



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This portion of the Baseline Sustainability Assessment, entitled **Resiliency** includes ideas and recommendations that help build additional sustainability capacity for Hilton Head Island. These ideas and recommendations are designed to help Hilton Head Island respond and adapt to the responsibilities and risks outlined in the first two sections of the Baseline Sustainability Assessment. The goal for this segment is to define the process for the Hilton Head Island community to become more resilient by implementing community wide sustainability strategies and tactics.

## Resiliency Explained

The Risk and Responsibility sections of the Baseline Sustainability Assessment provided two key insights.

The first insight is that the Hilton Head Island community has many sustainability adaptation efforts already underway, but is in need of better alignment and coordination of those existing initiatives. The community's responsibilities are significant and in need of attention. Energy and transportation impacts represent the largest opportunities for sustainability improvement. Water consumption was also determined to be a critical sustainability attribute, as well as efforts to decrease waste.

The second insight is that the Hilton Head Island community could be more proactive in preparing for the effects of climate change. Understanding how climate change could affect the Island is critical to influencing localized planning efforts that already exist that would help the community be better prepared.

In considering how Hilton Head Island could become a more sustainable and resilient community, WAP Sustainability referred to ICLEI's tool-kits for ideas and solutions. ICLEI's Mitigation and Adaptation programs collectively define five milestones for communities addressing sustainability. The purpose of the Resiliency section is to provide a buffet of ideas and recommendations to address sustainability mitigation and adaptation efforts. The ICLEI milestones provide a step by step approach that build on the work completed through the Baseline Sustainability Assessment.

ICLEI's FIVE MILESTONES FOR CLIMATE MITIGATION from the PREPARING FOR CLIMATE CHANGE GUIDEBOOK highlights five milestones for communities to follow in preparing for managing sustainability responsibilities.

## ICLEI's FIVE MILESTONES FOR CLIMATE MITIGATION

-  Mitigation Milestone One: Conduct a baseline emissions inventory and forecast
- Mitigation Milestone Two: Adopt an emissions reduction target for the forecast year
- Mitigation Milestone Three: Develop a local Climate Action Plan
- Mitigation Milestone Four: Implement policies and measures
- Mitigation Milestone Five: Monitor and verify results

ICLEI's FIVE MILESTONES FOR CLIMATE ADAPTATION provide a simple, standardized means of assessing climate challenges, establishing goals, developing and implementing a plan, and monitoring, measuring and reporting performance. The methodology underlying the Five Milestones for Sustainability is based on the Five Milestones for Climate Mitigation but defines a broader process for addressing climate adaptation.

## ICLEI's FIVE MILESTONES FOR CLIMATE ADAPTATION

- ✓ Adaptation Milestone One: Conduct a Climate Risk Study
- Adaptation Milestone Two: Set Preparedness Goals
- Adaptation Milestone Three: Develop a Climate Preparedness Plan
- Adaptation Milestone Four: Publish & Implement Preparedness Plan
- Adaptation Milestone Five: Monitor & Re-evaluate Resiliency

✓ Included in Baseline Sustainability Assessment

The following table highlights the ICLEI Milestones that were conducted as part of the Baseline Sustainability Assessment along with recommended next steps and future steps.

As part of the Baseline Sustainability Assessment	Next Steps	Future Steps
Mitigation Milestone One	Mitigation Milestone Two	Mitigation Milestone Four
Adaptation Milestone One	Mitigation Milestone Three	Mitigation Milestone Five
	Adaptation Milestone Two	Adaptation Milestone Four
	Adaptation Milestone Three	Adaptation Milestone Five

Actual recommendations and strategies to be implemented on Hilton Head Island are at the discretion of the community. The recommendations in this report were made based on the material findings of the Baseline Sustainability Assessment, academic research, evaluation of the actions of other communities and upon advice from leaders of other coastal climate resiliency and adaptation efforts of communities along the Atlantic coast and Gulf of Mexico.



### Mitigation Milestone Two: Adopt an emissions reduction target for the forecast year

The Responsibility portion of the Baseline Sustainability Assessment highlighted the process of evaluating carbon emissions sources and activities of Hilton Head Island, from largest to smallest. The largest generators of emissions were from two main sources, Electricity and Transportation. Mitigation Milestone Two from ICLEI suggests communities should adopt an emissions reduction target for a forecasted year.

## ICLEI's FIVE MILESTONES FOR CLIMATE MITIGATION

- ✔ Mitigation Milestone One: Conduct a baseline emissions inventory and forecast
- Mitigation Milestone Two: Adopt an emissions reduction target for the forecast year**
- Mitigation Milestone Three: Develop a local Climate Action Plan
- Mitigation Milestone Four: Implement policies and measures
- Mitigation Milestone Five: Monitor and verify results

✔ Included in Baseline Sustainability Assessment

The chart in Figure 5.1 represents a forecasted emissions scenario for Hilton Head Island until 2025. This projection is based on documented growth projection from the Land Use Comprehensive Plan as well as Hilton Head Island historical trends. The projection is consistent with the findings of the Baseline Sustainability Assessment, reaffirming that efforts to reduce transportation miles and electricity use from residential and commercial buildings is the most effective way to reduce GHG emissions from the Island.

The scientific community calls for action to reduce 20-40% GHG emissions by 2020 and 85% by 2050 to keep the planet below a 4°F temperature rise. A GHG reduction target for Hilton Head Island could be a 25% reduction by 2025 and an 80% reduction by 2050.

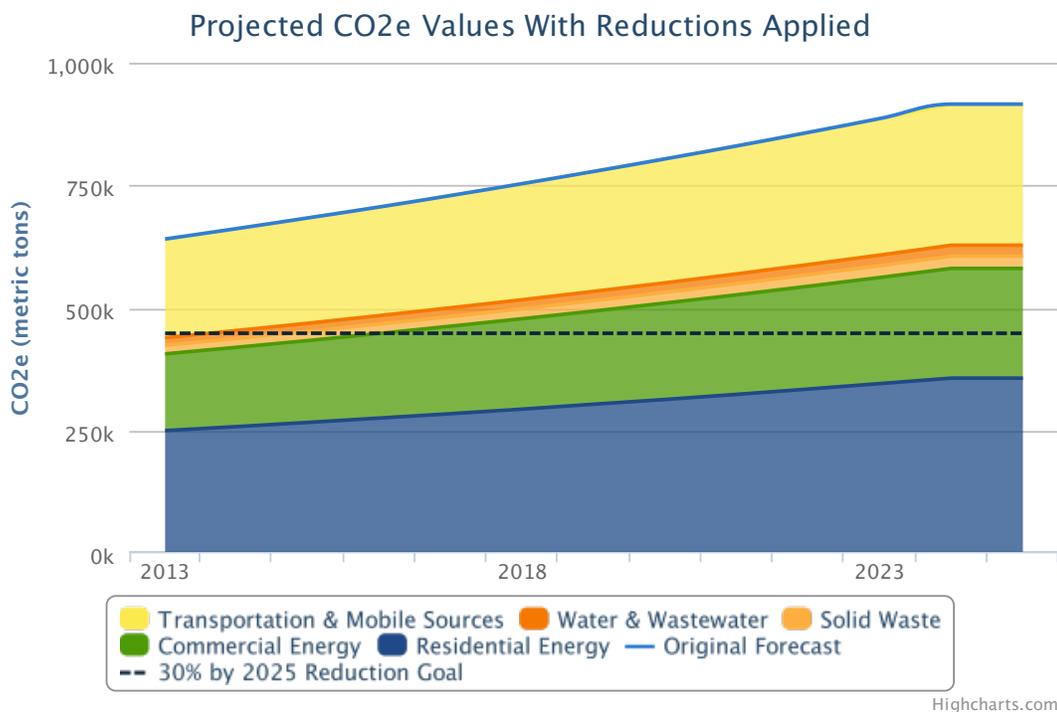
## Recommended GHG Reduction Goals for Hilton Head Island

25% GHG Reduction by 2025

80% GHG Reduction by 2050

Emissions scenario for Hilton Head Island until 2025:

Figure 5.1 Projected CO<sub>2</sub>e Values



### Mitigation Milestone Three: Develop a Local Climate Action Plan

The third ICLEI Milestone for Mitigation is the creation of a Hilton Head Island Climate Action Plan. The community should consider creating a short and simple Climate Action Plan as a next step to the Baseline Sustainability Assessment. The plan should detail steps to be taken by specific organizations and suggest tangible actions for the Island. The goal of the Climate Action Plan is to better manage and reduce sustainability impacts on the Island.

