Alachua County's Draft Climate Action Plan

August 5, 2025 (v2)

Alachua County's draft Climate Action Plan (CAP) is a comprehensive and integrated strategy for responding to local climate impacts and vulnerabilities by fostering resilience and sustainability. In practical terms, the CAP serves as a roadmap for the County to adapt and put resiliency into action, protecting public health, safeguarding natural resources, and ensuring a vibrant quality of life for all who live here. The written draft CAP is not intended to be the final version; rather, it serves as a mechanism to receive public input prior to its final approval and adoption. The current version includes the following sections and chapters, all of which are posted online at https://alachuacounty.us/Depts/epd/Pages/Climate-Initiatives.aspx:

- Introduction
- Chapter 1: Agriculture and Food Security
- Chapter 2: Energy Security and Efficiency
- Chapter 3: Flood Management and Infrastructure
- Chapter 4: Heat and Health
- Chapter 5: Land Use and Transportation
- Chapter 6: Natural Resources and Conservation
- Chapter 7: Waste Management and Resource Recovery
- Chapter 8: Water and Aquifer Protection
- Appendix A: Climate Vulnerability Assessment
- Appendix B: Draft CAP – Alachua County Comprehensive Plan Excerpts
- Vocabulary & Acronyms

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Introduction

Purpose

To guide, develop, and cultivate environmentally, socially, and economically resilient strategies and solutions to climate change for the whole community.

Alachua County's Climate Action Plan: What is it and why is it needed?

Climate Change and Local Impacts

Climate is the average weather including temperature, precipitation, and wind over a period of 30 years. According to the Intergovernmental Panel on Climate Change (IPCC), climate change occurs when there is a shift in climate over decades or longer.[1] Changes to the climate can be caused by an excess of greenhouse gases (GHGs) in the Earth's atmosphere. GHGs, such as carbon dioxide and methane, trap heat within the atmosphere in a process known as the greenhouse effect. Radiation from the sun is absorbed by the Earth's surface, but some of it "bounces" off the Earth and travels back into space as infrared radiation, or heat. GHGs absorb this infrared radiation in the atmosphere and re-emit it back to Earth, where it is absorbed. This creates a "greenhouse" in the atmosphere and provides the perfect climate for life on Earth. Without the greenhouse effect, global average temperatures on Earth could be as low as -18°C (-0.4°F), much colder than the 14°C (57°F) average today.[2]

Anthropogenic, or human-caused, activities such as burning fossil fuels for energy emit more GHGs than natural processes, causing more heat to be trapped within the atmosphere. This has consequences on human civilization by increasing drought and flooding events, crop failures, the strength of tropical hurricanes, sea level rise, etc. The increase of heat within Earth's atmosphere causes positive feedback loops that amplify other negative effects, further exacerbating climate change impacts.

[1] IPCC, "Global Warming of 1.5 ºC- Glossary," 2018.
[2] NASA Earth Observatory, "Global Warming, 2010.

Since the Industrial Revolution, GHG emissions have risen exponentially, and average global surface temperatures have increased at unprecedented rates. The IPCC's Sixth Assessment Report (AR6) found that emissions from anthropogenic sources have caused 1.1°C (~2°F) of warming since 1850-1900.[3] The IPCC, along with the United Nations, have established a goal of keeping global average temperatures no higher than 1.5°C above pre-industrial levels. If the current trajectory continues, it is expected that the atmosphere will reach averages of 1.5°C above pre-industrial levels in the next twenty years.

Alachua County is not immune to the impacts of climate change. Particularly threatening is how climate change and warming oceans are making hurricanes stronger.[4] The effect of extreme weather translates into very real economic, human and quality of life outcomes. Longtime residents recall the destructive 1993 "storm of the century" and Hurricanes Frances and Jeanne in 2004. More recent storms, such as Hurricane Irma in 2017 and Hurricane Helene in 2024, also caused immense damage and flooding. Figure 0.1 shows the Florida Billion-Dollar Disaster Events from 1980 to 2024.

