



THE UNIVERSITY of
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SCHOOL OF LAW



INCREASING CLIMATE RESILIENCE ON DAUPHIN ISLAND THROUGH LAND USE PLANNING



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I. INTRODUCTION

Dauphin Island, Alabama’s only barrier island, is located about five miles south of Mobile. About 1,200 residents call Dauphin Island home. Most year-round residents live on the island’s East End, while the West End of the island consists mostly of vacation homes and rental properties. Branding itself as the “Sunset Capital of the World,” the Town of Dauphin Island (Town) markets itself as an affordable, family-friendly, and old-fashioned vacation destination, an alternative to the more popular Spring Break beaches along the Gulf coast. In addition to its beaches and fishing opportunities, the island is home to an Audubon bird sanctuary on the East End.

Dauphin Island, like all barrier islands, is ever changing, constantly battered by waves and storms. The forces of erosion, flooding, and storm surge have significantly altered Dauphin Island over the years. In 2007, researchers estimated that Dauphin Island was 16% smaller than it was in 1958.¹ As a low-lying barrier island with an average elevation of only 7.2 feet and barely a mile wide at its widest point, Dauphin Island is especially vulnerable to sea level rise and other climate-related phenomenon that may intensify the forces already altering the island.

In addition to erosion, other climate stressors are threatening the ecology and economy of the island and surrounding region. The beaches on the western end of Dauphin Island are receding, resulting in the destruction of a significant amount of Alabama’s coastal marshes, which provide valuable habitat for the region’s abundant fish and wildlife. The loss of these marshes poses a threat to the state’s seafood industry and could have a significant economic impact on the region.

Dauphin Island’s Audubon Bird Sanctuary serves as a vital stopover for migratory birds. Unfortunately, climate stressors are threatening this ecological and economic asset. In addition to impacts from temperature changes, salt spray from storms can stress or kill native trees in the sanctuary, leading to a loss of the sanctuary’s canopy and valuable wildlife habitat. Further, a loss of native trees could allow invasive species like popcorn trees to take over the sanctuary, which will both threaten the native wildlife habitat and cost money and resources to eradicate. The loss of birding habitat would also reduce the number of birders traveling to the island, adversely affecting the Town’s tourism economy.

1. Robert A. Morton, *Historical Changes in the Mississippi-Alabama Barrier-Island Chain and the Roles of Extreme Storms, Sea Level, and Human Activities*, 24 *JOURNAL OF COASTAL RESEARCH* 1587-1600 (2008).

Recent storms have also devastated some of the rental properties on the island. Combined, Hurricanes Ivan and Katrina resulted in the loss of over 300 homes. Since Dauphin Island is reliant on tourist revenue, the loss of beach and rental properties can have a profound impact on the island. With fewer rental homes, less tourists are able to visit the island, which can result in lower sales, gas, and lodging tax revenue and adversely affect the Town's businesses and restaurants.

Local governments need to prepare both their officials and the community at large for an uncertain future. With climate stressors threatening the island's valuable resources, Dauphin Island residents and decision-makers need to understand the changing environment and the adaptation options available to make the island more climate resilient. In order to adequately plan for these climate stressors, they need to understand what climatic shifts are already underway in the region and community, what changes are expected in the future, and how these changes are anticipated to impact the island.²

Even armed with this knowledge, however, state and local policymakers will face significant management challenges in their efforts to address and mitigate climate change impacts on Dauphin Island. Several entities have management authority on Dauphin Island. A mayor and five-member town council govern the Town of Dauphin Island and are responsible for establishing policy, managing land uses, and providing governmental services like public safety and solid waste disposal. Assisting the mayor and the town council with development on the island is a planning commission. The Dauphin Island Water and Sewer Authority, which operates independently from the Town, provides water and sewer services. Finally, the Dauphin Island Park and Beach Board manages the island's public parks, beaches, campgrounds, and other recreational facilities. Like the Water and Sewer Authority, it operates independently from the Town.

Further, the forces of nature do not affect all parts of Dauphin Island equally. The East End is relatively stable, due in part to riprap and groins around Fort Gaines and bulkheads constructed on the island's sound-side shores. In comparison, the West End is susceptible to storm overwash and erosion on the Gulf beaches. A recent study found that two independent processes have dramatically altered the western three-fourths of the island.³ The island is moving to the north due to erosion on its Gulf beaches and storm overwash.⁴ These forces have significantly changed the shoreline on the West End. Property lines have consequently been thrown into a state of uncertainty, further complicating management actions on the West End.

2. See ICLEI - LOCAL GOVERNMENTS FOR SUSTAINABILITY, PREPARING FOR CLIMATE CHANGE, A GUIDEBOOK FOR LOCAL, REGIONAL, AND STATE GOVERNMENTS 49 (2007).

3. Morton, *supra* note 1, at 1587-1600.

4. *Id.* at 1593.

Compounding these physical differences are development patterns on the island. Many of the Town's permanent residents live on the more stable East End, while the West End contains mostly rental properties. Because of this, there is tension on the island about how to manage the erosion and storm damage on the West End, as the permanent residents of the East End feel they are financing projects on the West End for the benefit of others.⁵

Finally, the residents of the island have an extremely strong sense of place. "Sense of place" is often described as the feeling of community one receives upon arriving. Dauphin Island, with its unique barrier island location, beautiful beaches, and nature preserves has all the makings of an engaging place. Dauphin Island residents have a strong vision for what they believe the island to be, and can be strongly resistant to change, especially if management actions are perceived to be changing the character of the island. The challenge for the Town is to funnel that passion for place into climate adaptation policies and recommendations that maintain the desired character of the island.

Dauphin Island Climate Resilience Study

In 2012, the Mississippi-Alabama Sea Grant Legal Program (MASGLP), which is a part of the Mississippi-Alabama Sea Grant Consortium's Outreach Program, partnered with the Town and Park and Beach Board to undertake a multi-year climate resilience study for Dauphin Island. The project aimed to improve the capacity of Dauphin Island to adapt to changes in climate. To reach these objectives, the project was structured in two phases: an information gathering stage that aimed to assess the island's vulnerabilities and risks and an analysis stage to develop recommended policy responses for the identified vulnerabilities and risks.

The MASGLP began with background research on the climate-related threats facing Dauphin Island. The MASGLP accomplished this through two primary activities: (1) drafting a scoping document and (2) hosting a Vulnerability-Consequence Adaptation Planning Scenarios (VCAPS) workshop.⁶ The scoping document, entitled *Climate Impacts for the Southeastern U.S. and Dauphin Island, AL* and released in May 2013, discusses the current effects and future impacts of climate change on the island.⁷ This includes land loss and sea level rise, stronger storms, and rising temperatures. In addition, changes in precipitation are anticipated, including heavier downpours, longer periods of dryness between storms, and longer and more intense droughts.

5. SOCIAL AND ENVIRONMENTAL RESEARCH INSTITUTE, RESULTS FROM A VCAPS PLANNING WORKSHOP FOR EXTREME WEATHER IN DAUPHIN ISLAND, ALABAMA: FINAL REPORT (2013), <http://www.vcapsforplanning.org/docs/Dauphin%20Island%20Report.pdf>.

6. For a more in-depth discussion of the Dauphin Island Scoping Document and VCAPS workshop, see Catherine Janasie, *Climate Resiliency on Dauphin Island, Alabama*, Vol: 6:2 SEA GRANT LAW & POLICY JOURNAL 54 (2014), available at <http://nsglc.olemiss.edu/sglpj/vol6no2/sglpj-v6.2.pdf>.

7. CATHERINE JANASIE, CLIMATE IMPACTS FOR THE SOUTHEASTERN U.S. AND DAUPHIN ISLAND, AL (2013), available at http://masglp.olemiss.edu/Advisory/dauphin_island_scoping_document.pdf.

To assist the Town in its planning and adaptation efforts, the scoping document discusses the potential impacts that these climate changes could have on the island's natural resources and ecosystems, transportation and access to and around the island, and the local and regional economy. For example, sea level rise poses a threat to the island's roads and docks, which could become unusable as the result of flooding. Climate stressors on the island may also enable invasive species to thrive on the island, threatening the wildlife habitat and bird sanctuary, which would have both ecological and economic impacts.

The information-gathering phase of the project also involved a Vulnerability-Consequence Adaptation Planning Scenarios (VCAPS) workshop hosted by the MASGLP and the Mobile Bay National Estuary Program (NEP) on Dauphin Island in December 2012. VCAPS, created by North and South Carolina Sea Grant, the Social and Environmental Research Institute (SERI), and the University of South Carolina, is a facilitated, scenario-building process that uses an interactive, computer-based program to create a diagram that helps generate local adaptation options. In addition to representatives from SERI, the Mobile Bay NEP, and the Mississippi-Alabama Sea Grant Consortium, participants included representatives from the Town, Park and Beach Board, Water and Sewer Authority, Planning Commission, Dauphin Island Sea Lab, and Dauphin Island Property Owners Association.

At a VCAPS workshop, trained facilitators lead participants through a discussion while using software that diagrams pathways that link climate stressors, vulnerabilities, and consequences with appropriate local adaptation options.⁸ The facilitators provide the participants with a locally relevant climate scenario, such as increased rainfall, and then the participants engage in a diagramming process to define the potential climate implications for the area, including any factors that make the community unique and how the stressors might affect management decisions. The facilitator will also ask the group for actions that private individuals and public institutions could take to address identified issues.

The participants of the Dauphin Island VCAPS workshop chose to discuss severe coastal storms and the effects of storms in connection to sea level rise. The discussion of these stressors highlighted both the tension between the eastern and western ends of the island and the difficulty in identifying actions for the island to take to improve climate resilience.⁹ For instance, when discussing the long-term viability of the West End, there was a great deal of tension between those who feel it is costing too much to repeatedly rebuild the West End and those who feel that rebuilding the area is essential to the long-term economic viability of the island.

8. For more information on the VCAPS process, see <https://sites.google.com/site/vcapsprojects/home>.

9. SOCIAL AND ENVIRONMENTAL RESEARCH INSTITUTE, *supra* note 5.

Planning for Climate Resilience

During the second phase of its climate resilience study for Dauphin Island, the MASGLP analyzed the various types of planning actions that the Town could take to increase the island's climate resilience, and whether these options are feasible on Dauphin Island. The MASGLP completed this analysis by reviewing Dauphin Island's current ordinances, as well as the various state and federal laws that will affect its land use decisions. The MASGLP also looked to other towns that are facing similar issues to see if any provide models the Town could adapt.

Part II of this document provides an overview and history of barrier island development. Part III discusses local land use authorities available to the Town, as well as state and federal constraints on this authority. Since the main issues facing Dauphin Island revolve around erosion and flooding, the MASGLP focused on three priority action areas:

- Protect and enhance the natural environment;
- Protect and enhance Dauphin Island's built environment; and
- Strengthen Dauphin Island's structures.