## ICLEI's FIVE MILESTONES FOR CLIMATE MITIGATION

- ✔ Mitigation Milestone One: Conduct a baseline emissions inventory and forecast
- Mitigation Milestone Two: Adopt an emissions reduction target for the forecast year
- Mitigation Milestone Three: Develop a local Climate Action Plan**
- Mitigation Milestone Four: Implement policies and measures
- Mitigation Milestone Five: Monitor and verify results

Based on the findings in the Baseline Sustainability Assessment, Figure 5.2 is a list of possible recommendations the community could choose from when developing a Hilton Head Island Climate Action Plan.

**Figure 5.2 Responsibility Recommendations**

Recommendations	
Recommendation 1	Create an Implementation Organization
Recommendation 2	Raise Awareness and Explore Brand Options
Recommendation 3	Hire an Island Wide Sustainability Director/Manager
Recommendation 4	Define Community Wide GHG Reduction Targets and Resource Conservation Goals and Targets
Recommendation 5	Sign the U.S. Conference of Mayors Climate Protection Agreement and become an ICLEI Star Community
Recommendation 6	Develop Green Building Codes for Community Review, Consideration and Adoption
Recommendation 7	Create In-Home Energy Improvement Programs
Recommendation 8	Develop In-Home Water Reduction Programs
Recommendation 9	Provide Benchmarked Electricity Bills to Residential Customers so they know how they stack up
Recommendation 10	Provide Benchmarked Water Bills to Residential Customers so they know how they stack up
Recommendation 11	Develop a Second Home Owner and Rental Property Manager Resource and Energy Conservation Guide or Program
Recommendation 12	Promote Renewable Energy Systems on Island
Recommendation 13	Expand Biking as an Everyday Mode of Transportation
Recommendation 14	Expand Public Transit System with an Island Wide Shuttle System
Recommendation 15	Create EcoDistricts
Recommendation 16	Develop a "Park and Ride" Infrastructure connected to Shuttle System for on/off-island use
Recommendation 17	Build and Develop Alternative Fuels Infrastructure
Recommendation 18	Conduct Sustainability Training for Local Government Staff and Community Leaders
Recommendation 19	Review ARB Guidelines in Planned Communities to Identify Opportunities to Reduce Impacts
Recommendation 20	Consider Single Hauler Options and Recycling Systems for Waste Management
Recommendation 21	Provide Waste Audits for Businesses and Homes
Recommendation 22	Work with Service Providers to Offer Energy Efficient Modems and Set-top Boxes to Subscribers
Recommendation 23	Develop Energy Efficiency Programs for the Island's Largest Commercial Energy Users

### **Recommendation 1: Create an Implementation Organization**

In some cases, the Town of Hilton Head Island may not take the lead with mitigation and adaptation recommendations. However, some local governments do create sustainability offices to implement policies. One option for the community to consider would be for Mayor and Council to appoint a Sustainability Advisory Committee and create a staff position of Director of Sustainability to assist the advisory committee. Today's Sustainability Advisory Committee functions as a committee of the community's Greater Island Council and is supported by Experience Green, a local non-profit organization.

Another model utilized in recent years by other communities is partnerships of private/non-profit organizations to take the lead with community engagement, strategic planning and implementation. One example of this type is the Sustainability Institute in Charleston, which "is an award-winning, nonprofit organization with a mission of empowering South Carolinians to conserve energy and reduce our environmental impact where we live and work." The Institute administrates energy conservation programs, education programs, and holds community events. The City of Charleston also has the Charleston Green Committee. A similar organization is GreenSpaces in Chattanooga. In New York City and Long Island the Cleaner Greener Communities program is deploying sustainability throughout the Big Apple. SouthFace is the organization focused on greening the building stock of Atlanta.

This recommendation is for the Community to begin discussions with stakeholders to determine how mitigation and adaptation efforts can be implemented, whether through government or private organizations like Experience Green.

### **Recommendation 2: Raise Awareness and Explore Brand Options**

Sustainability efforts succeed when members of the community become aligned in mission, value and purpose. At the local level, this works best when the message is unique to the community, is honest and believable, preserves the community's history while focusing on the future. Establishing a real and credible sustainability brand in the marketplace is an important part of raising awareness. Particularly for a tourism based community like Hilton Head Island, it is important to have a sustainability brand that is marketable.

There are many examples of organizations focused on Sustainability throughout the county. Here are a few:

- New York : GreeNYC



- Atlanta: Power2Change
- Savannah: Thrive Sustainability
- Miami-Dade: GreenPrint
- Cleveland: Sustainable Cleveland 2019
- Charleston: Charleston UP

To raise awareness of local programs and the sustainability brand , the community could elect to engage in activities such as:

- EcoCompetitions between Planned Communities where each competes on energy, water and waste reduction to prove that its the greenest place to live on the Island.
- Flagship events, such as golf tournaments, fun runs on the beach and more, to raise awareness and money for mitigation and adaptation strategies and implementation.
- Expansion and promotion of the South Carolina Green Hospitality Alliance on Hilton Head Island. <http://www.greenhospitalityalliance.com>
- Public awareness campaigns can show that simple changes in a community's lifestyle can quickly yield significant recycling, energy and water savings and promote long term sustainability.

### **Recommendation 3: Hire an Island Wide Sustainability Director/Manager**

Sustainability Directors/Managers become the person that community residents and business owners look to with questions, share thoughts and raise concerns. This person should understand both the science and market of sustainability and be comfortable speaking publicly. They should be able to sell the vision, negotiate concerns of those who are not informed about sustainability and speak about the economic benefits to the Island. This individual should also assist with developing strategies, identifying key policies and facilitating implementation.

Many communities hire this person within the local government. Others choose to associate these individuals with a non-governmental, non-profit organizations. The Hilton Head Island Community should explore options for this position as part of the community engagement process.



#### Recommendation 4: Define Community Wide GHG Reduction and Resource Conservation Goals and Targets

These goals would allow the Hilton Head Island community to focus its actions and measure accomplishments and successes over time. Goals and targets could be developed to reflect evidence based need, but also buy-in from the community. Each goal should include a timetable for achieving those targets, and plans to do so. Commonly used targets by other communities include reduction of GHG emissions of 20% below 1990 levels by 2020 and 80% reductions by 2050. Goals and targets can be set with the Community Engagement process and include GHG emission reductions and/or tangible reductions in resource consumption such as electricity use, vehicle miles traveled, gallons of water consumed and waste sent to landfills.

Target metrics should consider both absolute use (i.e. total residential electricity consumed on the Island) and per capita use (i.e residential electricity divided by total full residents) to appropriately reflect changes over time.