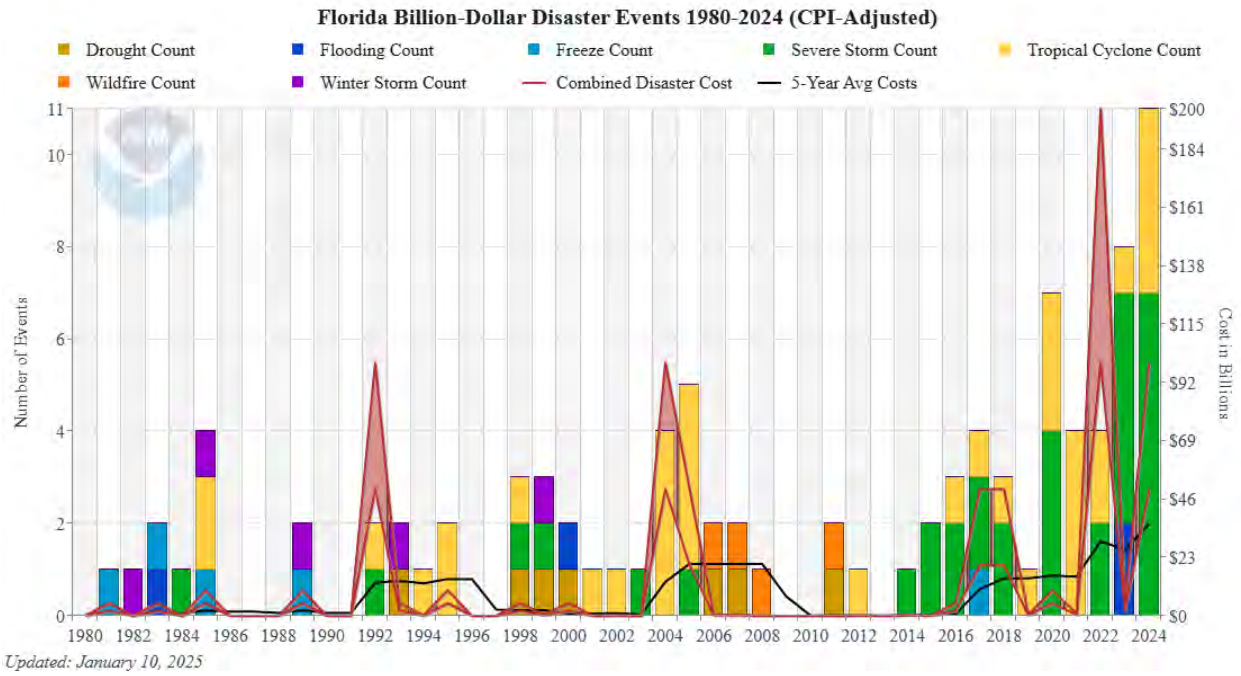

Figure 0.1 – Florida Billion-Dollar Disaster Events 1980-2024[5]

Tackling an issue of this size requires extensive comprehensive planning and deliberate, coordinated preparation for building resilience to both current and future impacts. The purpose of

[3] Lee and Romero, J. IPCC, 2023: *Summary for Policymakers. Climate Change 2023: Synthesis Report.* Contribution of Working Groups I, II, and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change, 2023.
[4] Gilford, Human-caused ocean warming has intensified recent hurricanes, *Environmental Research*, 2024.
[5] NOAA. "Billion-Dollar Weather and Climate Disasters," *National Centers for Environmental Information (NCEI)*

this Climate Action Plan (CAP) is to provide strategies that can be implemented locally to offset and reduce the economic and environmental impacts of a warming earth. These strategies have been devised to prepare Alachua County residents for the future while simultaneously reducing local contributions to climate change. Ultimately, the CAP aims to combine preparedness, mitigation, and adaptation to foster resilient communities and improve the quality of life for citizens.

Climate Action Plans (CAPs)

CAPs address climate change impacts by identifying appropriate adaptation and mitigation strategies which are then implemented through various government, business, and community entities. As per the "Florida Adaptation Planning Guidebook," the process of developing a CAP can be divided into four steps (Figure 0.2)[6]:

1. **Context** – Organize and identify local leaders to help guide the process of the CAP, and understand local values, constraints, and available resources.
2. **Vulnerability Assessment** – Understand where and how climate impacts are occurring within the County.
3. **Adaptation Strategies** – Develop localized and targeted strategies to address climate impacts.
4. **Implementation Strategies** – Carry out strategies in an economically and technically feasible manner.

[6] Florida Department of Environmental Protection, *Florida Adaptation Planning Guidebook*, 2018.