Part IV discusses legal issues arising in each of these focus areas, as well as current or potential actions that the Town could take to address climate stressors. While some of these options are simple, short-term solutions, the document also discusses longer-term, more progressive actions the Town could take. These actions items include:

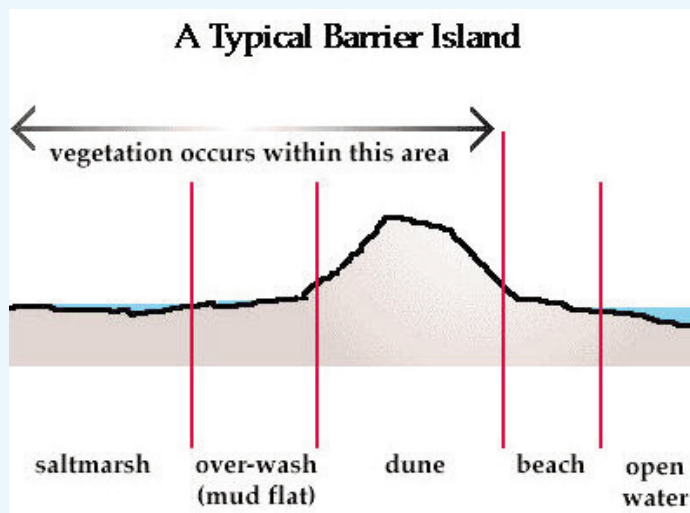
- To protect and enhance the natural environment:
 - o Determining where the dividing line is between private and public property on the island's beaches; and
 - o Updating the language in the Conservation Park section of the zoning ordinance to restrict development in the island's environmentally sensitive areas.
- To protect and enhance Dauphin Island's built environment:
 - o Including climate adaptation provisions in the Working Waterfronts section of the zoning ordinance, such as a requirement to include sea level rise estimates in planning documents; and
 - o Providing outreach on Low Impact Development techniques to help manage stormwater and flooding on the island.
- To strengthen Dauphin Island's structures:
 - o Considering regulations the Town could implement to make new structures in the vulnerable parts of the island more climate resilient, while encouraging more dense development on the more stable East End;

- o Creating vegetation guidelines to help control the amount of vegetation on the island and provide more protection for the island's structures; and
- o Providing outreach to homeowners on actions they can take to better protect existing structures on the island.

II. BARRIER ISLAND DEVELOPMENT AND HISTORICAL PERSPECTIVES

Few natural environments in the United States are defined by constant change quite like barrier islands. On a geologic time scale, barrier islands are quite young, with the majority being less than 7,000 years old.¹⁰ Their size and general shape are primarily a function of wave action and sediment accumulation over time, and these islands serve as a natural barrier to the mainland against storm surge.¹¹ These dynamic forces of change have resulted in a kind of hierarchy of different natural environments. The first, and most important of these, is the dune system.

The dune system shelters the island from the full force of the wind and ocean spray. In these sheltered areas, vegetation takes hold, which reinforces the island's position and clears the path for the development of a mature barrier island ecosystem. In a pristine natural state, a barrier island's dune system generally consists of three dune types.¹² The primary dune traps sand coming from the ocean and is the first line of defense against ocean waves and storm surge. In the secondary dune, larger plants such as goldenrod begin to take root along the beach. The furthest dune from the beach, the tertiary dune, marks another zone of transition. Behind these dunes is where larger vegetation begins to take root and large shrubs, trees, and other forms of greenery start to supplant the sandy surfaces and dunes of the open beach.



Courtesy of the NOAA Fisheries office of Habitat Conservation,
<http://www.habitat.noaa.gov/about/habitat/barrierislands.html>

10. *Beach Nourishment: A Guide for Local Government Officials*, NOAA OFFICE FOR COASTAL MANAGEMENT, <http://coast.noaa.gov/archived/beachnourishment/html/geo/barrier.htm?redirect=301ocm> (last visited June 1, 2015).

11. *Barrier Islands-Habitat of the Month*, NATIONAL MARINE FISHERIES SERVICE, <http://www.habitat.noaa.gov/about/habitat/barrierislands.html> (last visited June 1, 2015).

12. Spencer Rogers and David Nash, *THE DUNE BOOK*, NORTH CAROLINA SEWA GRANT (2003), http://www.seagrant.umaine.edu/files/chg/RogersNashdune_booklet.pdf.

Eventually these larger shrubs and trees give way to yet another distinct environmental community: the salt marshes. This ecosystem generally dominates the portion of the island closest to the mainland. Here, the ground slopes gently down to the water since the island is not being bombarded by constant wave action. These coastal wetlands are subject to tidal influence and serve two important natural functions. First, wetlands are a refuge and habitat for many aquatic species. In fact, more than 75% of America's fisheries species depend on these habitats to provide their food, nursery habitats, and places of shelter.¹³ Second, these areas serve as another natural defense by buffering wave action and trapping sediments, adding to the long-term viability of the island.

All these factors make for a unique coastal ecosystem, as well as a unique set of challenges for the towns that occur on these barrier islands. Barrier islands are the product of a series of different, interdependent natural systems, which help stabilize the island. These different ecosystems, in concert with each other, maintain a stable state that helps barrier islands endure despite the forces of nature.

Barrier Island Development

Development on barrier islands was spotty at best before the 1950's. Navigating over open water kept both resident and visitor numbers down, as did difficult living conditions. Only a few hardy souls were willing to face the threats posed by the constant wind and waves, treacherous currents, and malaria and other diseases carried by mosquitoes. Although no two barrier islands developed in the same way, two general urban typologies emerged: maritime villages and coastal resort towns.

Maritime villages traditionally had a high number of working waterfronts, with many of the island residents involved in fishing and seafood processing. In maritime villages like the village of Ocracoke in North Carolina, residents sustained themselves on the bounty of the sea and built simple, small houses since the stunted growth of trees on the island made quality building materials scarce.¹⁴ Due to the scarcity of building materials, existing structures were also often reused and moved to suit the purposes of the island's inhabitants. Further, new structures were frequently located near dense thickets of native vegetation to reduce exposure to the elements. Hurricanes meant that residents could not become too attached to a particular home, and the every day, constant barrage of wind and sand also required that exterior features, such as siding or chimneys, be frequently replaced.

13. *What is a Salt Marsh?*, National Ocean Service, <http://oceanservice.noaa.gov/facts/saltmarsh.html> (last visited June 1, 2015).

14. National Registration of Historic Places Registration Form from Genevieve Keller, Tim Keller & M. Ruth Little for Ocracoke Historic District (Aug. 16 1990), <http://www.hpo.ncdcr.gov/nr/HY0634.pdf>.

Most barrier islands, however, were developed as coastal resort towns. Historic resort towns were not as economically reliant on fishing and other maritime activities as maritime villages, but faced the same challenging environmental conditions. Similarly, resort towns showed a distinct preference for structures that were flexible and adaptable, such as those that emerged on Wrightsville Beach, North Carolina in the late 19th and early 20th centuries. Coastal cottages were often built using easy to maintain wood shingles and wood shutters that helped protect the house against hurricanes and other forms of violent weather.¹⁵ As is the practice today, these coastal cottages were built on raised pilings or basements.

Unlike maritime villages, resort towns had the added challenge of dealing with a high, seasonal influx of people. Historically, resort towns managed this sudden surge in coastal tourism in one of two ways: the beach boardwalk and the public pavilion. Though not as prominent along the Gulf Coast shoreline as in other areas of the country, a boardwalk can enhance a sense of place and create high value public amenities that help structure the beach experience in a meaningful way. Further, the pavilion was where everybody gathered, including seasonal day-trippers from nearby cities. The social interactions and activities taking place in pavilions in early resort towns provides a useful historic precedent on how shared, community amenities can contribute to the quality of a place in a way that a simple beach access point may not.¹⁶

Development of Dauphin Island

So how many of these historic patterns touch upon Dauphin Island's unique story and experience? While few structures are left in town to indicate the earlier patterns of settlement, there are historic accounts to draw upon that provide insight into how past generations lived on the island. The island's modern role as a coastal resort and vacation getaway was already coming into place as early as 1915, during which time a hotel was operating on the island.¹⁷ Although it appears the Town did have some ferry service to bring visitors over to the island, easy access to the island was not available until the 1950's. Growth, therefore, remained minimal.

While other coastal resort towns dealt with a large, seasonal influx of visitors by building beach boardwalks and public pavilions, these structures were not highly used on Dauphin Island. In the 1920's, land speculation led some to advocate for the construction of a boardwalk that would have extended over many miles of the island. That plan never came to fruition. The amenities that did exist at that time were generally a few bathhouses and one public pavilion built for soldiers in World War I who were stationed at Fort Gaines.

15. National Registration of Historic Places Registration Form from Beth Keane for James D. and Frances Sprunt Cottage (Nov. 1, 2013), <http://www.nps.gov/nr/feature/places/pdfs/13000935.pdf>.

16. Billy Arthur, *Summer Lights*, OUR STATE, July 1998, <http://digital.ncdcr.gov/cdm/compoundobject/collection/p16062coll18/id/70033/rec/1>.

17. Frances Young, *A History of Dauphin Island Under Five Flags 1699-1989*, DAUPHIN ISLAND FOUNDATION, <http://www.difoundation.org/history.htm> (last visited on June 1, 2015).

Dauphin Island's Future

Although it is natural for barrier islands to change and move, climate stressors are exacerbating these natural changes. On barrier islands, wave energy tends to be low from the spring through fall, allowing some sand from offshore sandbars to be added to the shoreline. During storms, wave energy increases, and these waves can remove sand from the beach and

deposit the sand offshore. When wave and wind action return to normal, this sand may be slowly redeposited on the beaches. Strong storms, however, have the potential to remove a significant amount of sand from the beach very quickly. Both sea level rise and future storms could have an impact on the amount of sand eroded from Dauphin Island's beaches.



Photo of a pavillion on Dauphin Island, courtesy of Catherine Janasie.

Dauphin Island has already become less resilient due to repetitive storms, allowing weaker storms to have a larger impact on the island. With these weaker, seasonal storms, more areas of the island become flooded, which can interfere with roads and other transportation infrastructure and damage property and natural resources. Further, storms can move sand around the island, blocking roads and forcing the Town to expend resources cleaning up the sand. These stressors will likely also impact stormwater systems, as greater rainfall and sudden storm events can lead to sewer overflows that jeopardize water quality and human safety. These events can present risks to human health and can trigger boil water notices and beach closures.

With ever-changing shorelines, both people and resources are put in harm's way and the long-term future viability of the community is uncertain. For Dauphin Island, this creates issues for the island's current residents whose safety and property are put at risk, and for the future of the island, which is economically dependent on rental houses and tourist income.

The remainder of this document will focus on how Dauphin Island might be able to improve its climate resilience through local land use planning. The next section discusses the Town's authority to engage in land use planning, as well as limits placed on this authority by state and federal laws and regulations. Part IV will then examine specific climate adaptation actions that Dauphin Island could take to improve its resilience.

III. LOCAL LAND USE PLANNING

Regulation of land uses has traditionally been viewed as a local function, as opposed to a state or federal function. Land use authorities are generally split between state, regional, county, and local governments and entities. As an incorporated municipality, Dauphin Island has authority to manage development on the island through both its general police power and certain land use planning authorities delegated to it by the state of Alabama. Over the years, the Town has actively exercised these powers by forming a planning commission, creating a comprehensive plan, and adopting ordinances, including the Town’s zoning ordinance.

The police power is a broad grant of authority in Alabama that “extend[s] to all appropriate ordinances for the protection of peace, safety, health, and good morals of the people affected thereby.”¹⁸ The police power enables local governments to adopt resolutions and ordinances to achieve a wide range of purposes, including maintaining public safety, health, prosperity, comfort, convenience, order, and morals.¹⁹ Local governments in Alabama, therefore, have a great deal of authority to take local actions to provide for the general welfare of their residents and protect them from harm. Many actions to combat climate stressors would fall within this broad grant of police power authority. New building standards to strengthen structures against storms and minimize debris, for example, can be justified as actions to protect the health and safety of residents.

Although land use planning is traditionally exercised by local governments, states differ in how much power they grant to local governments. Alabama is a Dillon Rule state, which means a local government may only exercise the powers that are given to it through the state’s constitution and statutes, such as the authority to zone property. Local governments can also take actions that are implied by these express authorities; in other words, those necessary or incidental to its express powers. Finally, the local government can take all actions that are essential and indispensable to the town’s purpose.²⁰

18. Ala. Op. Att’y Gen. No. 2010-045 (Feb. 26, 2010) (quoting *City of Homewood v. Wofford Oil Co.*, 232 Ala. 634, 169 So. 288, 290 (Ala. 1936)).