Some examples of community wide goals and targets include:

- New York City, NY : 30% GHG emissions reduction by 2030, divert at least 75% of the city's solid waste from landfill by 2030.
- Washington DC: Increase recycling rates to 45% by 2050, 16% reduction in water consumption by 2020.
- Atlanta, GA: Greenhouse gas emissions reduction of 15% by 2020, 20% reduction in per capita citywide water consumption by 2020.
- Cleveland, OH: GHG reduction goals of 10% by 2016, 20% by 2020, and 45% by 2030, landfill diversion rate of at least 50% by 2030.
- El Cerrito, CA: Reduce water use in existing buildings by 20%, achieve Zero Waste by 2035, reduce GHG emissions by 15% below 2005 levels by 2020 and 30% by 2035.

#### Recommendation 5: Sign the U.S. Conference of Mayors Climate Protection Agreement and become an ICLEI STAR Community

Hilton Head Island should consider making a public commitment on climate protection by signing the U.S. Conference of Mayors Climate Protection Agreement. Over 1,060 mayors have signed The U.S. Conference of Mayors' Climate Protection Agreement, vowing to reduce carbon emissions in their cities below 1990 levels, in line with the Kyoto Protocol.



Under the Agreement, participating cities commit to take following three actions:

1. Strive to meet or beat the Kyoto Protocol targets in their own communities, through actions ranging from anti-sprawl land-use policies to urban forest restoration projects to public information campaigns;
2. Urge their state governments, and the federal government to enact policies and programs to meet or beat the greenhouse gas emission reduction target suggested for the United States in the Kyoto Protocol -- 7% reduction from 1990 levels by 2012;
3. Urge the U.S. Congress to pass the bipartisan greenhouse gas reduction legislation, which would establish a national emission trading system.

**If paired with Hilton Head Island’s membership with the ICLEI’s STAR Community Program, Hilton Head Island would be participating in the two most widely recognized sustainability and climate protection programs available to local governments.**

The STAR Community Rating System (STAR) is the nation’s first framework and certification program for local sustainability, built by and for local governments and the communities they serve. The Rating System encompasses economic, environmental, and social performance measures for both local governments and the broader community.

Released in October 2012, STAR rating represents a milestone in the national movement to create more livable communities for all. The rating system’s evaluation measures collectively define community-scale sustainability, and present a vision of how communities can become more healthy, inclusive, and prosperous across seven goal areas.

### **Recommendation 6: Develop Green Building Codes for Community Review, Consideration and Adoption**

Local jurisdictions influence the built environment through the adoption of building codes. Evaluating and modifying current codes or adopting new codes has proven to simultaneously reduce environmental impact, and increase long-term value and efficiency in building stock. To ensure that new construction is developed in a manner that is aligned with Hilton Head Island’s sustainability goals, the current building codes should be examined and compared to energy efficiency and green codes that have been adopted in other cities throughout the United States.



An excellent starting point could be the International Green Construction Codes (IgCC). The IgCC was created through collaboration with the International Code Council (ICC), the American Institute of Architects (AIA), ASTM International, ASHREA, the U.S Green Building Council (USGBC) and the Illuminating Engineering Society (IES). The code works in unison with current International and Domestic Codes. At its roots, it is designed to be adaptable and flexible. As such, jurisdictions can pick and choose the most useful provisions and deploy only what makes sense within their community. As such, the community may choose to adopt energy provisions that have short term paybacks while disregarding provisions that require certain costly “green” materials.

Any adopted green building codes could also support adaptation efforts explained later in this section. Additionally, the community could go above and beyond “off-the-shelf” green codes by focusing on energy efficiency designs and solutions that work best for coastal communities.

For an idea of what this type program might look like, see New York City’s Energy Conservation Code at <http://www.nyc.gov/html/gbee/html/codes/energy.shtml>

### **Recommendation 7: Create In-Home Energy Improvement Programs**

By its very nature, the adoption of green building codes for new construction is a forward facing initiative. It addresses buildings yet to be built. However, something could also be done with the stock of properties that are currently in use. Older buildings may have outdated technologies that need repair or replacement. Buildings may have aged, resulting in tiny openings in their structure that leak internally conditioned air to the outside. Properties may require major fixes (new insulation throughout) or they may only need minor adjustments (caulking the perimeter of windows). Given the age of the average property on Hilton Head Island, energy improvement programs could pay big dividends.

To tackle energy efficiency of the existing building stock, many communities have developed home audit and retrofitting programs. These programs are typically administered by non-profit groups and in some cases, in partnership with the local utilities. Most successful programs start with a free or low cost energy audit and then offer grants and/or financing options to homeowners to make the changes identified in the audit. There are numerous examples of these programs throughout the United States. Many of the organizations appear to have received seed money from a local community foundation, through grants, or local



government sustainability budgets, while some are standalone for profit businesses. Others utilize a revolving loan funded by a portion of energy savings. Another model includes partnering with private for-profit companies. See the Charleston example below.

- Charleston W.I.S.E (Worthwhile Investments to Save Energy) <http://charlestonwise.org>

### **Recommendation 8: Develop In-Home Water Reduction Programs**

Water audits and retrofitting programs were also defined as a need for the Hilton Head Island community. Water conservation initiatives are critical, as the PSDs (Public Service Districts) are continually challenged in meeting the Island's water demands. Current studies show that saltwater is intruding from Port Royal Sound at a rate of more than 200 feet per year. Many of the wells on the north end of the Island have been abandoned due to excessively elevated chloride concentrations, and several more of the Upper Floridian wells may also be made unusable in the near future.

Buildings may have outdated water systems that need updates. Some properties may require major repairs (replacing aging pipes and valves) or they may only need minor adjustments (water saving fixtures). Older properties are also prone to water leaks and drips associated with aging seals, gaskets and welds. Given the age of the average property on Hilton Head Island, this program could be especially effective, as many older homes consume an excessive amount of water.

While water consumption represents a minor emission source, it is a significant risk to the Island's sustainability due to the aquifer retreat. Properties throughout the Island have the potential to reduce water usage associated with daily use and through irrigation. According to the Public Service Districts (PSDs), approximately 60% of potable water is used for irrigation of landscape. The community could develop a low cost water reduction program with new, low cost conservation technologies installed in irrigation systems and in residential homes. This program could be funded by the PSD's with sponsorship/partnering opportunities for product manufacturers. The key to success is implementing programs to assist residential home owners rather than asking them to conduct the retrofit themselves. Getting the word out through a good marketing and communications campaign can also make a big impact.



### **Recommendation 9: Provide Benchmarked Electricity Bills to Residential Customers so they know how they stack up**

Many utilities provide average community consumption information directly on utility bills to show homeowners how their energy use compares to others in the community. Customers who are above the community average typically work to reduce consumption because they can visually see that their usage is high.

Another technique is to provide recognizable visual cues and graphics on electricity bills. For example, bills may have a small green box in the upper right corner signifying that the user is at or below the community average. Alternatively, a customer who is above the community average may see a red box. Along with the “red box” the bill could also contain information on how to go from red to green, including reference to a home energy retrofit program (see Recommendation 2).

Working with Palmetto Electric to implement a benchmarking system could identify ways to normalize the process to include energy intensity factors such as kWh use per square foot which could help identify the properties that have the biggest opportunities for energy reductions.

A less effective, but potentially easier to deploy program, would be to encourage and/or incentivize community property owners to use the EPA’s Energy Star Portfolio manager. The free, online software allows users to import energy data directly to the system. The system then shows how the property’s energy use compares with similar properties throughout the country. The system can be used for individual homeowners as well as multi-unit property owners, such as hotels. Portfolio Manager may be extremely useful for individuals who own multiple rental properties on the Island.

### **Recommendation 10: Provide Benchmarked Water Bills to Residential Customers so they know how they stack up**

Building on recommendation nine, benchmarked water bills for customers can help educate residents on their water use and drive reductions in water consumption.