Figure 0.2: Florida Adaptation Planning Guidebook steps to make an Adaptation Plan

1) Context

The 2020 decennial census estimated that 278,468 people live in Alachua County, a majority of whom are concentrated in the Gainesville area.[7] Surrounding the County's urban and suburban hubs are vast expanses of farms and ranches, many of which have been working local lands for several generations. Urban, suburban and rural areas throughout Alachua County each have unique climate impacts and ways to best prepare for them. Local responses to climate change largely depend on geography, population, infrastructure, and access to resources. For instance, what works to address flooding in an urban area may not work in a rural area. This also means that Alachua County's responses to climate change will differ from other counties around Florida.

Solutions to climate change vary depending on location and the resources available. This is where public outreach and community participation become vital. Prior to the development of the CAP, a survey was conducted to assess citizens' weather-related risk perceptions and their impact on the community's quality of life. The survey, along with the County's Climate Vulnerability Assessment, identifies and further contextualizes the most appropriate climate mitigation and adaptation strategies to be incorporated into the CAP. For example, respondents were asked to select up to three threats of weather changes that they are concerned will impact them the most.

[7] The Gainesville Sun. "How Many People Live in Alachua County, Florida." 2020.

Of the 456 valid responses, the majority were concerned by extreme heat (58%), rainfall flooding/extreme precipitation (56%), and water pollution (47%). These data pinpoint what is important to the community and which climate impacts to prioritize.

County staff also worked to ensure that a variety of interest groups from different backgrounds were able to participate in the development of the CAP and provide feedback. They hired local organizations to curate surveys based on the content of the Vulnerability Assessment (see next section) and distribute them to the public. Organizations were chosen based on their representation of communities that are often left out of climate conversations. Organizations that worked with the County include:

- Bailey Learning and Arts Collective, Inc.
- Rural Women's Health Project
- Flourish Farm Consulting, LLC
- Grace 2 Overcome, Inc.
- Saint Peter-Saint Paul Community Council of Archer, Inc.

Additionally, County staff collaborated with local organizations to host climate-related events. This includes the 2024 Alachua County Climate Summit, where the first draft of the CAP was shown to the public.

By taking several public outreach approaches, County staff are better able to contextualize community needs and identify which issues must be prioritized as climate impacts worsen. The County's outreach goal is to engage 20% of the County's population in the CAP's development and review phases. This includes many partner organizations and the Alachua County Climate Summit.

2) Vulnerability Assessment

A Climate Vulnerability Assessment of Alachua County was conducted to evaluate how climate change will impact the County and how well-prepared its communities are for it. By quantifying future impacts, the County can develop a CAP that accurately and precisely addresses Alachua County's local climate and resiliency issues. The results allow for an assessment of where the County is right now and how it can improve moving forward. For more information on the results of the Assessment, please see appendix A. Results will be incorporated into the different sections of the CAP.

The Assessment evaluated three main components: 1) exposure, 2) sensitivity, and 3) adaptive capacity where physical and economic dimensions were considered. Exposure is defined as the presence of people, assets, and ecosystems where they can be adversely affected by climate

hazards.[8] Sensitivity is the degree to which an exposed asset is affected. Adaptive capacity is the ability that assets must cope or withstand potential impact from the threat with minimal disruption or loss. These three components develop a community-focused evaluation of climate impacts in Alachua County. For more information on the Vulnerability Assessment, see Appendix A.

3) Adaptation and Mitigation Strategies

Based on the results of the Vulnerability Assessment and public input, the CAP contains 8 chapters that precisely identify and incorporate Alachua County-specific climate adaptation and mitigation strategies. The chapters of the CAP are:

1. Agriculture and Food Security
2. Energy Security and Efficiency
3. Flood Management and Infrastructure
4. Land Use and Transportation
5. Natural Resources and Conservation
6. Heat and Health
7. Waste Management and Resource Recovery
8. Water and Aquifer Protection

The chapters following the Introduction cover each of these areas in detail with results from the Vulnerability Assessment. Each chapter has an overarching purpose, with general goals that match the purpose. Specific strategies and action items are listed under each goal for more targeted and localized ways to mitigate and adapt to climate change.

4) Implementation Strategies

"Implementation strategies are the specific steps a community takes to incorporate the adaptation [and mitigation] strategies into existing planning, budgeting, and staffing mechanisms."[9] To be a resilient and vibrant community in the future, the County must develop localized implementation strategies areas of greatest climate-related vulnerability. Collaboration with local municipalities, agencies, and organizations is necessary to foster multi-jurisdictional solutions and maximize co-benefits.