19. ALA. CODE § 11-45-1.

20. Ala. Op. Att’y Gen. No. 2013-030 (Feb. 5, 2013) (quoting *New Decatur v. Berry*, 90 Ala. 432, 433 (1890)) (stating that Dauphin Island did not have the authority to place a toll booth on public streets). Specifically, the rule in Alabama states it is “a general and undisputed proposition of law that a municipal corporation possesses and can exercise the following powers, and no others: First, those granted in express words; second, those necessary or fairly implied in or incident to the powers expressly granted; third those essential to the declared objects and purposes of the corporation, not simply convenient, but indispensable.” *Id.*

Alabama law grants municipalities the power to plan and adopt zoning regulations.²¹ Alabama Code Section 11-52-2 authorizes municipalities to adopt a municipal plan and create a planning commission. The Dauphin Island Planning Commission has nine members, including the Mayor, a member of the Town Council, an Administrative Official of the Town, and six other members appointed by the Mayor. The Planning Commission meets once a month and works with the Mayor and Town Council to prepare, maintain, and implement plans, regulations, and ordinances for the town.

The majority of the Planning Commission's decisions and determinations derive from the Town's adopted land use plan. A land use plan is generally extrapolated from existing community land use and building types, and changes are often made as a community identifies potential areas for development or places where it wishes to encourage development in the future. The land use plan is generally tied to a comprehensive plan, which is developed first and serves as a guiding document providing an assessment of existing local conditions.²² From these findings, a series of basic policy recommendations are put in place that help the local government implement the vision of where it wants to go. A land use plan is essentially a formalized version of the community's vision and the steps it needs to take to prosper in the future.

Municipal land use plans are implemented through zoning regulations. Zoning is a legal structure that has developed over the last century, with New York City credited as the first locality to adopt zoning in 1916. The U.S. Supreme Court ruled that zoning was constitutional and could be a valid exercise of a local government's police power in the seminal case *Village of Euclid v. Ambler Realty Co.*, 272 U.S. 365 (1926). Since this case, courts have rarely found zoning ordinances to be invalid. The exception is when ordinances are arbitrary and have no connection to the police power (i.e., to the public health, morals, safety, and welfare).²³

A municipality's zoning code can be likened to a patchwork quilt of different colored squares. Each square has a certain number of basic regulations attached to it, which govern the form, size, use, and overall layout on that particular square. The number of different zones, and where they are located throughout the community, will generally be informed by the land use plan.²⁴ Zoning is the tool most local governments will reach for when trying to promote greater quality of life.

21. ALA. CODE Title 11, Chapter 52- Planning, Zoning and Subdivisions. Section 11-52-1(1) defines a municipality as cities or towns. Under Section 11-40-6, a city has 2,000 or more inhabitants, while a town has less than 2,000 inhabitants. Since according to the 2010 Census, the Town has 1,238 residents, Dauphin Island is a town under Alabama law.

22. MUNICIPAL ASSOCIATION OF SOUTH CAROLINA, COMPREHENSIVE PLANNING GUIDE FOR LOCAL GOVERNMENTS (2014), [https://www.masc.sc/SiteCollectionDocuments/Land Use Planning/Comp Planning Guide.pdf](https://www.masc.sc/SiteCollectionDocuments/Land%20Use%20Planning/Comp%20Planning%20Guide.pdf).

23. CHARLES M. HAAR & MICHAEL ALLAN WOLF, LAND USE PLANNING AND THE ENVIRONMENT: A CASEBOOK 145-46 (2010).

24. FOUNDATION FOR LOUISIANA, THE CITIZEN'S GUIDE TO LAND USE. http://www.foundationforlouisiana.org/news_resources/citizen_guides/.

Alabama Code Section 11-52-72 states that the purpose of zoning regulations should be “to lessen congestion in the streets, to secure safety from fire, panic and other dangers, to promote health and the general welfare, to provide adequate light and air, to prevent the overcrowding of land, to avoid undue concentration of population, and to facilitate the adequate provision of transportation, water, sewerage, schools, parks, and other public requirements.” The regulations should also consider “the character of the district and its peculiar suitability for particular uses and with a view to conserving the value of buildings and encouraging the most appropriate use of land throughout such municipality.”

In order to reach these goals, local governments can regulate development by enacting restrictions on several items, including the:

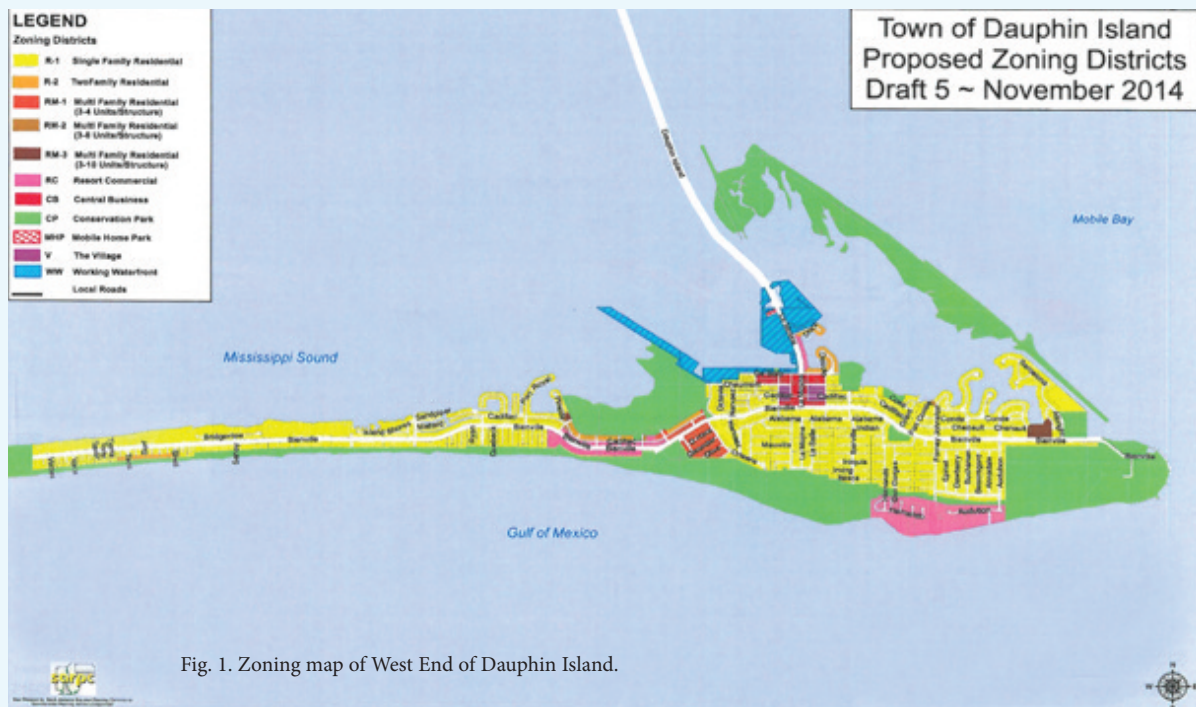
- Size, height, and number of structures;
- Portion of a lot that may be used, as well as the size of yards and open spaces;
- Population density; and
- Uses and locations of structures and land for residence, trade, industry, and other purposes.²⁵

Zoning on Dauphin Island

Dauphin Island’s main exercise of its police power to provide for the orderly development of the island has been through its zoning ordinance. In its zoning ordinance, the Town has divided the island into various residential districts, a Resort Commercial District, a Central Business District, a Conservation Park District, and a Mobile Home Park District. Further, the Town recently amended its zoning ordinance to create two new districts that replaced the Town’s previous Industrial and Manufacturing Districts: the Village and Working Waterfront Districts.²⁶ These two new districts enable some mixed use, which allows for different types of land uses to be stacked on top of or next to each other and ideally provides residents with easier access to daily needs.

25. AL. CODE § 11-52-73.

26. Town of Dauphin Island, The Town Crier (Dec. 2014), http://townofdauphinisland.org/applications/documentlibrary/documentlibrary_docs/DECEMBER%20TOWN%20CRIER.pdf. The Council’s votes came after months of meetings and comments by the town’s residents concerning the changes as well as work with the South Alabama Regional Planning Commission (SARPC). In addition to the Village and Working Waterfront Districts, the changes include more allowable areas for Bed and Breakfasts and the allowance of docks, piers, and boat lifts on unimproved properties. DAUPHIN ISLAND, ALA., ZONING ORDINANCE art. 4. Bed and Breakfasts are now allowed in the Resort Commercial, Central Business, and Working Waterfront zoning Districts.



As Fig. 1 above shows, a majority of the island is zoned for residential use, with a large part of this zoning being made up of the R-1 Zoning District, which allows single-family residences and accessory buildings. In addition, there are zones for two-family and multi-family residences, though these areas are much smaller than the R-1 District. The Town’s zoning allows for only residential use on the island’s West End, with a large area devoted to single-family homes and much smaller area allowing for two-family homes.

Both residential and commercial uses are allowed in various parts of the island’s East End. Commercial uses are permitted in the Resort Commercial district, which is located by the Audubon Bird Sanctuary; the Central Business District, which encompasses a couple different areas near the center of the island; and a few parcels along Bienville Boulevard and just over the bridge to the island.

The Town has provided for conservation on the island through its Conservation Park District, which covers property on the Gulf side of the island on the both the West and East Ends, as well as large areas of property on the East End. The Audubon Bird Sanctuary encompasses a significant amount of conserved property on the island. However, much of the island’s vulnerable West End is zoned residential, allowing residential homes to be built, with only a small sliver of property being devoted to the conservation area.

Legal Constraints on Local Planning

Although the Town of Dauphin Island has broad authority to guide development through land use planning, its authority is not unfettered. A number of federal and state statutes and regulations place constraints on the Town's decision-making. In addition, two general legal principles also affect the Town's regulation of waterfront property. First, under the public trust doctrine, the state owns the submerged lands under navigable waters from the mean high tide line out to three nautical miles. Second, shorelines are in a constant state of flux and the legal boundaries of waterfront property parcels are constantly changing shape or migrating.

Submerged Lands and the Public Trust

In the United States, states acquired title to lands underlying navigable waters including tidal waters at statehood, meaning that Alabama obtained title to its submerged lands when it became a state in 1819.²⁷ Land under navigable waters is held in trust by the State of Alabama for public use, pursuant to the public trust doctrine, an ancient common law doctrine adopted in the United States as part of the common law of England. In tidal areas in Alabama, which would include Dauphin Island, the boundary between these public, state-owned submerged lands and privately owned property is the mean high tide line (MHTL).²⁸ In Alabama, the public can use state-owned submerged lands for the traditional public trust uses of navigation, commerce, and fishing,²⁹ as well as for public recreation and to protect fish and wildlife.³⁰ Upland, waterfront property owners may also have rights, referred to as riparian rights, to conduct activities on state-owned submerged lands, such as the right to access water, construct piers,³¹ and harvest oysters.³²

27. *Phillips Petroleum Co. v. Mississippi*, 484 U.S. 469 (1988). See also ALA. ADMIN. CODE r. 220-4-.09(3)(n) (defining state owned submerged lands as including but not limited to “tidal lands, sand bars, shallow banks, and lands waterward of the mean low water line beneath navigable fresh water or the mean high tide line beneath tidally-influenced waters, to which the State of Alabama acquired title on December 14, 1819, by virtue of statehood, or thereafter and which have not been heretofore conveyed or alienated.”). Alabama has expressed the extent of its ownership of submerged lands through legislation, stating that “[a]ll the beds and bottoms of the rivers, bayous, lagoons, lakes, bays, sounds and inlets within the jurisdiction of the state of Alabama are the property of the state of Alabama to be held in trust for the people thereof ...” ALA. CODE § 9-12-22. See also ALA. ADMIN. CODE r. 220-4-.09(3)(n).

28. ALA. ADMIN. CODE r. 220-4-.09(3)(n).

29. *Id.* r. 222-4-.09(1)(c).

30. *Id.* r. 222-4-.09(1)(d).

31. ALA. CODE §§ 33-7-50 through 33-7-53.

32. *Id.* § 9-12-22.