### **Recommendation 11: Develop Second Home Owner and Rental Property Manager Resource and Energy Conservation Guide or Program**

There are times that homes just don't need to be "on"; typically this is when they are not occupied. For many residences on Hilton Head Island this may be a frequent occurrence considering the Island's stock of timeshare units, condominiums and second home properties. There are many things that second homeowners and property managers can do when those properties are not occupied to conserve electricity. These actions include changing set points on thermostats, turning off water heaters, changing irrigation settings and shutting down "ghost load" equipment, such as DVRs and microwaves. Advanced techniques are attractive to owners who want more control, is to install wireless enabled devices that can be used to control settings from most anywhere. More basic techniques include weatherization, installation of high efficiency windows, HVAC upgrades, etc.

The community may also consider developing a simple online guide for property owners and rental agencies. It may choose to get more aggressive by offering incentives for owners of second homes and to rental property managers who participate in programs that define the difference between "on" and "off" for properties. Additionally, service oriented options could be developed where a residential energy specialist comes into the home and turns it to "off" position at the end of vacation and returns to turn the home "on" before visitors' arrival.

### **Recommendation 12: Promote Renewable Energy Systems on Island**

Deploying renewable energy is not a quick fix solution but over time it could generate clean energy while simultaneously helping a community to become more resilient. Communities throughout the United States are becoming more open to using on-site generated energy in the form of wind, solar and geothermal. Local, state and federal incentives in the form of grants and tax breaks can help advance these solutions.

As a first step, the community could consider forming an Alternative Energy Sub-Committee to evaluate what technologies are best suited for Hilton Head Island, what incentives are available, and what policies exist within individual planned communities, such as prohibitions against tree trimming that are limiting renewable energy installations.

The community might also evaluate how local codes and design guidelines could be amended to allow for the installation of solar panels and other renewable energy generators.



A significant renewable energy pilot project could serve as an outward example of success for the direction that the community is going.

For inspiration check out the NY-Sun solar initiative (<http://ny-sun.ny.gov>) or connect with the leaders at GreenSpacesChattanooga (<http://www.greenspaceschattanooga.org>) about the success of its community based solar incentive programs.

### **Recommendation 13: Expand Biking as an Everyday Mode of Transportation**

Hilton Head Island is a bikeable community that has been recognized at the Gold Level as a Bicycling Friendly Community by the League of American Bicyclists. Many of the planned communities across the Island have leisure trails, pedestrian paths, wide shoulders along their roadways and are relatively dense in terms of development, which is key criteria for an effective bicycling infrastructure.

Bicycle commuting for people who use bicycles for daily activities such as riding to work, running errands, and traveling to others areas of their community is on the rise. According to the US Census' American Community Survey, the United States has seen a 62% increase in bicycle commuting since 2000. Looking at more recent years, the trend is even more pronounced (10% increase since 2011). In total, however, bike commuting still represents less than 1% of all commuting trips in the U.S. However, expectations are changing which will include those of visitors to Hilton Head Island. Washington, DC, one of the top visitor originating cities for Hilton Head Island, ranks as third on a list of US cities with the highest number of bike commuters. This ranks our nation's capital even higher than perennial bike commuting powerhouse, Seattle.

Hilton Head Island has a lot of key infrastructure in place to be a great bicycle commuting community. The Island could broaden and expand this culture by adopting the following recommendations:

- Expand on the core message, promote and expand infrastructure

For residents and visitors on Hilton Head Island, biking is an enjoyable outdoor activity, a benefit for health, a way to wear out the kids, and even a way to save money on gas. The communities comprehensive bike path system is primarily used for recreation rather than commuting. This impressive system could be promoted for commuting and everyday transportation use at local events, on the radio and in Town and Chamber materials. Additional bike repair stations and bike racks along



the routes and throughout the Town could be installed. A study might identify where key additions or expansions of the current system can be made to further its usability for commuting. Conduct biker safety courses for both cyclists and motorist. Work with the Chamber to develop a campaign promoting Hilton Head Island as a top biking destination for recreation and commuting year round.

- Encourage Access

Hilton Head Island has a large bike rental program whereby bike rentals are both accessible and affordable. Many communities have implemented a bike share program in addition to bike rental facilities. The community could work with the bike rental companies to provide rental kiosks in which cyclists pay for use of bikes with an annual membership or with a single use fee. The kiosks could be stationed at several popular locations, such as Coligny Plaza and Shelter Cove Towne Centre, allowing cyclists to pay only for the time that they are on the bike and allow them to pick-up and drop-off at different locations. These programs work well in visitor based communities in which individuals want to bike but don't want to, or are unable to transport their bikes with them. These services are provided in cities such as Seattle, WA, New York, NY, Chattanooga, TN, and Washington, DC, Atlanta, GA, Louisville, KY, Orlando, FL and many European cities. A full list of U.S. bike share cities can be found at [bikeshare.com](http://bikeshare.com).

- Incentivize

Consider a *Green Trips* incentive program for daily commute by locals. GreenTrips is an online platform where users and employees can log their commuting miles. Awards are given to those that log the most miles.

#### **Recommendation 14: Expand Public Transit Options with an Island Wide Shuttle System**

Hilton Head Island traffic during peak tourism season is often congested at pinch points. Saturday vacation rental unit turnover days bring significant stress to local infrastructure. Currently there is no public transit system operating within Hilton Head Island. Palmetto Breeze Transit operates a bus service bringing workers and visitors to and from the Island from adjacent communities, but does not operate an intra-Island public transportation system. There are, however, very good resort shuttle services and systems within the Island's two largest resort communities, Palmetto Dunes and Sea Pines Plantation.

There are mixed-use retail areas and centers of activity widely dispersed across the Island such as Hilton Head Plantation's Main Street, Indigo Run's commercial district, the Office Park



area and Coligny District outside Sea Pines, Pineland Station and Port Royal Plaza in the mid-island area, Shelter Cove Towne Centre at Palmetto Dunes and many others. Many of these retail and employment centers are convenient to adjacent planned communities and walking and biking to these centers is convenient for residents. Hopping a shuttle to go to other commercial properties and activity centers across the island is not currently an option, causing many to take their car to shop or work. A local shuttle system linking retail and employment centers across the Island could provide a significant alternative to single passenger vehicle use possibly expanding bicycle commuting and reducing local traffic on roadways.

Public transit options are often misunderstood. Social concerns along with a loss of flexibility and control, turn many communities away from the idea. The Hilton Head Island community could implement a public transit system in the form of a trolley or resort shuttle. The transit system could be designed around its core resort, commercial, planned community, historical and environmental assets. Focusing on an intra-Island shuttle system would reduce single vehicle travel on the Island while promoting interconnectivity between planned communities, beaches, parks, and commercial developments. Having a public transportation option could also increase business and sales tax revenues in restaurants, retail establishments, and along key routes.

Additional public transit options such as Uber or Lyft, allow residents and visitors to move around the Island without having to find parking or drive their own car. This type of transportation system is extremely popular in major cities with residents that routinely visit Hilton Head Island. This implementation would require flexibility and adjustments of security measures at community entrances.

### Recommendation 15: Create EcoDistricts

The Charleston Upper Peninsula Initiative is an urban eco-district designed to reinvent a formally manufacturing-heavy region of the community into a model for sustainable design and living. The entire district is being designed based on eight strategies:

- Strategy #1: Equitable Development
- Strategy #2: Urban Form + Pattern
- Strategy #3: Energy
- Strategy #4: Transportation + Mobility
- Strategy #5: Civic Places



- Strategy #6: Water + Ecosystem Function
- Strategy #7: Locally Sourced Materials
- Strategy #8: Urban Agriculture

The upper peninsula includes residential homes, multi-family units, restaurants and bars, entertainment venues and office space. This one stop location offers everything that residents need to live, work and play in one sustainable area. It includes energy efficient buildings, walkable and bikeable streets, local food sourcing, low impact water conservation street design, waste reduction technologies and more. The Upper Peninsula Initiative has already been recognized as a model for other areas of the community implementing policies and future programs. There are other examples across the country.