Recommendations from this CAP can be used to update the Alachua County Comprehensive Plan and associated codes starting in 2026. They can also be integrated into the County's capital improvement plans, as well as emergency management strategies. This way, the CAP will directly influence County policies to bring about strong adaptation and mitigation efforts. Each chapter

[8] U.S. Climate Resiliency Toolkit, "Understand Exposure."
[9] *Ibid* footnote 6.

discusses how its strategies further the objectives of the Comprehensive Plan and enhance already-existing legislation.

Implementation of strategies and action items will depend on several critical success factors. Funding, time, number of staff, state or federal government opt-in, community support, and enforcement are just some examples of factors that will be necessary for successful implementation of most of the strategies recommended in this CAP. It is also essential that community partners and organizations who are already doing important climate work can continue to do so. They are the foundation of Alachua County's engaged, active community who care deeply about climate change and its impacts. The ability to collaborate with them or assist in funding initiatives is crucial to increasing resiliency within Alachua County.

This is not the final version of the CAP. The CAP will become an online living document on a dashboard that is accessible to the public. It will be updated as progress is made towards the strategies or action items. More strategies and action items will be added overtime to continuously work towards climate resiliency and preparedness. There may be topics or issues that are not addressed in this version but will be incorporated into the living document. There are currently plans to develop chapters dedicated to Emergency Management and Storm Preparedness as well as a Circular Economy.

If there is an important issue that is not addressed in this version that should be included in the living document, please go to the Alachua County Climate Initiatives page on the Alachua County website and respond to the Climate Action Plan Form. All responses are read and considered by staff.

Integrated and Strategic Resilience: The Triple Bottom Line

The path towards climate resilience is not complete without integrating policies that are technically feasible, economically viable, and tailored to address specific community needs. This CAP combines the expertise of County staff and industry professionals, the Climate Vulnerability Assessment, and community feedback to develop strategic policy recommendations and action items. This allows for targeted policy changes that directly address the needs of Alachua County citizens, particularly those most susceptible to climate impacts. Each chapter of the CAP is built upon these sources to maximize resiliency across Alachua County and provide a suite of paths to address climate impacts.

The Triple Bottom Line combines the three principles of Profit, People, and Planet to create sustainable planning strategies.[10] While typically utilized by businesses, it is a useful concept to develop strategies that consider the economic, social, and environmental consequences of policies and codes. Each chapter of this CAP has a triple bottom line section outlining the following:

[10] Miller, "The Triple Bottom Line: What It is and Why It's Important," *Harvard Business School*, 2020.

1) **People:** The societal impact of these strategies will be analyzed to discuss how they increase the quality of life of residents. Strategies were developed with citizen comfort (livability, security, housing, etc.) and convenience in mind, prioritizing community resilience and prosperity.

2) **Profit:** The economic costs and savings of these strategies will be briefly explained to provide a deeper understanding of their total impact. It is important to ensure that the County invests in projects and initiatives that are not economically inefficient or wasteful of taxpayer money. Many of the strategies proposed will have short-term or long-term economic savings for the County, residents, property owners, developers, etc.

3) **Planet:** The environmental and ecological benefits of the strategies will be discussed, particularly focusing on they either protect natural resources, mitigate climate change, or increase nature-based solutions to climate change.

Baseline & Targets for the Climate Action Plan

Alachua County Comprehensive Plan 2019-2040

The Alachua County 2019-2040 Comprehensive Plan lays out the framework for maintaining a resilient community with a heavy emphasis on natural resource conservation and efficient energy use. The Plan's principles guide this CAP, particularly Principle 1 of the Future Land Use Element, which encourages social and economic considerations when making land development policy. These considerations will be applied to all chapters in the CAP, however, to provide feasible and community supported strategies.

The Comprehensive Plan also states that Alachua County aims to "Reduce countywide GHGs by 80% from 2009 baseline emissions by 2050, with an intermediate goal of a 40% reduction by 2020 and a short-term goal of 5% annual reduction."[11] This goal not only holds the County accountable to attain net-zero emissions, but it establishes realistic targets that are measurable. The CAP is centered around this goal as well as the rest of the Comprehensive Plan. For more information on the Comprehensive Plan, please visit the Alachua County website.