Ambulatory Boundaries

For most property owners, property boundaries are fixed, set out in metes and bounds in property deeds. But such static conceptions of property do not work along the coasts where the shoreline is constantly changing. A different set of legal rules has evolved to govern coastal property boundaries. An additional complication is that the neighbor for these waterfront property owners is the state of Alabama, which, as mentioned above, holds the submerged lands and waters in trust under the public trust doctrine.

As discussed above, the boundary line between state lands and private property is the MHTL. Since the MHTL is an average of the location of the high tide over an extended period of time, formal surveys are needed to determine its exact location at any given time. A number of coastal processes cause the MHTL to move, and with it the property line. Changes to the beach can happen because of:

- Accretion, which is the gradual, imperceptible addition of sand to a beach;³³
- Reliction, which occurs when water withdraws from a shoreline and uncovers new dry sand;
- Erosion, which occurs when water gradually removes sand from the beach; and
- Avulsion, which is the sudden, apparent addition to or loss of land due to water action, such as changes due to a hurricane.

Generally speaking, the property line between private coastal property and state submerged lands moves with the MHTL when changes are the result of the natural forces of accretion, reliction, and erosion. As the shoreline moves, the property lines move.³⁴ Any land that is gained through accretion will belong to the waterfront property owner, while any land lost through erosion will belong to the state.³⁵

Shorelines, however, can also change due to human activity that results in artificial accretion or erosion. Dredging projects and the installation of jetties, groins, and living shorelines can all change how sand moves along a beach.³⁶ Alabama courts have found that in the case of artificial accretion, the private waterfront property owner can only claim title to the new land if he did not cause, consent to, or participate in the project that caused the accretion.³⁷ If the property owner, or a prior property owner, played a role in the accretion, the new land belongs to the state.

33. *Reid v. State*, 373 So.2d 1071, 1072 (Ala. 1979).

34. *Greenfield v. Powell*, 118 So. 556, 558 (Ala. 1928) (stating where the change is gradual and imperceptible, whether caused by accretion, reliction, or encroachment, the boundaries shift with the shifting of the channel or shore).

35. *Reid*, 373 So.2d at 1074.

36. *Id.*

37. *Id.* If a project results in artificial erosion and thereby causes an upland owner to lose land, the state of Alabama allows the landowner to seek permission from the Alabama Department of Conservation and Natural Resources State Lands Division to reclaim the lost land. ALA. ADMIN. CODE r. 220-4-.09(4)(b)(5) (reclamation activities on state owned submerged lands shall be approved only if avulsion or artificial erosion is affirmatively demonstrated).

Coastal property owners are unfortunately all too aware of how suddenly shorelines can change during storm events like hurricanes. These sudden changes are known as avulsion.³⁸ Alabama law treats avulsion differently than accretion or erosion. Unlike gradual changes to the shoreline, an avulsive event does not change the property line. The location of the MHTL before the avulsive event remains the dividing line between state and private property.³⁹ Therefore, following an avulsive event, an oceanfront property owner does not lose property that is covered by water to the state, nor does the landowner take title to any additions of dry sand.

It is important to note that in Alabama a landowner can ask to reclaim land that has been lost due to an avulsive event, such as a storm. Landowners may apply for a permit from the Alabama Department of Conservation and Natural Resources State Lands Division (ADCNR - State Lands) to refill the lost land. Property owners must request a permit within five years of the event and show that the avulsive event caused a sudden change to the property.⁴⁰

Alabama Control Construction Line

Alabama regulates construction and other activities on its Gulf beaches and dunes. In general, construction or alteration of the dunes is prohibited between the MHTL and the control construction line (CCL).⁴¹ In order to construct or substantially improve a structure on a piece of land that is intersected by the CCL, a property owner must obtain a permit from the Alabama Department of Environmental Management (ADEM).⁴² Alabama's CCL is not delineated by reference to the MHTL. Rather it is a fixed line that has been established by the state in its coastal management rules, including along the Gulf coast of Dauphin Island.⁴³

Unfortunately, Alabama's CCL has not been updated for some time. As a result of beach erosion on Dauphin Island, the island's CCL is now under water. Most dry land is behind the CCL, which means construction and other activities on the island's Gulf beaches and dunes do not require an ADEM permit or need to comply with ADEM's Coastal Program Rules.⁴⁴ Because state approval isn't needed, some property owners have built seawalls on their property that may be worsening erosion on the island. While federal approvals may still be needed for some of these projects, as

38. ALA. ADMIN. CODE r. 220-4-.09(3)(b) (defining avulsion as "the sudden or perceptible loss or addition to land by the action of water).

39. *Greenfield v. Powell*, 118 So. at 558 (where, by a sudden and violent or artificial change, the channel or shore on which riparian or littoral lands are bounded is shifted, the boundaries of such lands are unaffected, and remain in their original position).

40. ALA. ADMIN. CODE r. 220-4-.09(4)(b)(5).

41. *Id.* r. 335-8-2-.08(1).

42. *Id.* r. 335-8-2-.08(3)(a).

43. *Id.* r. 335-8-1-.02(p).

44. Alabama Department of Environmental Management, Alabama Coastal Area Management Program, <http://adem.alabama.gov/programs/coastal/default.cnt> (last visited June 1, 2015).

discussed below, the CCL further emphasizes the importance of local planning on Dauphin Island. Although state approvals are not needed, the Town has the authority to regulate development in these areas and could take actions under its police and enumerated powers to address this issue.

Applicable Federal Programs

A number of federal laws and policies govern development on barrier islands and place constraints on local government planning actions. Four laws commonly encountered with respect to barrier island projects are discussed below: the Coastal Zone Management Act, the Coastal Barrier Resources Act, the Americans with Disability Act, and the National Flood Insurance Program. Depending on the specific action under consideration, other federal laws and programs may be triggered. Dauphin Island, like other coastal communities, needs to be aware of a range of potential federal regulatory restrictions and requirements when proposing action to address climate resilience.

Coastal Zone Management Act

Alabama has an approved coastal management program authorized under the federal Coastal Zone Management Act. Approved in 1979, the Alabama Coastal Area Management Program (ACAMP) is run jointly by the ADEM Coastal Program, which is responsible for monitoring, permitting, and enforcement, and the ADCNR-State Lands, which is responsible for policy development and planning.⁴⁵ The program is intended “to promote, improve and safeguard the lands and waters located in Alabama’s coastal area through a comprehensive and cooperative program designed to preserve, enhance, and develop these valuable resources for present and future generations.”⁴⁶ ADEM will review certain projects proposed in the coastal zone, including beach and dune projects, dredge and fill projects in wetlands, and other activities that could impact coastal resources.⁴⁷ The specific provisions of the ACAMP as they relate to beach restoration projects will be discussed in Part IV.⁴⁸

Coastal Barrier Resources Act

The Coastal Barrier Resources Act (CBRA) aims to reduce the risks associated with hazardous coastal development on barrier islands and preserve natural resources.⁴⁹ Congress sought to achieve this goal by limiting the amount of federal funding that could be used to support development on designated barrier islands.

45. For an overview of the ACAMP, see <http://adem.alabama.gov/programs/coastal/default.cnt>.

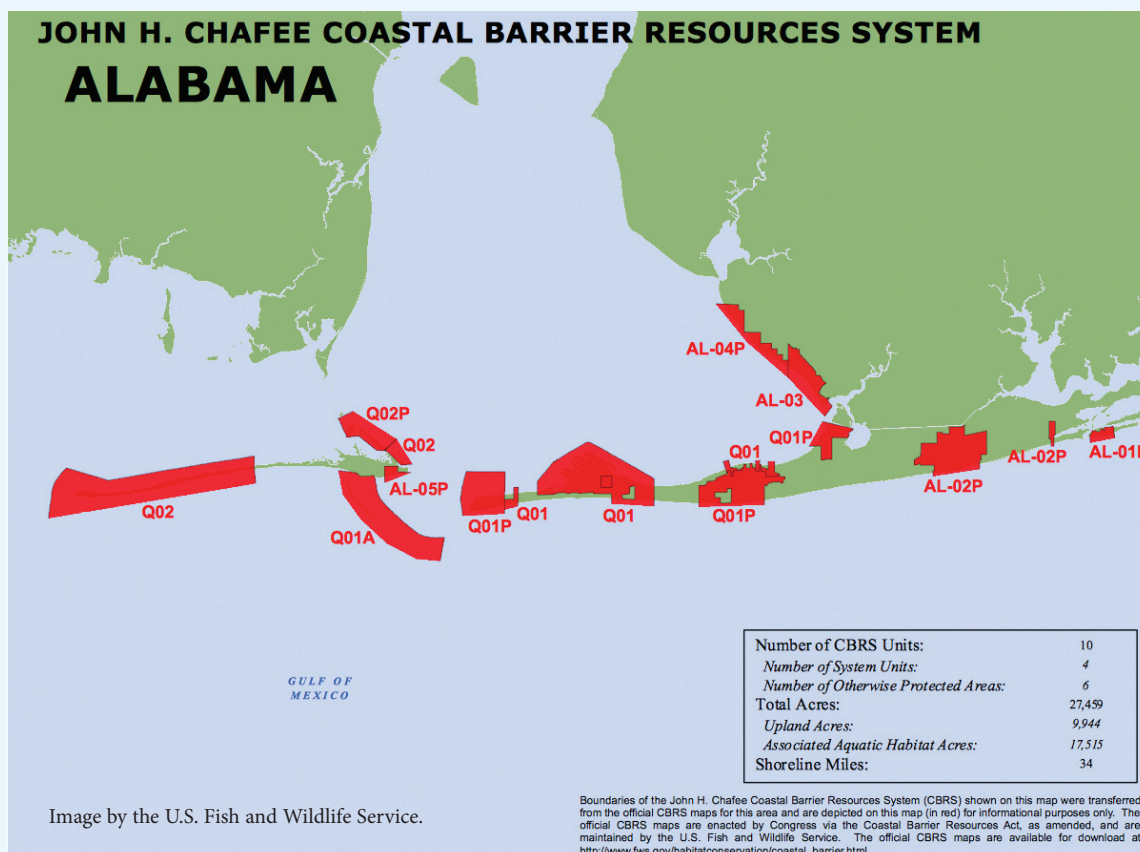
46. ALABAMA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT, ALABAMA COASTAL AREA MANAGEMENT PROGRAM, <http://adem.alabama.gov/programs/coastal/default.cnt> (last visited June 1, 2015).

47. *Id.*

48. The complete ADEM Division 8 Coastal Program Rules can be found at <http://adem.alabama.gov/alEnviroRegLaws/files/Division8.pdf>.

49. 16 U.S.C. § 3501.

The CBRA established the Coastal Barrier Resource System (CBRS), which included undeveloped coastal property throughout the United States along the Gulf of Mexico, Great Lakes, and Atlantic coasts. The U.S. Fish & Wildlife Service maintains the CRBA maps which are periodically updated. Parts of Dauphin Island are included in the CBRS, and the maps are available online at: <http://www.fws.gov/CBRA/Maps/Mapper.html>.



The CBRA does not limit development of property within the CBRS. Rather it restricts “future Federal expenditures and financial assistance which have the effect of encouraging development of coastal barriers.”⁵⁰ If a piece of property is located within the CBRS, certain federally subsidized programs and financial assistance may not be available to the property owner. No restrictions, however, are imposed on the ability of a private property owner to develop his property with non-federal funds. Development can proceed if all the necessary authorizations are obtained. In addition, certain activities are exempted under the Act.

Similar to the Alabama CCL discussed above, the CBRA highlights again the importance of local land use planning by the Town. The CBRA does not prohibit development, just the expenditure of federal funds. If the Town wishes to guide development on the island, it needs to develop its own regulations.