In an effort to revitalize underutilized areas, the community may choose to draw from the successes of the *Charleston Upper Peninsula Initiative* on the Island by designating areas of Hilton Head Island as EcoDistricts. These EcoDistricts could serve as pilot locations for both mitigation and adaptation strategies. Not only would this show residents what is possible, but be an attraction to visitors, providing an additional eco-tourism attraction on the Island.

#### **Recommendation 16: Develop a “Park and Ride” Infrastructure Connected to Shuttle System for on and off-island use**

Consider developing park and ride infrastructure to help reduce emissions and the number of vehicles miles traveled on the Island. Park and Ride systems could serve Bluffton commuting traffic and be placed at various location across Southern Beaufort County before the bridges. In addition, these facilities for resort and commercial property employees could be placed on the Island before the Cross Island Parkway. This system should be developed in tandem with the Island’s public shuttle system.

#### **Recommendation 17: Build and Develop Alternative Fuels Infrastructure**

Transportation systems on Hilton Head Island are currently powered by two fuel sources, unleaded gas and diesel fuel. Alternative fuel’s such as hydrogen, propane, natural gas, and electric are commercially available to Hilton Head Island. However, the corresponding infrastructure needs to be developed for these options to adopted. Electric Charging stations could be installed at commercial locations as well as strategic locations inside the planned



communities. Hydrogen, propane and natural gas fuel stations would need to be developed and built. These fuel sources can lower costs and have a smaller impacts on the environment than traditional gas and diesel.

The community could work with the alternative fuel industry associations to determine which fuel sources best fit for Hilton Head Island and assist with establishing a plan for infrastructure development. With these and other infrastructure improvements, Hilton Head Island could position itself into one of the first alternative fuel vacation destinations in the country. Additionally, vehicles and equipment such as golf carts, lawn mowers, trolleys, shuttles, cabs, government service vehicles and community and resort service vehicles could be converted and/or phased to utilize the new lower emission generating fuel source(s).

#### **Recommendation 18: Conduct Sustainability Training for Local Government Staff and Community Leaders**

Education programs regarding sustainability are key to informing and engaging community members, government staff and civic leaders about issues facing the Island. These programs could highlight local issues, best practices in implementation, and brainstorm solutions for more complicated matters. Some of these programs could be focused on emerging leaders similar to the Chamber of Commerce's Leadership Hilton Head Island program and be an immersion type/class experience. The overall goal is to inform constituents and build sustainability capacity in leadership and decision making so that implementation efforts and options can be reviewed, understood, streamlined, aligned, and acted upon for future success.

#### **Recommendation 19: Review ARB Guidelines in Planned Communities to Identify Opportunities to Reduce Impacts**

Architectural Review Boards (ARB's) of the Island's planned communities maintain standards and design guidelines regulating improvements. A review of community guidelines across the Island indicates that there is not a common approach to sustainable practices such as water conservation, green building techniques and renewable energy improvements. Some call for water-conserving systems using drip irrigation and other guidelines simply state that irrigation is required. Some allow solar panel and geo-thermal heat pump installation, others do not. These gaps create confusion in the market place thereby diminishing success of



broad based community buy in. In many cases, existing guidelines result in higher energy and water consumption.

The community could conduct a comprehensive review of ARB Guidelines across the Island to identify opportunities and suggest alternative approaches. Best practices in water and energy conservation such as LED light fixtures, in-ground moisture sensors, rain gauges and new low water flow sprinkler heads as well as renewable energy systems could make a drastic difference if applied across the Island.

### **Recommendation 20: Consider Single Hauler Options and Recycling Systems for Waste Management**

The waste management and recycling system on Hilton Head Island is inefficient in its current design and operation. Multiple waste haulers set up contracts directly with planned communities and individual homeowners. The result is an excessive number of waste trucks with different schedules, passing by properties to get to other properties. The overall impact is higher prices and more trucks on the roads than necessary, operating for longer periods than is required. Additionally, accurate waste tracking data at a community wide level is a challenge because there is no standardized method due to having multiple haulers.

The benefits of utilizing a single hauler or haulers for each community is the ability to cover the Island more efficiently, with less redundancy by strategically moving from parcel to parcel, block by block, in a coordinated and planned schedule. The result is less vehicles traveled between properties and a more efficient waste pick-up process. Curbside recycling efforts could mirror this system and greatly improve the single stream recycling program. Waste tracking efforts would be better managed, as data from a single waste hauler would be more accurate. Additionally, collaboration between the single waste haulers and sustainability initiatives could achieve greater outcomes to reduce waste volumes, meet waste and recycling expectations, and set a fair and equitable price for waste management efforts.

### **Recommendation 21: Provide Waste Audits for Businesses and Homes**

Waste is a minor source of emissions for the Island but important in reducing landfill volume contribution and waste management costs. Developing a waste audit function on the Island, offered to both commercial and residential properties is a way to establish authentic waste profiles (learning what people throw away versus recycle) and manage waste streams by



material. For example, waste audits that reveal large amounts of glass may prompt future efforts focused around glass recycling or the limiting of glass bottles on the Island. Alternatively, waste audits may reveal that residents and commercial buildings are doing a poor job of separating recycled materials and that programs such as pay-to-throw could be considered to increase recycling rates.

A waste audit function could be developed by the community in partnership with other audit type functions from other recommendations. This function could also be part of negotiations with a single waste hauler as recommended in Recommendation 20.

### **Recommendation 22: Work with Service Providers to Offer Energy Efficient Modems and Set-top Boxes to Subscribers**

In many homes, cable or satellite set-top boxes are large consumers of electricity. Devices that have DVR and HD functionality tend to be the largest energy consumers as compared to non-HD devices that do not have DVR functionality. The challenge with these devices is that local cable providers make the choice for which devices are provided. Users of these devices are not ordinarily given an option when choosing their device or even have the information or opportunity to consider the energy intensity of this technology.

Advocacy for energy efficient set-top box units and modems should be prioritized. Hosting meetings with leadership from Hargray and Time Warner and asking for existing equipment to be retrofitted and new equipment to be more energy efficient is a challenging, but significant win to reduce energy consumption. Additionally, the Town of Hilton Head Island has entered into a local cable franchise agreement with each provider and has some leverage as to which providers have the business on Hilton Head Island.

### **Recommendation 23: Develop an Energy Efficiency Program for the Island's largest Commercial Energy Users**

Commercial energy users should also be engaged to reduce Island-wide electricity use. As identified in the Responsibility section of the Baseline Sustainability Assessment, residential energy use is a slightly larger source of emissions than commercial consumers. However, a program could be designed to help large commercial energy users reduce consumption.



The first step is to create awareness by working with Palmetto Electric to identify the largest energy users on the Island. Developing a list of the top 10-25 users will create a priority list to target. Second, engaging these large consumers on their energy use through one-on-one discussions, energy roundtable meetings, or via a simple letter asking them to reduce energy usage can be the start to positive change. Third, rewarding reduction in energy consumption with incentives almost always proves successful. Many of these programs currently exist through Palmetto Electric; however, the end user may not be aware of these options. Additional incentives in the form of recognition by the Town or Chamber, financial incentives in the form of one day/week/month tax breaks could help prompt involvement.