Greenhouse Gas Inventories

Alachua County published a Greenhouse Gas Inventories Report to determine the amount of GHGs the County emits, and which sectors emit the most. The last Greenhouse Gas Inventory was published in 2022 (using 2019 data). This study, produced by Local Governments for Sustainability (ICLEI), an international non-governmental organization, found that Alachua

[11] Comprehensive Plan Energy Element, Objective 1.1

County emitted 4,253,781 metric tons of carbon dioxide equivalent (MT CO2e) in 2019. Transportation made up most of these emissions (39%), followed by process and fugitive emissions (21%) and commercial energy (20%).[12] The remaining came from a combination of solid waste, residential energy, industrial energy, and water and wastewater. There were some decreases compared to the previous Inventory in 2009. For example, between 2009 and 2019, GHGs from residential electricity decreased by 21%, and commercial electricity decreased by 22%.[13]

These data establish a benchmark for future comparisons to quantify progress. The next Greenhouse Gas Inventory will be released in 2026 (using 2024 data). A decrease in emissions compared to 2019 levels is expected, partly due to the Covid-19 Pandemic as well as efforts made by Alachua County and its cities and municipalities. The goal of the County is to release Inventories every five years.

It is important to acknowledge that the Comprehensive Plan's goal of a 40% reduction by 2020 was not met. The County is continuing to work toward net zero and the 80% reduction by 2050, with the CAP serving as a mechanism to reach that target.

Climate Migration

Climate migration is expected to increase in Florida as sea level rise pushes populations inland. Climate migration occurs when the impacts of climate change result in individuals moving to less impacted areas.[14] Climate migration to Alachua County is expected to increase in the following decades. A study by the Bureau of Economic and Business Research and the University of Florida projects a net migration of around 27,000 people by 2100, as shown in Figure 0.2.[15] This is on top of an already growing population. The projections also show an estimated 2,000 additional housing units by 2040 and 11,000 by 2100, placing stress on local natural resources and infrastructure. These projections show an urgent need to prepare Alachua County for an influx of new residents while also pushing for climate preparedness and environmental conservation.

[12] ICLEI. *2019 Inventory of Community and Government Operations Greenhouse Gas Emissions*, 2022, 6.
[13] *Ibid* footnote 12, 17-18.
[14] Huang, "Climate Migration 101: An Explainer," *The Online Journal of the Migration Policy Institute*, 2023.
[15] Bureau of Economic and Business Research, *BEBR 2100 Population Projections for Alachua County Project*. n.d.