50. *Id.*

Americans with Disabilities Act

The Americans with Disabilities Act (ADA) seeks to eliminate discrimination against disabled individuals.⁵¹ Specifically, the ADA mandates that public accommodations and commercial facilities be accessible and usable by disabled individuals.⁵² Local ordinances that include requirements to elevate both new and existing buildings on the island may result in compliance issues with the ADA regarding the installation of lifts or ramps by property owners.⁵³ Since these modifications can be costly, the Town should keep these factors in mind when considering ordinance changes.⁵⁴

National Flood Insurance Program

The National Flood Insurance Program (NFIP) is a federally subsidized program created in 1968 by Congress to create a more workable nationwide flood insurance program. Congress designed the program to both protect against flood losses and encourage land uses that would minimize these losses. The Federal Emergency Management Agency (FEMA) administers the program in partnership with private insurance companies, and communities qualify to participate in the program through the adoption of minimum standards for floodplain management, such as through building codes or other land use regulations. Participating communities then receive discounts on their flood insurance premiums through the Community Rating System (CRS).⁵⁵

Under the NFIP, FEMA is working with other partners to update the Flood Insurance Rate Maps FIRMs in the Southeastern U.S., including Alabama.⁵⁶ For Dauphin Island, Preliminary FIRMs are expected to be released in June 2016, with effective date of the maps scheduled for September 2017.⁵⁷ With the release of new FIRMs, the Town may face increased requirements for building codes and elevation standards.

With these local government powers, as well as the potential applicable federal programs in mind, Dauphin Island has a range of options available to address the island's climate resilience. The final section of this report will discuss some of these options.

51. 42 U.S.C. § 12101.

52. *Id.* § 12183.

53. Jessica Grannis, ZONING FOR SEA-LEVEL RISE: A MODEL SEA-LEVEL RISE ORDINANCE AND CASE STUDY OF IMPLEMENTATION BARRIERS IN MARYLAND, GEORGETOWN CLIMATE CENTER (2012).

54. For example, at the May 2015 Planning Commission meeting, a resident made a request to operate a tourist home on their property, which is located up a sand dune. In considering what action the planning commission should take, there were questions about what ADA provisions, if any, would apply to a small vacation property on the island.

55. See Niki L. Pace, *The Changing Landscape of the National Flood Insurance Program: A Federal Perspective*, THE MISSISSIPPI-ALABAMA SEA GRANT LEGAL PROGRAM, http://masglp.olemiss.edu/advisoryservice/floodinsurance/nfip_materials_fl_bar.pdf.

56. *Information for Alabama*, FEMA, <http://www.southeastcoastalmfip.com/Pages/States/Alabama.aspx> (last visited June 1, 2015).

57. *Flood Map Update Schedule*, NATIONAL FLOOD INSURANCE PROGRAM, Flood Map Update Schedule, https://www.floodsmart.gov/floodsmart/pages/flooding_flood_risks/mapScheduleSearch.action?zipCode=36528&x=21&y=23 (last visited June 1, 2015).

IV. PLANNING FOR A CLIMATE RESILIENT DAUPHIN ISLAND

There is a wide range of actions that local governments on barrier islands can take to become more climate resilient. Communities must choose which options fit them best; and in thinking about climate resilience, local governments should consider both short- and long-term actions. Once an approach is settled upon, outreach to the community on the risks of climate stressors will likely be essential to garner support for complicated or controversial actions.

The remainder of this report will discuss various planning choices that the Town of Dauphin Island can make to address climate resilience on the island. The planning choices are grouped within the following three focus areas:

- Protect and enhance the natural environment;
- Protect and enhance Dauphin Island's built environment; and
- Strengthen Dauphin Island's structures.

Protect and Enhance the Natural Environment

A barrier island like Dauphin Island is a complex grouping of different natural environments that work in concert with each other to maintain stability. Dauphin Island has many policy options to choose from to protect and enhance its natural environment. These include, but are not limited to:

- Regulations or incentive programs to protect dunes and wetlands;
- Beach restoration projects; and
- Legal mechanisms to protect resources in their natural state, such as conservation easements.



Photo of Dauphin Island beach, courtesy of David King.

Protecting Dunes and Wetlands

Dauphin Island has enacted several ordinances that address natural resources and sand on the island. These include ordinances dealing with protective berms, sand removal after storms, and development that will affect wetlands. A short overview of each of these ordinances is provided below.

Protective Berms

Ordinance No. 66-A was adopted on June 17, 2008 to maintain sand berms built on the island to provide protection from turbulent weather. The ordinance restricts the public's use and access to the berm by prohibiting "pedestrian and vehicular use of the sand berms along the Gulf beaches and the Silver Cay area on the Western portion of Dauphin Island." The Town justified the ordinance on public health and safety grounds providing the following policy rationale:

WHEREAS, the public's interest is served by preservation of the sand berms to prevent the overflow of the Island during periods of turbulent weather which may cause damage to public improvements, including public streets and the water and sanitary sewer system. Inundation of the Island creates a public health hazard by restricting access to emergency vehicles; by interfering with the orderly evacuation of the Island; and by causing an overload of the Town's sanitary sewer system, resulting in the discharge of contaminants onto public streets and into environmentally sensitive areas of the Island. Such a discharge poses a public health risk to all of the Town's inhabitants and visitors.

Sand Removal

Ordinance No. 79, adopted on August 6, 2002, addresses the removal of sand that has been deposited on private property and public rights-of-ways by storm events. Whenever possible, property owners are encouraged to restore the sand to the island's Gulf beaches. Permits are needed to remove sand from a right-of-way or a waterway. Contractors, homeowners, any person, corporation or other entity must have the Town's written permission to remove sand from the Town's rights-of-ways or "from any waterway or bay side of any lot on the north side" of the island. In addition, "[a]ll sand located west of Pensacola Street shall not be moved or transported east of Pensacola Street."



Photo of dunes and sand covered roads on the West End of Dauphin Island after Hurricane Isaac, courtesy of Catherine Janasie.

Development Affecting Wetlands

Ordinance No. 85, adopted on August 3, 2004, places restrictions on development affecting Dauphin Island's wetlands. A majority of the Town Council must approve any development that will have an adverse impact on the Town's wetlands, and applicants must provide for mitigation. The mitigation ratio is 2:1; the ordinance, however, provides no further detail on how this ratio is to be implemented. Mitigation sites must be located within the Town and contain similar plant and animal diversity as the wetland being destroyed.

The vegetation in barrier island environments has two distinct roles to play in the island's ecosystem: maintaining water quality and keeping the island anchored in place.⁵⁸ Dauphin Island is fortunate to have a heavy amount of vegetation on the East End, but on the narrow West End, there is a distinct lack of mature vegetation. As a result, homes on the West End are inadequately protected from the elements and the land is much less stable. The Town could increase its climate resilience by protecting and enhancing the vegetation on the island, which would stabilize dune systems and provide storm protections.

Many cities and towns have ordinances for the protection of existing natural habitats that could serve as a model for Dauphin Island; few, however, are designed to reestablish these natural buffers in places where they no longer exist. Because the West End is currently devoid of most vegetation, restoration and enhancement efforts are needed first. After new plant communities become established, traditional habitat protection ordinances would be more effective.

Photo of vegetation on the East End of Dauphin Island, courtesy of Catherine Janasie.



To encourage the growth of vegetation on the island, the Town should consider a combination of public programs and private incentives. Any revegetation effort would entail a fair amount of trial and error, as it is often difficult to predict the success of restoration projects on a site-by-site basis. As a first step, the Town might consider focusing on building up the natural system of dunes. The Town, in partnership with local academic and other organizations, could undertake dune-planting projects. Both Florida and North Carolina Sea Grants have compiled a valuable guide on dune plantings, including how to build dunes in a natural manner.⁵⁹

58. Ann Green, *Barrier Island Buffers: Bald Head Forest Anchors the Island*, COASTWATCH (2008), <http://ncseagrant.ncsu.edu/coastwatch/previous-issues/2008-2/early-summer-2008/barrier-island-buffers-bald-head-forest-anchors-the-island/>.

59. Florida Sea Grant, *Common Coastal Plants in Florida: A Guide to Planting and Maintenance* (1997), <https://www.flseagrant.org/publications/healthy-coasts/>; Spencer Rogers & David Nash, *supra* note 12.

In the event that dune plantings prosper and take hold, the Town may wish to consider larger and more ambitious projects. One such project idea would be the gradual reintroduction of a maritime forest ecosystem on the West End of the island. A similar project was done along the coast of New Jersey, and a link to a video showing this process is provided below.⁶⁰ These types of projects could be accomplished through a grassroots approach, one that the Town could help facilitate. In the town of Emerald Isle, North Carolina, a revegetation/reforestation committee was established.⁶¹ This committee helps encourage revegetation in the town by sponsoring group planting projects and aligning with other regional organization, such as master gardening programs, to leverage resources and help underscore the importance of new vegetation.

Beach Restoration Projects

In August 2011, Dauphin Island completed a three-phase study that looked at ways to address chronic beach erosion on the island and preserve the barrier island and beaches for future generations. The study found that while the shoreline on the East End of the island was receding at a rate of 9.0 feet/year, the shoreline on the West End of Dauphin Island was receding at a faster rate of 12.7 feet/year. In order to restore the island's beaches to enhance the habitat, storm protection, and recreational opportunities that the beach provides, Dauphin Island is currently considering several beach restoration projects. These projects are only a short- to medium-term solution, however, as the larger forces of erosion will continue. The Town's Comprehensive Plan discusses some previous beach projects that did not have lasting effects, but notes that "[w]hile there have been attempts at placing small amounts of sand on the beaches in the past, those efforts were not of the scale of the present plans nor did they add new, clean sands to the littoral system of the island."⁶²

East End Restoration Project

To address erosion on the East End of the island, the Town is undertaking the East End Shoreline Restoration Project. The project would span a 0.92-mile stretch of beach from the Audubon Bird Sanctuary to Fort Gaines. The Town intends to take 240,000-300,000 cubic yards of sand from the Sand Island Beneficial Use Area to restore the beach and install breakwaters to retain sand and slow and limit erosion. Permits are needed from both the U.S. Army Corps of Engineers and the Alabama Department of Environmental Management (ADEM). The Town's permit application is still being reviewed by the agencies, but moving through the process. A final public hearing was held on April 16, 2015, after which the Town began planning to advertise for construction of the project.⁶³

60. Philip Mansfield, *Bradley Beach Maritime Forest Planting*, VIMEO (Oct. 30, 2013), <https://vimeo.com/78225471>.

61. THE TOWN OF EMERALD ISLE, *Revegetation/Reforestation Committee*, <http://www.emeraldisle-nc.org/volunteers/revegetation.htm> (last visited on June 1, 2015).

62. DAUPHIN ISLAND, ALA. COMPREHENSIVE PLAN ch. 6 (2013).

63. TOWN OF DAUPHIN ISLAND, *THE TOWN CRIER* (Apr. 2015), http://townofdauphinisland.org/uploads/files/TOWM_CRIER_APR_2015.pdf.

Deepwater Horizon Oil Spill Funds

In the November 2014 distribution of *Deepwater Horizon* oil spill funds, the state of Alabama received \$9.6 million from the National Fish and Wildlife Foundation (NFWF). Included in these funds was a grant of \$3.6 million to fund “a study on the future of Dauphin Island.”⁶⁴ The study will include an engineering study to determine the feasibility of a sustainable restoration of the island. According to NFWF, the study will evaluate restoration alternatives that could increase the island’s storm resilience.⁶⁵

In undertaking a beach restoration project, the Town should be cognizant of how the project will impact property rights in the area. In Alabama, a coastal municipality can apply for a permit from Alabama Department of Conservation and Natural Resources (ADCNR) for a beach project. A beach project is defined as a project to restore a beach and provide storm protection by placing and maintaining sand, as well as the associated stabilization structures, vegetation and associated irrigation systems, and any structures created for access.⁶⁶ Before beginning the construction of a beach project, a coastal municipality must hold a public hearing, identify the location of the MHTL and where the project is in relation to it and the CCL, and obtain the required permits and any necessary rights from affected property owners.⁶⁷

In considering the permit application, the ADCNR Commissioner will work with the ADEM Director, as well as certain federal agencies, such as the U.S. Army Corps of Engineers, U.S. Fish & Wildlife Service, and the National Marine Fisheries Service.⁶⁸ The Commissioner will deny a permit if the project adversely impacts nearby waterfront property owners, public trust lands, and fish, shellfish and wildlife.⁶⁹

It is also important to note that Alabama will retain title to lands that are seaward of the MHTL filled in by a beach project, as well as future land gained through accretions or natural and artificial fill processes.⁷⁰ While waterfront property owners do not need to consent to,

64. See Alabama Barrier Island Restoration Assessment, <http://www.nfwf.org/gulf/Documents/al-dauphin-assessment-14.pdf>.