## **Adaptation Milestone Two: Set Preparedness Goals**

The second ICLEI Milestone for Adaptation is the development of Hilton Head Island Climate Preparedness goals. These goals need to consider what activities should happen today to prepare and sustain Hilton Head Island for future generations. They should also align with the results of the climate risk study, which were completed as part of the Risk portion of the Baseline Sustainability Assessment.

### ICLEI's FIVE MILESTONES FOR CLIMATE ADAPTATION

 Adaptation Milestone One: Conduct a Climate Risk Study

#### **Adaptation Milestone Two: Set Preparedness Goals**

Adaptation Milestone Three: Develop a Climate Preparedness Plan

Adaptation Milestone Four: Publish & Implement Preparedness Plan

Adaptation Milestone Five: Monitor & Re-evaluate Resiliency



Included in Baseline Sustainability Assessment

As identified in the risk assessment portion of the Baseline Sustainability Assessment, preparedness goals should focus on impacts related to sea level rise and increased flooding. Secondary impacts such as increased temperature, effects to critical infrastructure should also be considered.

Preparedness Goals should meet the following criteria.

1. Upgrade the existing built infrastructure that is in harm's way. Climate preparedness is the responsibility of all relevant authorities.
2. Avoid putting anything new in harm's way. Communities can use a range of regulatory and planning tools to curtail new development in coastal locations subject to tidal flooding now and in the future.
3. Land Use Comprehensive Planning should support climate preparedness efforts.
4. Zoning and planned community ordinances should not restrain climate preparedness and should be adjusted if found to do so.
5. Building and development plans and building codes should effectively define climate preparedness measures or be rewritten to do so.



6. Capital Project Budgets (spending on infrastructure, capital improvements, and community re-development) should include reasonable and comparable funding to support climate preparedness efforts.
7. Climate preparedness incentives (smart growth/bonuses/preservation) should focus on Island assets most at risk and change over time as risks change.

Climate preparedness on Hilton Head Island should also focus on the following elements. Specific recommendations for each are explained further in a later section of the report.

- A. Programs that protect critical infrastructure
- B. Properties and assets that are most at risk
- C. Healthcare facilities that ensure resiliency has an effective plan
- D. Discussions on climate preparedness
- E. Adaptation measures in existing planning processes



### **Adaptation Milestone Three: Develop a Climate Preparedness Plan**

The third ICLEI Milestone for Adaptation is the development of Hilton Head Island Climate Preparedness Plan. Ideally, creating a short and simple climate preparedness plan can support efficient progress. The plan should detail steps for specific organizations to take, and suggest tangible Island-wide actions. The goal of the Climate Preparedness plan is to better manage and reduce sustainability impacts while increasing the Island's adaptive capacity.

## ICLEI's FIVE MILESTONES FOR CLIMATE ADAPTATION



Adaptation Milestone One: Conduct a Climate Risk Study

Adaptation Milestone Two: Set Preparedness Goals

**Adaptation Milestone Three: Develop a Climate Preparedness Plan**

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Included in Baseline Sustainability Assessment

One such manner to complete the climate preparedness plan is through the VCAPS process. The VCAPS, or Vulnerability, Consequences and Adaptation Planning Scenarios, is a participatory modeling and engagement technique in which the community is presented with data regarding environmental risks and solutions.

The VCAPS process typically involves a series of meetings in which a team of climate experts, planning professionals, trained facilitators, and diagramming scribes present researched information to the public. Along with climate data, scenarios are presented to the public for consideration and discussion. These scenarios include both threats to the community as well as predetermined mitigation and adaptation solutions (such as those found in this document).

Each meeting includes a facilitated conversation that can be used to plan and implement adaptation and mitigation strategies. The intangible output is a community that has greater buy-in to the planning efforts due to the fact that they have taken part in its creation. Regional communities that have utilized the VCAPS process include Dauphin Island, Alabama, Orange Beach, Alabama, and Plymouth, North Carolina. Locally, McClellanville, Sullivan's Island and most recently, the City of Beaufort and Port Royal have participated in the VCAPS process.



The South Carolina Sea Grant Coastal Climate Extension Office supported the recent effort of the VCAPS process in Beaufort and Port Royal. It is a valuable local source and should be included in the Hilton Head Island process to build collaboration capacity. Finally, it should be noted that the first step in the VCAPS process is the collection of local hazards and relevant mitigation and adaptation strategies. This Baseline Sustainability Assessment takes care of that first step.

The following recommendations may be referenced to stimulate discussions in the VCAPS process or as a standalone climate preparedness planning effort. Based on the findings in the Baseline Sustainability Assessment, this list was developed specifically for reference when developing Hilton Head Island's Climate Preparedness Plan.

**Figure 5.3 Risk Recommendations**

Recommendations	
Recommendation 1	Improve regulations for buildings within the 100-year floodplain
Recommendation 2	Develop a rebuilding and repair housing assistance program
Recommendation 3	Study and implement programs to encourage retrofits of existing buildings with improvements in low lying areas of the Island
Recommendation 4	Work with Insurers to incorporate resiliency standards in insurance underwriting
Recommendation 5	Work with FEMA to increase deductibles and recommend residents select higher deductibles
Recommendation 6	Work with utilities to reflect climate risks in system design and equipment standards
Recommendation 7	Work with critical service providers to ensure operability and resiliency
Recommendation 8	Consider the resilient design aspects of the Hilton Head Hospital
Recommendation 9	Adopt resiliency design standards for potable water and wastewater treatment facilities
Recommendation 10	Work with third-party service providers to protect critical assets and networks
Recommendation 11	Protect natural resource infrastructure to assure greater climate change resiliency
Recommendation 12	Review beach re-nourishment plans to assure long term health and resiliency of beaches



### **Recommendation 1: Improve regulations of buildings in the 100-year floodplain**

The current rules for flood-resistant construction incorporate elevations from the most recently adopted FEMA FIRM maps, but those have not been significantly updated since 1984. The Town has done a good job tracking proposed FIRM map changes and should continue to modify FEMA flood zones across the Island as updates are issued. The community might also consider changes that introduce resiliency measures, such as elevation guidelines for mechanical equipment in the zones that currently do not require these measures.

Looking to the future where sea level rise could result in flood elevations beyond the 100-year floodplain, the community might consider establishing a set of interim metrics to indicate whether sea levels around the Island are rising at expected rates. These matrices could be updated in conjunction with the Land Use Comprehensive Planning Process, the Hazard Mitigation Plan Updates and future re-writes of the Land Management Ordinance. If, by 2020, sea level rise surpasses the metrics put forth by these measurements, appropriate Building Codes could then be amended to require the changes noted above.

### **Recommendation 2: Develop a rebuilding and repair housing assistance program**

Develop a program to assist with rebuilding and repairing seriously damaged buildings in economically distressed areas that, due to flooding, should be completely rebuilt or substantially improved to higher resiliency standards. The Town with Federal Funds or a privately funded entity, could assist financially challenged owners in rebuilding and significantly improve these properties based on the most accurate floodplain data. The purpose of this program is to make it both physically and financially feasible for owners of buildings in economically distressed areas, that are in the 100-year floodplain to retrofit their buildings to current Federal flood-resistant construction standards.

### **Recommendation 3: Study and implement programs to encourage retrofits of existing buildings with improvements in low lying areas of the Island**

Land use studies would be helpful to address planning issues in low areas that are vulnerable to flooding. The results would identify ways to facilitate and encourage voluntary retrofits of existing vulnerable buildings over time. This effort should be undertaken in close consultation with local residents, elected officials, and community stakeholders since these studies will focus on the challenges posed by the combination of flood exposure, the vulnerability of the



building types that are found in these areas, and low elevations that could make retrofit of vulnerable buildings expensive and/or complicated.