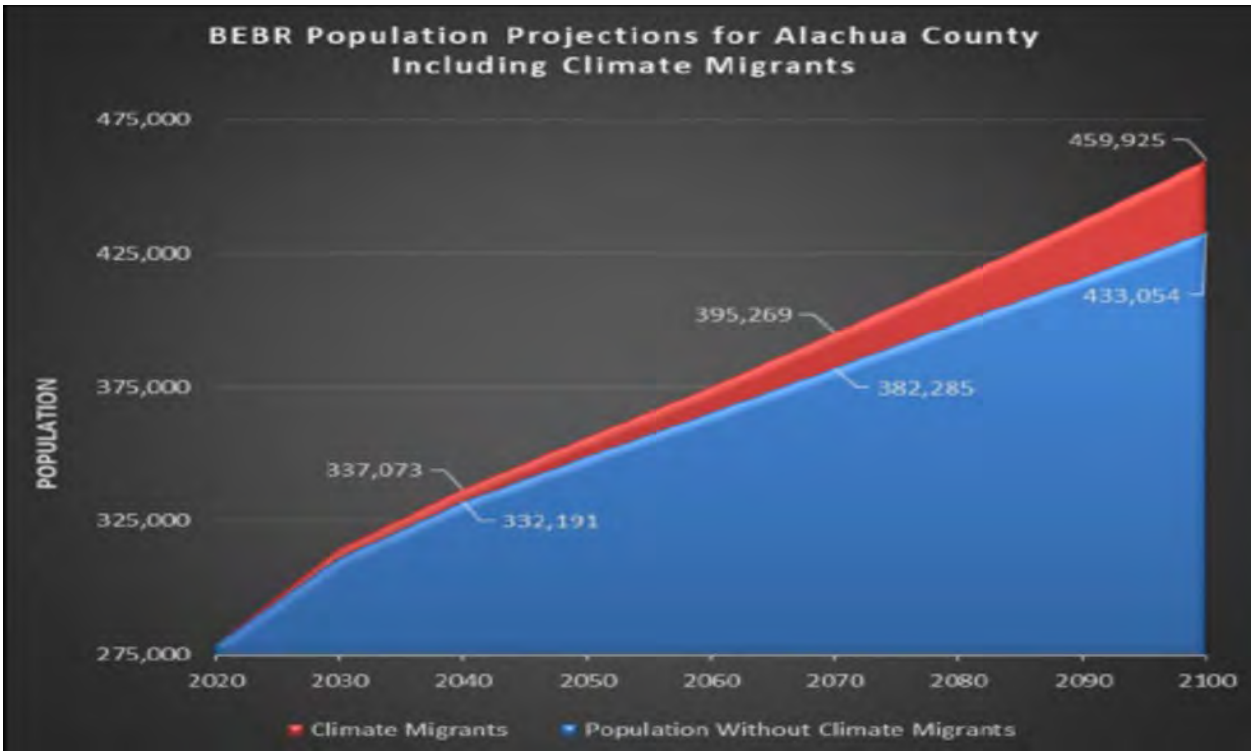

Figure 0.2: Bureau of Economic and Business Research Population Projections for Alachua County including Climate Migrants (2020-2100)

Specified Targets and Baselines

Many chapters within this CAP are missing quantitative baselines. Without more comprehensive baselines, specific goals are difficult to set on a more detailed level than general GHG reduction.

While this plan's strategies and associated metrics are strides in the right direction, additional CAP efforts should be undertaken to better understand and quantify the County's current baselines. Without such research, creating well defined implementation steps is not possible, and thus this plan should serve as an outline for future climate action planning to more clearly define specific study areas, including but not limited to estimated chapter-related GHG emissions as well as specific resiliency goals and timelines by which to achieve them.

Once baselines are achieved, targets for specific strategy actions can be defined to quantify the specific metrics to refine the listed strategies. Baselines can also assist in determining priority areas for actions to be taken, highlighting areas of highest and least concern based on established goals. From here, implementation steps can be taken towards quantified goals. These specific baselines and quantified targets will be added to the living document, dashboard version of the CAP as the data are collected.

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1. Agriculture and Food Security

Purpose

Ensure the continued viability, sustainability, security, and accessibility of the food system for all in Alachua County in the face of climate change.

Promote locally produced foods and goods to reduce food distribution impacts, reach those most in need, and maximize local economic benefits.

Introduction

Agriculture, Food, and Climate

A food system encompasses all the steps and actors involved in producing, processing, distributing, and consuming food. It is a complex network that involves social, economic, environmental, and cultural factors. It is made up of several interdependent processes, including aggregation and distribution mechanisms, environmental support systems, and consumer behavior and demand.

Climate change can result in wide-ranging failures and collapse within food systems if one or more of these processes are impacted. Shifts in temperatures, precipitation, natural disasters, and the spread of diseases are all climate impacts that can disrupt the flow of agricultural goods and food systems. As a result, agricultural policies that build up supporting infrastructure, communities, and people are a critical investment to meet the coming challenges of a changing climate and ensure the continuation of a resilient food system.

Agriculture in Alachua County

Agriculture is essential to Alachua County's economy, history, and culture. According to the USDA 2022 census, Alachua County has 1,712 farms that cover 198,000 acres (see Figure 1.1). The annual market value of these farms' agricultural products is $146 million.[1] Agriculture is also

[1] USDA, County Profile, 2022

a major employer; it is the 3rd largest employment sector in Alachua County and accounts for 37,147 jobs.[2]