65. ALA. CODE § 11-47-250. Alabama law defines a beach as “a sandy shoreline area abutting to the Gulf of Mexico, characterized by low relief, generally of gentle slope, and some vegetation, extending into the abutting waters to a distance 1,000 feet seaward of the MHTL.” *Id.*

66. *Id.*

67. *Id.* § 11-47-252.

68. *Id.* § 9-15-56(d).

69. *Id.*

70. *Id.* § 9-15-55. While AL law provides for Sales of Submerged Lands and Made Lands Lying Under or Abutting Tidal Waters, the provision is not applicable to “to any submerged lands of the state abutting the Gulf of Mexico and lying seaward of the mean high tide line that are filled in the course of, or by subsequent natural or artificial accretion to, a beach project undertaken by a coastal municipality pursuant to Article 11 of Chapter 47 of Title 11 with the permit of the Commissioner of the Department of Conservation and Natural Resources as provided in Section 9-15-56.” *Id.* § 33-1-18.

participate in, or object to the beach project for Alabama to retain these lands, projects that do not have the consent of abutting landowners are only allowed along beaches that have experienced significant land loss.⁷¹ In general, projects are not allowed on beaches that have not suffered from erosion or storm damage.⁷²

Planning Action:

In meetings, the Town has expressed uncertainty as to where the line between public and private property is currently located due to changes to the island's coastline. Property surveys would be needed to answer this question, as well as official opinions by ADCNR State Lands and the Attorney General's office regarding interpretations of state law. Formal requests by the Town for such opinions would help move discussions forward and minimize confusion.

Photo of the West End Beach on Dauphin Island, courtesy of Catherine Janasie.



71. *Id.* § 9-15-56(d).

72. *Id.*

Land Conservation

In addition to enhancing the island's vegetation and restoring its beaches, another way for the Town to protect and enhance its natural resources is to conserve more property on the island.

Conservation Park District

Currently, Dauphin Island's zoning ordinance provides for a Conservation Park (CP) District "to preserve and maintain, in its natural state, to the extent possible, land for conservation, open space and for outdoor recreational uses."⁷³ The uses that are allowed by right in this district include:

- Natural preservation areas, parks, and green belt areas;
- Recreational areas like public and private beaches, swimming pools, tennis courts and related structures, golf courses and driving ranges, and country clubs;
- Historic and archaeological sites; and
- Marine science laboratories, instructional and institutional uses, and civic buildings.⁷⁴

Thus, while conservation is a goal of this district, it allows by right development that would alter land from its natural state.

Planning Action:

While the ordinance itself states that "[s]ome areas should not be developed due to their unique and environmentally sensitive character," this statement is not binding in any way. Amending the ordinance to restrict development in more environmentally sensitive areas or in areas that are vital for storm protection would increase the effectiveness of the ordinance in achieving stated conservation goals.

Conservation Easements

In 2014, a conservation easement was finalized to protect 160 acres of public parklands on the island. The Dauphin Island Park and Beach Board (DIPBB) entered into this conservation easement with the Atlantic Coast Conservancy and Pelican Coast Conservancy, and the easement protects DIPBB properties at Cadillac Square, the Audubon Bird Sanctuary, and the Dauphin Island Campground. In addition to providing permanent park grounds on the island, the easement is also expected to protect important migratory bird sites for the state.⁷⁵

73. DAUPHIN ISLAND, ALA., ZONING ORDINANCE § 8 (2014).

74. *Id.* § 2.

75. *Historical Conservation Easement*, DAUPHIN ISLAND PARK AND BEACH BOARD, <http://dauphinisland.org/conservation/>, (last visited June 1, 2015).

The Town could encourage the use of more conservation easements to keep land on the island in its natural state. Conservation easements aim to protect a property’s natural, historic, and scenic features and often detail what building is allowed and prohibit specific uses and activities on the property.⁷⁶ The easement operates by the property owner transferring an easement in the property to a government entity or land trust in order to keep land in its natural state. In Alabama, only a governmental entity that can hold real property and certain charitable entities with related conservation purposes can hold a conservation easement.⁷⁷ The landowner will keep certain rights in the property, but must comply with the restrictions in the easement that prohibit certain uses of the property for perpetuity. In exchange for the easement, the property owner becomes eligible for federal tax deductions for charitable contributions.⁷⁸



76. ALA. CODE § 35-18-1. Conservation easements limit the use of a particular parcel of land in order to retain or protect the “natural, scenic, or open-space values of real property, assuring its availability for agricultural, silvicultural, forest, recreational, or open-space use, protecting natural resources, maintaining or enhancing air or water quality, or preserving the historical, architectural, archaeological, paleontological, or cultural aspects of real property.”

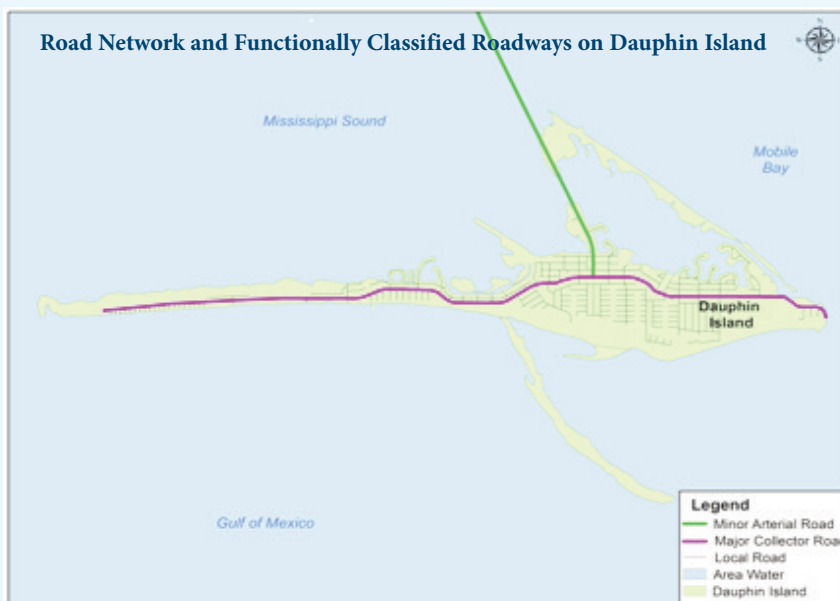
77. *Id.*

78. CHRISTINE A. KLEIN, FEDERICO CHEEVER & BRET C. BIRDSOING, *NATURAL RESOURCES LAW* 724 (3rd ed. 2013).

Protect and Enhance Dauphin Island's Built Environment

Vehicular access to Dauphin Island from the mainland is gained by a low-lying causeway, the Dauphin Island Parkway. There are a few major roads throughout the island, including Le Moyne Drive and Bienville Boulevard. On the wider, more developed East End, there is a more advanced network of roads connecting the residential areas, as well as the ferry dock providing alternative access to the mainland. On the narrower, more vulnerable West End, the main street is the two-lane Bienville Boulevard. This is the only street access to many of the residences on this part of the island.

Since the island is low-lying and narrow, sea level rise and flooding will adversely affect the existing infrastructure and potentially restrict access to and around Dauphin Island. For example, storms could flood the causeway and interfere with evacuation and re-entry of the island before and after a storm. Utility and emergency workers could have difficulty getting onto the island after a storm, which makes it difficult for the Town to resume services. Due to access concerns, more and more people have been choosing to stay on the island during storms, decisions that could have very dangerous consequences.



Source: Alabama Department of Transportation (ALDOT) and Dauphin Island Comprehensive Plan

Dauphin Island may also face access problems with its docks, as well as the ramps and roads to those docks. When the causeway and bridge are inaccessible due to flooding, the ferry to Dauphin Island has been used as backup access to the island. If the ferry docks are also flooded, this mode of transportation is also eliminated. Access to the island in such an event would be limited to private watercraft and docks.



Photo of flooded road on Dauphin Island, courtesy of Jay Williams.

Infrastructure Projects

Dauphin Island is currently planning a couple of new infrastructure projects that could be susceptible to flooding. Therefore, with these and future projects, the Town has the opportunity to design the projects in a way that helps improve the island's climate resilience.

New Dauphin Island Ferry Dock

The state of Alabama is planning on rebuilding the ferry dock on Dauphin Island. Funded by the Federal Highway Administration's Ferry Boat Discretionary Fund, the state is looking to make such improvements as a wider dock, covered shelter, and new fencing.⁷⁹ The project is scheduled to be finished in 2015.

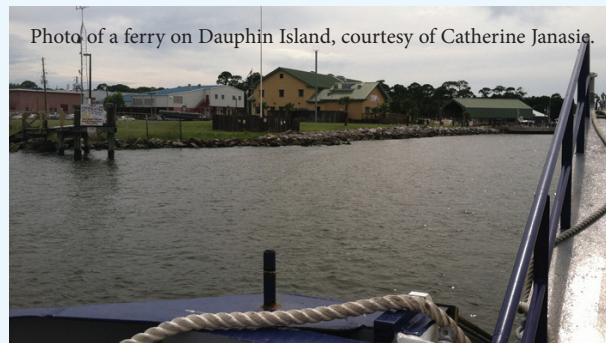


Photo of a ferry on Dauphin Island, courtesy of Catherine Janasie.

Road Repair

The Alabama Department of Transportation recently committed \$225,000 of state funds to improve and repair Bienville Boulevard. The road is considered critical access to the ferry dock. The Town will be responsible for any costs that exceed the amount pledged by the state.⁸⁰

Working Waterfront District

The Town of Dauphin Island recently adopted a new zoning ordinance establishing a Working Waterfront District. Through the creation of the Working Waterfront District, the town is hoping

79. Alabama Department of Transportation, *State to Build New Ferry Dock on Dauphin Island* (Oct. 29, 2014), http://www.gulfcoastnewstoday.com/area_news/article_622206a2-5f7e-11e4-a5a2-5f5f61c76864.html (last visited on June 1, 2015).

80. TOWN OF DAUPHIN ISLAND, *THE TOWN CRIER* (Dec. 2014), http://townofdauphinisland.org/applications/documentlibrary/documentlibrary_docs/DECEMBER%20TOWN%20CRIER.pdf.

to preserve and promote “the unique waterfront setting of the island through the combination of residential uses, commercial activities and public open space.”⁸¹ The Ordinance aspires that the district will “support and encourage water oriented commercial activities that are essential to the island economy, and provide numerous opportunities for pedestrian and tourist access to the surrounding waterfront.”⁸² Finally, the Ordinance provides that:

[a] successful working waterfront should provide public access to both active and inactive aspects of the waterfront (marinas, harbors, boat slips and launches, parks, pedestrian boardwalks, observation decks, fishing piers, etc.), support the commercial uses that depend on the waterfront location (commercial/recreational fishing and boating, seafood sales, waterfront dining, etc.), and offer additional residential, retail and service uses to supplement the waterfront activities.⁸³

By creating this vision for the new district and by listing the various types of development it foresees in the area, the Town is hoping to encourage a large amount of new development in this part of the island. This area, however, is particularly vulnerable to flooding and sea level rise. Unfortunately, the zoning ordinance contains no provisions to ensure the resilience of future development to climate stressors.