Local designers might develop a set of revised Island-wide principles and guidelines while designing flood-resilient buildings. This strategic and evidence based reference would be a helpful tool to Hilton Head Island's construction and revitalization for the future generations.

**Recommendation 4: Work with Insurers to incorporate resiliency standards in insurance underwriting**

Consistent with the principle of risk-based premiums, any measure that reduces a property's risk of damage should be reflected in a reduction in the cost of insurance. Investments in mitigation have many long-term benefits, including protecting lives and reducing the risk of property losses. Insurers and lenders also benefit when policyholders invest in mitigation by reducing their potential exposure to loss. However, based on the current NFIP rating system, insurance costs can be reduced significantly when a building is elevated above the base flood elevation.

Outreach to insurance underwriters could start dialogue about collaboration on ways to transform Hilton Head Island into a resilient community. Through partnerships with other flood prone planned communities across the Island, the community could collectively identify and demonstrate effective strategies and programs to reduce flood risks and assigned insurance rates. The output of such programs could be lower insurance costs that keep the Hilton Head Island real estate market strong and the community competitive as a vacation destination.

**Recommendation 5: Work with FEMA to increase deductibles and recommend residents select higher deductibles**

Currently under the National Flood Insurance Program (NFIP), deductibles up to \$50,000 are allowed for commercial policies, but residential policies are limited to a maximum deductible of \$5,000. The NFIP made recommendations to increase maximum deductibles to \$10,000 as of April 2015. Estimates show that this increase in deductible could reduce rates by more than 30 percent, while a \$25,000 deductible could cut premiums in half. The \$25,000 maximum is not currently proposed and would likely be available only to property owners



who do not have Federally backed mortgages, and Hilton Head Island could be poised to benefit from such changes.

Working with FEMA to evaluate the higher-deductible option could result in premium reductions for various property types, and could determine which property owners would be best served by higher deductibles. Based on an analysis of real estate values, it is likely that the Island's property owners can afford the higher deductible and therefore, could reduce monthly NFIP premiums.

In connection with the introduction of higher deductible policies, the Town could lobby for FEMA to initiate a comprehensive policyholder education initiative to help consumers choose a deductible level that they can afford, while avoiding the potential for underinsurance in the event of a loss.

**Recommendation 6: Work with utilities to reflect climate risks in system design and equipment standards**

The community's utility systems should be capable not only of reliable day-to-day operation, but also of remaining operational during extreme weather events (such as hurricanes, tropical storms, and heat waves), as well as recovering quickly if parts of the system fail.

The Town of Hilton Head Island and Palmetto Electric are currently working to bury 108.63 miles of overhead power lines on the Island with a completion date of 2019. This program is funded by rate payers through the Hilton Head Island franchisee fee which was adopted by the Town in November 2004. This is a valuable investment, as an underground power system allows the Island to better withstand lightning, tropical storms and low level hurricanes.

The community could also explore how possible future increases in average temperatures of only 1 degree Fahrenheit might affect peak energy demands. Coordination and proactive engagement now could ensure that Palmetto Electric incorporates temperature and humidity forecasts in bulk power system planning and buying. This could also encourage Palmetto Electric and Santee Cooper planners to adjust long-term plans for resource adequacy and transmission reliability, to ensure that power supply will be adequate and affordable, even if the climate changes.

Discussions may also include the topic of design efforts to increase resiliency in all of the Island's utility systems. The community could organize and facilitate annual discussions among utilities to examine system designs and possible changes to standards that might



accommodate higher ambient peak temperatures, longer heat waves, extended exposure to flooding and saltwater, and stronger and more sustained winds.

**Recommendation 7: Work with critical service providers to ensure operability and resiliency**

Hospitals, nursing homes, and adult care facilities rely on extensive equipment and utility services to diagnose, treat, and care for patients. Basic utilities such as power and water supply; building equipment for heating, ventilation, air conditioning, and elevator systems; medical equipment including diagnostic labs, X-ray machines, and medical gas tanks; and other services such as kitchens and laundry rooms are all integral to regular patient care. This equipment is typically located in the facilities' lower levels, which can be at risk of flooding during extreme weather events. Many providers have operational plans and workarounds for these systems in case of disruptions.

Given Hilton Head Island's aging populations and examples from previous storm events in other communities, select systems (specifically power, water, heating, and air conditioning), require both operational planning and physical hardening to make them more resilient. These systems are the foundation of a facility's infrastructure and are essential for the operation of all other services and equipment, including emergency operations. Without reliable system functionality, providers cannot ensure safe patient care will be available, and evacuation may be the only option. Furthermore, severe damage to these systems can result in long-term facility closures with repairs that can take many months.

Facilitating discussions with healthcare providers and retirement facilities focused on preparedness are recommended. The focus would be to evoke actions to ensure critical building systems are physically protected from the impacts of extreme weather. These discussions could address facility responses to outages, and sharing best practices and designs of backup systems. A collective effort might also identify financial assistance programs to support the mitigation projects of providers who have limited funding sources. These basic, but proactive steps could help minimize the risk of evacuating patients and help improve the overall resiliency of critical healthcare facilities.



### **Recommendation 8: Consider the resilient design aspects of the Hilton Head Hospital**

Hilton Head Regional was constructed in one of the higher areas of the Hilton Head Island, but is still located in the 500-year floodplain. As such, this facility could experience severe system failures due to storm surge and may be at risk of evacuating patients. One significant relevant example of this type failure is the New Orleans scenario as part of Hurricane Katrina.

Hilton Head Regional may already meet several of the requirements outlined below, but conversation on protection measures for these systems could help uncover limitations. The goal is to establish a resiliency discussion so that essential facilities remain operational during critical events. Should existing planning and protection measures not be adequate, one option to explore is establishing a new code requirement for higher levels of protection and critical systems redundancy.

Discussion with the Hospital might also identify strategies to improve resiliency related to electronic data and communications technologies. One example is ensuring that the Hospital increases its IT and telecommunications resiliency by installing two independent points-of-entry for telecom and communication to reduce the risk of outages from a single supplier.

The facility could also ensure that electrical equipment, emergency power systems, and domestic water pumps are protected at the 500-year flood elevation by raising or hardening equipment in place, or dry flood-proofing basements and lower floors. Additionally, it is important that emergency power systems, including generators and fuel pumps, are accessible to building staff at all times. This ensures that emergency power can be maintained continuously, even during flood conditions.

Finally, the Hospital could install backup air conditioning service for inpatient care areas in case of utility outages, such as chillers on emergency power; pre-connections for temporary boilers and chillers if primary equipment is not elevated; and pre-connections for external generators as a backup power source in case the hospital must run on emergency power for extended periods.

### **Recommendation 9: Adopt resiliency design standards for potable water and wastewater treatment facilities**

Adoption of resiliency standards for an increased level of protection for design and construction of all three Public Service District (PSD) facilities might be considered. The



standards would be based on proposed changes to FEMA Flood Insurance Rate Maps and consider implications of possible sea level rise projections for 2050.

Hilton Head Island's three PSD's have each been dealing with the effects of saltwater intrusion since the late 1990's, and each have critical equipment that provides potable water to residents and businesses. Both Hilton Head PSD and Broad Creek PSD entered into agreements with Beaufort Jasper Water and Sewer Authority (BJWSA) to supply water from the Savannah River via a pipeline constructed in 1999 that transports treated Savannah River surface water to the Island. Hilton Head PSD as well as South Island PSD have also built reverse osmosis drinking water treatment plants to provide for additional water source diversification.