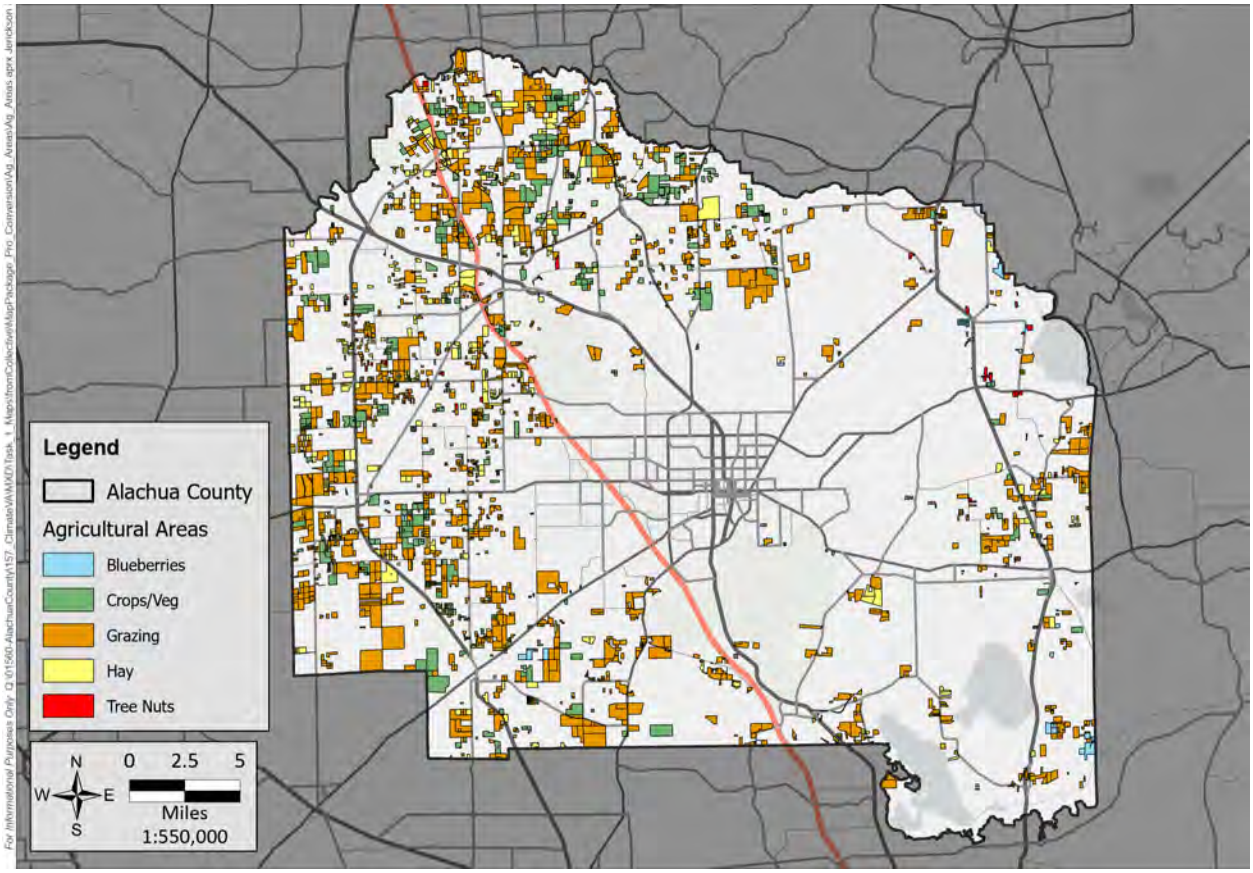

Figure 1.1: Map of Agricultural Properties in Alachua County[3]

The Alachua County Climate Vulnerability Assessment provides vital insights into the potential future of agriculture and its place in a broader food system. Due to the increase in temperatures, some agricultural products currently grown in Alachua County may no longer be suitable or may have shortened growing seasons, including snap beans and maize. Additionally, warmer nights and hotter days may increase the potential for more pests and weeds, resulting in additional pesticide and herbicide use that negatively impacts pollinators. The increase in temperatures will also have an impact on livestock as it increases the possibility of heat stress, which may impact milk production and fertility.[4]

There are concerns regarding more intense weather events, including rainfall and droughts, that could disrupt harvests and cause economic struggles. These dramatic and increasingly frequent

[2] UF/IFAS Extension Alachua County, Economic Impacts of Agriculture in Alachua County
[3] Jones Edmunds, Agricultural Risk Assessment Report, 2023
[4] Thornton et al., "Impacts of heat stress on global cattle production during the 21st century: a modelling study," *The Lancet Planetary Health*, 2022.

weather events will compound the interconnected problems of the supporting food system components: aggregation, distribution networks, and consumers. Long-term success in protecting agricultural resources and local food production within and around Alachua County requires comprehensive, interconnected strategies and a variety of crops extending beyond the current generation of farmers and ranchers.