In the coastal community of Satellite Beach, Florida, city leaders worked with the Indian River Lagoon National Estuary Program on the sea level rise threats facing the town.⁸⁴ The project included a study to determine the local impacts of sea level rise to Satellite Beach and the formation of a Sea Level Rise Subcommittee to devise strategies and policies that could be incorporated into the city’s Comprehensive Plan. The result of the project was a sample ordinance, which offers many valuable ideas Dauphin Island could draw upon to combat sea level rise at the local level. Some of these recommendations, such as including sea level rise estimates into the city’s capital expenditure program and future stormwater infrastructure planning, would be valuable in fostering a working waterfront that would be viable for the long term.

Planning Action:

To increase the climate resilience of its new working waterfront district, the Town should consider including sea level rise planning requirements in the Working Waterfronts section of the zoning ordinance, or taking other action to address the threat of climate stressors to this area of the island.

81. DAUPHIN ISLAND, ALA., ZONING ORDINANCE § 11.

82. *Id.*

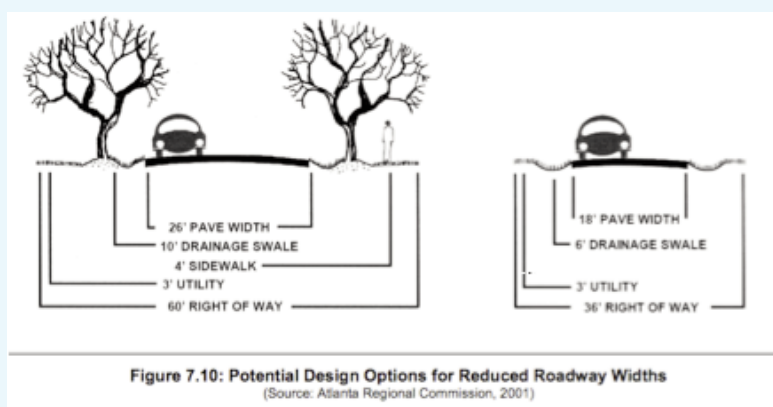
83. *Id.*

84. *Satellite Beach Sea-Level Rise Comprehensive Plan Recommendations*, GEORGETOWN CLIMATE CENTER, <http://www.georgetownclimate.org/resources/satellite-beach-sea-level-rise-comprehensive-plan-recommendations> (last visited June 1, 2015).

Reducing Flooding through Low Impact Development

Recently attention has shifted to mitigating stormwater and water quality impacts with the concept of Low Impact Development (LID). Many municipalities are now opting for a more site-specific, context sensitive series of solutions to flooding and stormwater management.⁸⁵ A few of these LID practices are described in greater detail below and can be valuable tools in combating flooding on the island.

One LID technique that could be helpful on the island is the reduction of impervious surfaces. A number of the parking lots and driveways in Dauphin Island are already pervious, but a reduction in impervious surface loads upon the island can also be accomplished by reducing the street width along the island.⁸⁶ Narrower streets not only reduce impervious surface, but they can reduce future maintenance costs, an important consideration when one factors in the potential for hurricanes or tropical storms. If a reduction in size is infeasible, installation of grass channels or swales to receive roadway runoff are good alternatives.



Vegetated swales are essentially depressions in the landscape that collect water from surrounding areas and convey them to a treatment source or simply towards an exit off the property.⁸⁷ Where the site can support it, vegetative swales may also be used to grow different kinds of

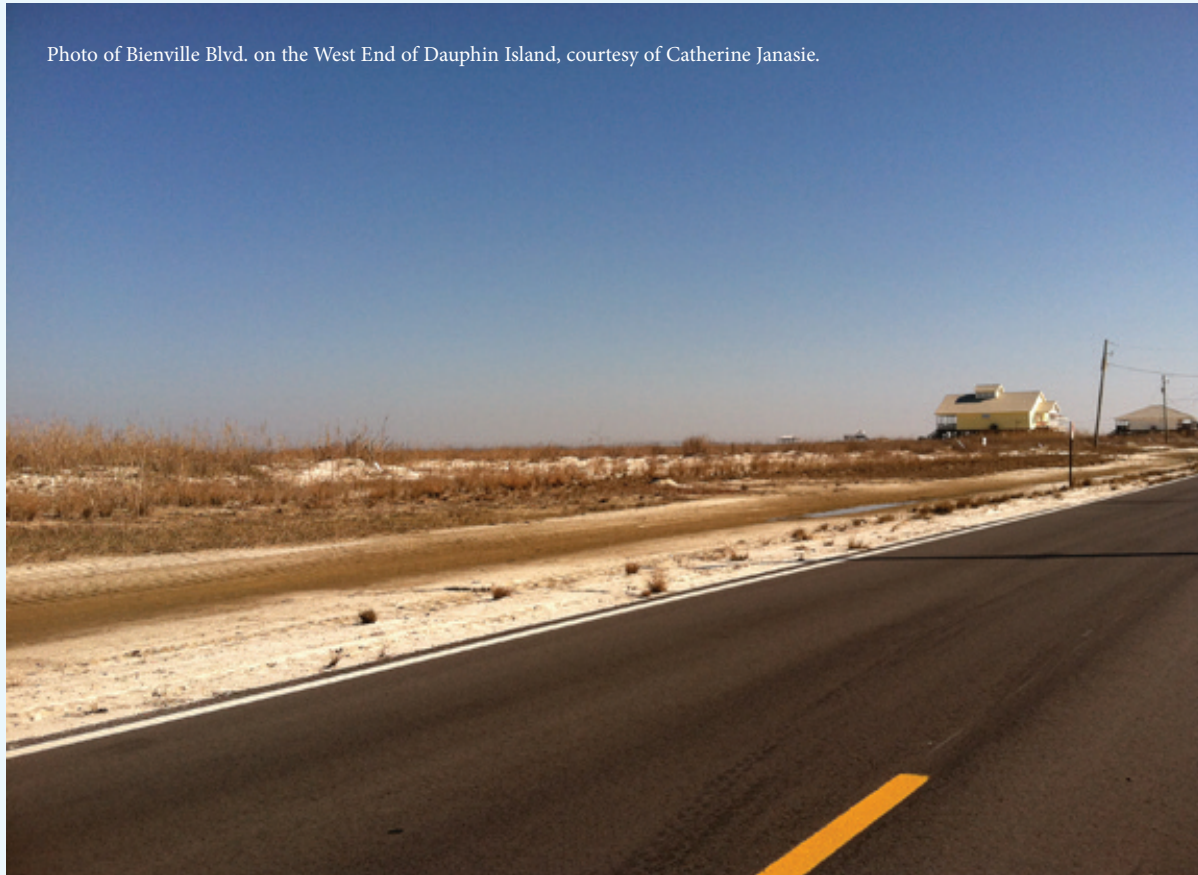
native vegetation. Since these swales are typically used in public right-of-way areas such as roads and highways, they are great candidates for stormwater filtration and retention. Vegetated swales also offer an additional way for the Town to encourage more vegetation on the island.

85. *Low Impact Development (LID)*, U.S. Environmental Protection Agency, <http://water.epa.gov/polwaste/green/> (last visited on June 1, 2015).

86. CENTER FOR WATERSHED PROTECTION, COASTAL STORMWATER SUPPLEMENT TO THE GEORGIA STORMWATER MANAGEMENT MANUAL (2009).

87. NORTH CAROLINA COOPERATIVE EXTENSION, LOW IMPACT DEVELOPMENT: A GUIDEBOOK FOR NORTH CAROLINA (2009), http://www.ces.ncsu.edu/depts/agecon/WECO/lid/documents/NC_LID_Guidebook.pdf.

In general, public right-of-ways are excellent candidates for a number of LID projects. Bioretention, or rain gardens, are also possible in this context. Most rain gardens take the form of an excavated basin over which specialized types of soil are placed. Eventually, plants are placed in the soil and the rain garden is complete. Rain gardens are prized not only for their benefits in the area of stormwater management, but also as scenic assets. In public areas such as parking lots or city parks, a rain garden is a valuable, incremental step a municipality can take towards better management of its stormwater.



Strengthen Dauphin Island's Structures

As alluded to when discussing the history of barrier island development, a key factor in the long-term survival of these communities was a clear understanding of the physical context of the island. There are a few tools and options that the Town may implement to ensure that new and existing development on the island is more climate resilient. Tools such as stronger building codes and optional design guidelines can respond to the unique geographic challenges of a barrier island.

New Construction

In thinking about climate resilience, a logical place for a municipality to start is to regulate new development to ensure that it is more resilient to climate stressors. A local government has several options to make new structures more resilient, including building codes, planning guidelines, and siting requirements.

Building Codes

Under Alabama law, the state is directed to adopt a state building code that protects the health, safety, general welfare, and morals of the state's residents.⁸⁸ The state of Alabama has adopted the 2009 International Building Code (IBC). However, these requirements only apply to state buildings and other construction, hotels, movie theaters, and schools.⁸⁹ Under state law, therefore, residential buildings do not have to meet the standards set forth in the 2009 IBC.

On the local level, municipalities are authorized by state law to adopt a model building code published by the Southern Building Code Congress International. Under this authority, Dauphin Island has adopted the 2006 International Building Code and 2006 International Residential Code.⁹⁰ The residential IBC applies only to new construction and not to structures that existed at the time the Town adopted the code, which was February 17, 2010.⁹¹ However, while existing structures will not have to be up to code, the IBC applies to any additions, alterations, and repairs to these existing structures.⁹² The IBC defines addition, alteration, and repair as follows:

- An addition is “an extension or increase in floor area or height of a building or structure;”
- An alteration is “any construction or renovation to an existing structure other than repair or addition that requires a permit” and “a change in a mechanical system that involves an extension, addition or change to the arrangement, type or purpose of the original installation that requires a permit;” and
- A repair is “the reconstruction or renewal of any part of an existing building for the purpose of its maintenance.”⁹³

88. ALA. CODE § 41-9-163.

89. *Id.* § 41-9-162.

90. DAUPHIN ISLAND, ALA., ORDINANCE no. 60-E Building Codes (2010), www.townofdauphinisland.org.

91. INTERNATIONAL BUSINESS CODE § 102.7 (2006), http://publicecodes.cyberregs.com/icod/irc/2006f2/icod_irc_2006f2_1_sec002.htm; DAUPHIN ISLAND, ALA., ORDINANCE no. 60-E Building Codes, http://townofdauphinisland.org/uploads/files/ORDINANCE_NO_60E.pdf.

92. INTERNATIONAL BUSINESS CODE § 102.7.1 (2006), http://publicecodes.cyberregs.com/icod/irc/2006f2/icod_irc_2006f2_1_sec002.htm.

93. INTERNATIONAL BUSINESS CODE § 202 (2006), http://publicecodes.cyberregs.com/icod/irc/2006f2/icod_irc_2006f2_2_sec002.htm.

Design and Vegetative Guidelines

In order to strengthen new development, the Town could also adopt a set of design guidelines. Design guidelines are usually advisory in nature, rather than mandatory, and can present a wide variety of suggested design practices, such as how to design streets and what kind of native plantings would be best to use. Design guidelines can communicate community design goals and expectations in clear language, as well as ways the barrier island ecology should inform the community design process. A town council or planning commission often has a vision they aspire to, but that vision can be rather vague. These guidelines offer valuable assistance to homeowners and developers who wish to incorporate elements of coastal architecture into their new homes and buildings.

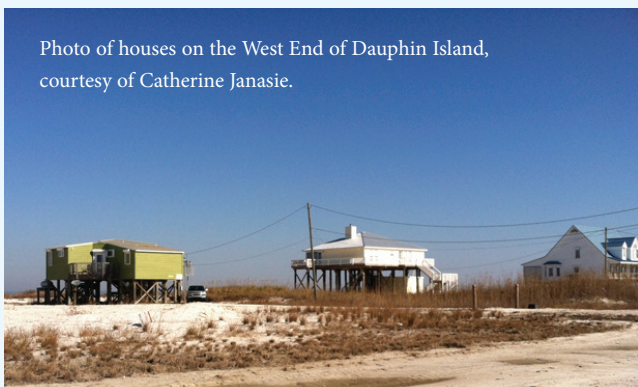


Photo of houses on the West End of Dauphin Island, courtesy of Catherine Janasie.