Resiliency improvements could include efforts and recommendations to harden pumping stations. Some of the communities pumping stations are located in low-lying areas which makes them vulnerable to storm surge. Protective measures could include raising or flood-proofing critical equipment, and/or installing backup power supplies.

Design improvements could also include hardening the wastewater treatment plants. All three of the community's wastewater treatment facilities are located on the Island. In the event of significant coastal storm flooding, all are at risk. Improvements may be needed to protect these facilities by raising or flood-proofing these assets that are critical to the treatment process. Possible options to consider may include constructing barriers, improving infrastructure, or implementing redundancy measures to avoid failure of these important treatment systems.

The Island PSD's have conducted, and continue to engage in future water supply demand analysis and planning. The community might facilitate discussion among all three PSD's to identify collaboration opportunities to improve resiliency and efficiency collectively. This effort may influence future improvement opportunities that ensure a longterm and high quality source of drinking water for the Island.

**Recommendation 10: Work with third-party service providers to protect critical assets and networks**

Third party vendors such as internet, cable television, telephone service providers and waste hauling companies own and operate assets on the Island that are critical to the its daily



functioning. Disruption to these assets due to a major disaster could cause significant impacts.

Internet and cable providers lease equipment to consumers and also maintain power supplies along the cable network. These systems are prone to disruption from storm or flooding events and should be audited for resiliency. In addition, ensuring back-up capacity with redundant equipment at nearby locations could help reduce recovery time.

Potential disruptions to the solid waste disposal and removal process due to damaged waste hauling and storage equipment might also be evaluated. These assets are critical to maintaining a healthy environment for all Island inhabitants. A community effort to work with the network of waste haulers could identify resiliency measures and encourage those network members to plan for the provision of backup equipment and processes.

**Recommendation 11: Protect natural resource infrastructure to assure greater climate change resiliency**

According to reports from the U.S. EPA, healthy waterbodies have a tolerance for a 10-15% threshold of impervious surface cover. Once the impervious surface area exceeds 15%, the health and quality of adjacent aquatic systems begin to decline.

The Island's land mass above the high tide line is approximately 34.5 square miles, with approximately 5 square miles covered with impervious surfaces. This equals an impervious surface area percentage of 14.4%. The Island is broken down into 34 watersheds, of those watersheds, 31 are over 10% and 23 are over 15% impervious surface area. The Town's comprehensive ordinances and development regulations are largely responsible for the high quality environment on the Island and protecting and managing impervious coverages. The community sustainability initiative should support the Town's continued effort to assure that these ratios are not exceeded over time.

The current requirements for tidal and freshwater wetland buffers help to maintain pervious surface areas and improve stormwater runoff retention on site. However, if greater rainfall amounts occur as indicated by climate change projections, increased runoff retention may be a needed resiliency measure. Stormwater treatment facilities could improve runoff filtration and also have the ability to improve groundwater recharge rates. Additional site design standards could be explored and used when updates to the Land Use Comprehensive Plan and Land Management Ordinances occur. Additional exploration of ideas to address the



Island's ability to hold more water from larger storm events and rising seas would also be a valuable investment for Island sustainability.

**Recommendation 12: Review beach re-nourishment plans to assure long term health and resiliency of beaches**

The Town of Hilton Head Island invests significantly in beach re-nourishment projects that rebuild portions of the beach that are reduced or lost due to erosion. As a result of sea level rise, the Town may need to extend beach and dune protections in areas not previously protected. A continued commitment to implement its Capital Improvement Program and Land Acquisition Program to develop, renovate, or expand beach parks, especially in areas that may become susceptible to sea level rise, is strongly recommended.

A map could be developed to identify areas where beaches may change and evaluate properties that could be at risk due to sea level rise. Language in the Land Use Comprehensive Plan, Beach Management Plan and LMO could also be updated to ensure beach management practices associated with development are consistent and effective in light of Hilton Head Island's exposure due to possible climate change impacts. While many of these protections are already in place, further exploration would be important to understand which portions of the beach might have the highest risk, as well as which beaches may grow in size from these impacts.

It would be a valuable exercise to review the long term projections for cost of beach re-nourishment programs in light of possible sea level rise projections. Will the frequency of the program need to be increased? Will new sources of material need to be identified to support the program? Is the current funding structure and revenue stream adequate over the long term? These and other questions might be part of community discussions to consider all possible impacts due to long term changes in the environment, the weather and rising sea levels.



**Examples of other Communities taking Resiliency action:**

Savannah is a major port city that also boasts one of the nation's most extensive National Historic Landmark Districts. The waterfront is in many ways the engine behind the city's past and present prosperity. Founded as a major cotton export city, Savannah's cobbled streets and old warehouses draw millions of visitors each year, and provide a popular hub for recreational fishing. However, the city is entering a new era, as riverfront buildings experience increased flooding at high tide.

Neighboring Tybee Island, at the mouth of the Savannah River, was once known as Savannah's beach. The Island has a permanent population of approximately 3,000, which swells to 30,000 during the summer. As Georgia's most densely developed barrier island, Tybee Island has a colorful past, as the haunt of the notorious pirate Blackbeard. Like Savannah, this vacation destination acknowledges that it sits on the front line of sea level rise and is already taking steps to adapt. These efforts include raising the elevation of electronic controls for city wells, placing tide gates on storm-sewer outflows, raising roads, and nourishing eroding beaches. The Mayor of Tybee Island has also signed the U.S. Conference of Mayors Climate Protection Agreement along with 1,060 other mayors across the United States.

Floods in the Savannah area, including Tybee Island, now occur about 10 times per year, up from an average of only five or less some 40 years ago. The Island is served by a single highway, Highway 80, which has become particularly prone to tidal flooding during a full or new moon. When water floods this and other roads, residents often contend with standing water, and downtown parking lots become inaccessible. Conditions are worse during higher spring tides, which occur twice a month when sun, moon, and earth align. At these times, flooding can affect many sections of downtown, as well as stretches of the railway to the Port of Savannah.

Onshore winds and low-pressure systems off the coast often aggravate flooding by pushing water against the shore and allowing successive tides to build up. On those occasions, storm sewer pipes on parts of Tybee Island fill with sea water and cannot drain into the ocean, therefore, back flow occurs. Such events leave cars abandoned and properties flooded. Projections show that by 2030, only 15 years from now, Savannah could see more than 30 tidal floods per year—a threefold increase compared with today. And sea level rise of almost half a foot will transform today's nuisance tidal floods into more dangerous and damaging ones, with conditions that now occur only during the worst tidal floods. Projections for 2045



are stark: Savannah could see a foot of sea level rise and a 10-fold increase in tidal flood events— to more than 100 annually. Each year, about 10 of those floods would fall into the extensive category, affecting highways, houses, businesses, infrastructure, and parks, across an expanded area of the city and region.

Dealing with sea level rise is a steep challenge for historic coastal cities and low-lying barrier islands, but it is one that both Savannah and Tybee Island are tackling. In southwest Tybee Island, which has seen chronic flooding, large-diameter pipes with tide gates—a multimillion-dollar project—now prevent seawater from flowing into the sewer system. These pipes can also store rainwater to limit flooding when heavy rains occur with high tides. Other neighborhoods have retrofitted storm sewers, and the Island has built five canal pumping stations to deal with the highest tides. More projects to increase resilience in the face of flooding are in the works.

The Chatham County-Savannah Metropolitan Planning Commission has suggested that Savannah retrofit bridges with deeper foundations and increase the capacity of culverts to cope with both rainfall and seawater. In the longer term, the region plans to elevate new bridges and dig deeper foundations to enable infrastructure and buildings to withstand continued flooding. Other ideas include raising roads, building dunes, and even moving vulnerable facilities and infrastructure.