A good example of an island community that has implemented an exemplary set of design guidelines is the town of Manteo in North Carolina. Manteo's guidelines offer basic advice on preferred building materials, context-based neighborhood design ideas, and positive examples of projects built in the regional traditions of community design.⁹⁴

As discussed above, since vegetation is vital to protecting structures and stabilizing the island, the Town could encourage new vegetation on the island by imposing regulatory standards on new private development. The barrier island town of Duck, North Carolina, for example, has included vegetation provisions in its zoning ordinance and development review process.⁹⁵ These vegetation provisions, among other things, mandate vegetation coverage requirements ranging from 10% to 15% of the total lot in question, as well as a vegetation management plan. The ordinance also protects mature trees, as any tree greater than 24 inches in diameter at breast height can only be removed after a tree removal permit has been obtained from the town. Dauphin Island could develop similar vegetation regulations in its zoning ordinance, setting clear policy directives for maintenance of vegetation cover on the island.

93. INTERNATIONAL BUSINESS CODE § 202 (2006), http://publiccodes.cyberregs.com/icod/irc/2006f2/icod_irc_2006f2_2_sec002.htm.

94. TOWN OF MATEO, DESIGN GUIDELINES: THE MANTEO WAY OF BUILDING (2004), <http://www.townofmanteo.com/vertical/sites/%7BFA5B00D1-7FF5-44C9-8717-2CCB2DD41EDC%7D/uploads/%7BE826E640-438C-4FCE-9781-B0EF02597828%7D.PDF>.

95. *Vegetation Management*, TOWN OF DUCK NORTH CAROLINA, *Vegetation Management*, <http://www.townofduck.com/vegetationmanagement/> (last visited June 1, 2015).

Planning Action:

Since the island's natural systems are the best defense against the constant assault of nature, the Town should consider developing vegetation guidelines to help control the amount of vegetation on the island and provide more protection for the island's structures.

Siting of Structures

Another way that the Town could increase resilience is by deciding where the most prudent place is on the island to locate structures in light of the island's vulnerability to flooding and sea level rise. Once these locations are identified, the Town could think about encouraging more dense development in the more suitable areas, instead of the more vulnerable areas of the island.



Damage to beachfront homes on Dauphin Island, AL. September 11, 2005, courtesy of Lieut. Commander Mark Moran, NOAA Corps, NMAO/AOC.

Recognizing the ability of zoning to address climate hazards, the Georgetown Climate Center recently developed a model sea level rise ordinance to help local communities manage the impact of increased flooding events. The model ordinance addresses sea level rise in two ways. In order to protect development, the ordinance expands the areas protected by floodplain regulations. The model ordinance also creates two new sea level rise zones that are subject to more rigorous regulations: a Conservation Zone and an Accommodation Zone. The model ordinance provides language for standards to be applied in both of these zones.

In the Conservation Zone, the model ordinance allows communities to:

- Limit development and redevelopment to uses like recreation or open space;
- Increase setbacks to the maximum extent practicable;
- Limit structure size, putting fewer people at risk and limiting the economic impact of storms; and
- Restrict the rebuilding of structures damaged by storms.

In addition, the model ordinance directs the local government to implement the Accommodation Zone by:

- Limiting new development or requiring special use permits;
- Increasing setbacks, including erosion-based or tiered setbacks, such as by requiring larger structures to have bigger setbacks;
- Increasing structure elevations, to account for rising sea levels; and
- Limiting the size and height of structures, by allowing only smaller structures while taking into account the height of elevated structures to provide for flood protection.

As discussed above, Dauphin Island currently provides for two zones on the vulnerable West End: the Conservation Park District along the waterfront and Single Family Residential. Because of extensive beach erosion, however, much of the Conservation Park District may not exist anymore. The Town should conduct a survey to see where these zones are in relation to the shape of the West End as it currently is, and thus, how much of the Conservation Park district actually remains.

Since the CCL is also in the water, if the Town wants to control the type of development in this vulnerable area, it will have to do so through local regulation. While the Town would not have to adopt something as progressive as the model ordinance, it could choose to modify the setbacks, elevations, size, and other characteristics of buildings in the vulnerable parts of the island.

In addition, the Town may want to encourage more dense development on the island's East End. Though density can sometimes be perceived as a bad quality in a small town or village, certain kinds of density can make it easier to provide public amenities that can make for a more satisfying beach experience. Density doesn't have to be condos and hotel towers. It can be expressed through something as simple as smaller, single-family lots or through the addition of an accessory home. On Dauphin Island, where residents value their small-town scale and charm, a concept known as "middle housing" might be worth considering.

Middle housing is a term that has been used to describe the range of residential uses that straddle the line between single-family homes and apartment or condominium complexes. These can include townhouses and duplexes, but the main focus tends to revolve around accessory dwellings such as garage apartments and carriage houses.⁹⁶ These types of structures help create a

96. Dan Parolek, *Missing Middle Housing: Responding to Demand for Urban Living*, BETTER! CITIES & TOWNS, (April 3, 2012), <http://bettercities.net/news-opinion/blogs/dan-parolek/17698/missing-middle-housing-responding-demand-urban-living>.

kind of blended density, one that can effectively increase the island's carrying capacity for new development, while retaining the quiet charm that Dauphin Island residents cherish.

A carefully coordinated policy of encouraging accessory dwelling units can have significant results. In the city of Santa Cruz, an accessory dwelling program was put in place to take some of the pressures off of the local housing market.⁹⁷ The city revised its zoning ordinance to encourage the creation of Accessory Dwelling Units and released architect-generated prototypes to clarify the new changes. Since enacting this change, the city has issued somewhere between 40 and 50 accessory unit building permits each year.

Existing Structures

The Town also has several options to increase the climate resilience of existing structures on the island. For instance, improvements to existing homes can be accomplished through retrofitting and maintenance. Retrofitting generally involves integrating new features into a home after it has been completed, such as installing storm shutters on windows and doors.⁹⁸ Larger, structural changes could also include installing hurricane rods within the house for more stability and sealing roofs to better protect the structure against wind and rain damage. Though these structural changes will help with climate resilience, it is also important for the island's existing structures to be properly maintained. Wood-frame structures, for instance, will last longer if the exterior is repainted every five years.⁹⁹ A fresh coat of paint can help protect against rot that would weaken the building's overall integrity.



Photo of condos on the East End of Dauphin Island, courtesy of Catherine Janasie.

Further, since LID can also reduce flooding, homeowners on the island could make their property more climate resilient by using LID techniques, such as reducing the amount of impervious surfaces on their properties. For instance, the Town could coordinate a rain barrel workshop in conjunction with the Dauphin Island Park and Beach Board to educate residents on the value of LID techniques.

97. NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, ET AL., SMART GROWTH FOR COASTAL AND WATERFRONT COMMUNITIES (2009), <http://coastalsmartgrowth.noaa.gov/report.html>.

98. MISSISSIPPI GULF COAST SUSTAINABLE COMMUNITIES INITIATIVE, PLAN FOR OPPORTUNITY: REGIONAL SUSTAINABILITY PLAN FOR THE MISSISSIPPI GULF COAST (2013), <http://www.gulfcoastplan.org/wp-content/uploads/2014/04/Plan-for-Opportunity-Small.pdf>.

99. MISSISSIPPI-ALABAMA SEA GRANT CONSORTIUM ET AL., MISSISSIPPI HOMEOWNERS HANDBOOK TO PREPARE FOR NATURAL HAZARDS (2010), <http://nsgl.gso.uri.edu/masgc/masgch10001.pdf>.

Planning Action:

The Town might wish to encourage property owners to participate in the FORTIFIED Home Hurricane Designation through Smart Home America. This six-step designation process allows homes to receive a FORTIFIED Home Hurricane Designation when an inspector verifies that a homeowner has taken the necessary steps to insure that their structure is constructed as well as it can be to stand up to the assault from severe weather and storm surge. Basic engineering techniques such as a sealed roof deck, an adequate roof covering, and openings that are designed to withstand high-pressure ratings are all components that are inspected during the process. With this in mind, the Town could hold a local workshop on the certification system or invite representatives from SmartHome America to discuss various options to make homes on the island better protected against the onslaught of hurricanes and other storms.

Conclusion

As discussed above, the Town has a variety of potential actions that it could take to address climate stressors. These actions include:

- To protect and enhance the natural environment:
 - o Determining where the dividing line is between private and public property on the island's beaches; and
 - o Updating the language in the Conservation Park section of the zoning ordinance to restrict development in the island's environmentally sensitive areas.
- To protect and enhance Dauphin Island's built environment:
 - o Including climate adaptation provisions in the Working Waterfronts section of the zoning ordinance, such as a requirement to include sea level rise estimates in planning documents; and
 - o Providing outreach on Low Impact Development techniques to help manage stormwater and flooding on the island.
- To strengthen Dauphin Island's structures:
 - o Considering regulations the Town could implement to make new structures in the vulnerable parts of the island more climate resilient, while encouraging more dense development on the more stable East End;
 - o Creating vegetation guidelines to help control the amount of vegetation on the island and provide more protection for the island's structures; and
 - o Providing outreach to homeowners on actions they can take to better protect existing structures on the island.

APPENDIX: REFERENCES AND RESOURCES

Preparing for Climate Change: Guidebook for Local, Regional, and State Governments

- Developed by Climate Impacts Group, King County, Washington, and ICLEI – Local Governments for Sustainability
- Five Milestones of Climate Adaptation:
 - Conduct a Climate Resiliency Study (vulnerability assessment)
 - Set Preparedness Goals
 - Develop a Climate Preparedness Plan
 - Publish & Implement Preparedness Plan
 - Monitor & Reevaluate Resiliency
- In addition to guidebook, member communities can access ADAPT – online planning tool that guides local governments through the Five Milestones.
- <http://www.icleiusa.org/>

Georgetown Climate Center’s Adaptation Clearinghouse

- Contains numerous adaptation planning resources including:
 - Laws and policies
 - State and local adaptation plans
 - Reports and guides
- Climate Center has also developed toolkits for:
 - Sea Level Rise and Coastal Land Use
 - Urban Heat
- <http://www.georgetownclimate.org/adaptation/clearinghouse>

Social and Environmental Research Institute

- Developed the Vulnerability, Consequences, and Adaptation Planning Scenarios (VCAPS) as a joint project of the Social and Environmental Research Institute and the Carolinas Integrated Sciences and Assessments Programs
- Process strives to help communities become more resilient to weather and climate change by
 - Engaging in dialogue
 - Summarizing potential impacts
 - Identifying gaps in data, knowledge
 - Thinking strategically about how to prevent harm.
- Regional Examples: Orange Beach and Dauphin Island, AL
- <http://www.seri-us.org/>
- <http://www.vcapsforplanning.org/>

Virginia Coastal Policy Clinic

- Has created various reports on sea level rise and flooding, and the ability of local governments to act to address these issues.
- Reports include using zoning to address sea level rise and the Dillon Rule.
- <http://law.wm.edu/academics/programs/jd/electives/clinics/vacoastal/reports/index.php>

Bald Head Island Land Use Plan

- Model land use plan developed for the small community of Bald Head Island in North Carolina.
- The plan for Bald Head Island includes a comprehensive overview of the various types of vegetation communities found on the island along with a land suitability analysis, which uses various forms of coastal data to rank portions of the island based on their potential to receive additional development.
- http://villagebhi.org/government/development_services/planning_dept/pdf/CAMA/04%20Report%20Phase%20I.pdf

Smart Growth for Coastal and Waterfront Communities

- This report contains a number of distinct policy recommendations for communities with a strong connection to the water.
- The document offers numerous case studies from cities and towns across the country and how they used regulations and incentives to give rise to smarter coastal development.
- <http://coastalsmartgrowth.noaa.gov/report.html>