Recent Alachua County Farm Trends

Aging Farmers

Forty percent (370 million acres) of the nation's agricultural land is owned or operated by seniors. According to the 2022 United Stated Department of Agriculture (USDA) Census of Agriculture, over 40% of farmers in Alachua County were over the age of 65.[5] In comparison, the University of Florida Institute of Food and Agricultural Sciences (UF/IFAS) determined the average age of Florida Farmers to be 59.9 years in 2022, making the local farmer community older than the average and in greater need of succession planning services.[6] In 2022, less than 6% of Alachua County farmers were under the age of 35.[7]

As aging agricultural landowners in Alachua County prepare to retire, the future of the land they steward is at a critical turning point. How and to whom they transfer their land will enormously impact the next generation of farmers and ranchers and the opportunities available to them. Regional food systems, local economies, and climate change adaptations depend on a new generation's ability to access and steward the land well.

Loss of Small & Large Farms, Growth in Mid-Sized

The number of small farms (1 to 9 acres) in Alachua County has decreased by approximately 9% since 2017. Statewide trends are more severe: farms under 180 acres saw a 21% elimination, equivalent to 3,027 farms lost. The number of farms 1,000 acres or larger in Alachua County has declined by almost 10%. On the other hand, farms between 180-499 acres saw a 12% increase over 2017.[8]

On top of issues such as farmer age and agricultural land loss, small farmers may face market challenges in moving crops to wholesale and retail destinations. A lack of regional processing, distribution, and aggregation facilities impedes market access. As an example of a systemic disruption that can impact producer access, the COVID-19 pandemic throttled the production of out-of-region meat processing facilities. During the crisis, small ranchers could not move livestock through the food system while larger producers were able to utilize the production capabilities of

[5] *Ibid* footnote 1.
[6] Menard, Changes in the Average Age of Farmers in Southern States from 2017 to 2022, 2024.
[7] *Ibid* footnote 1
[8] *Ibid* footnote 1.

distant processing plants. More recently and locally, crop processing facilities, such as in Hawthorne, have closed. These facilities had the specialized cooling and storage spaces necessary to preserve food until it is ready to be distributed to the market. Promoting local and regional processing facilities is an opportunity to strengthen the local food supply chain.

A food system dependent on distant, centralized aggregation, distribution, and processing facilities can be a weak link for local consumers and producers. The lack of local processing, aggregation, and distribution facilities that can meet the needs of small to mid-sized producers on a regional scale makes the local food system more vulnerable to sudden shocks. It deepens the dependency on large-scale, out-of-region food suppliers.

Food in Alachua County

Food Security and Accessibility

Food insecurity occurs when households lack assured access to healthy foods. As explained previously, climate change can cause food production and distribution disruptions, increasing food insecurity in many areas.[9] Alachua County is not immune to this, as food deserts, or places where it is difficult to obtain healthy foods, persist throughout the County. In 2022, the Food Insecurity Rate in Alachua County was 13.6, which is higher than the Florida average, 13.2.[10] While it has steadily decreased over the last decade, Covid-19 introduced a shock to the economy and agricultural sector, causing insecurity and instability to the local food system. This signifies a need to increase resilience against shocks such as climate change.

Food insecurity and food deserts particularly impact low-income communities. A study by the University of Florida found several food deserts within Alachua County in areas with high concentrations of low-income housing and impoverished children.[11] Limited and inconsistent access to healthy food can cause higher levels of health issues, including obesity and cardiovascular diseases.[12]

Food waste is also a problem, with the EPA estimating that 1/3 of the food in the United States ends up in landfills.[13] Much of this food is in good condition and edible, but it is not being distributed effectively for various reasons, including the dispersion of grocery stores and dependence on large retailers that do not sell all of their produce. Diverting edible food and

[9] USDA, *Climate Change, Global Food Security, and the U.S. Food System*, 2015.
[10] Florida Department of Health, *Food Insecurity Rate*, 2023.
[11] Babb et al., "Food Deserts in Alachua County: Identifying Food Deserts and Methods for Improvement."
[12] Odoms-Young et al., "Food Insecurity, Neighborhood Food Environment, and Health Disparities: State of the Science, Research Gaps and Opportunities," 2024.
[13] City of Gainesville. *Composting & Food Waste Reduction*.

produce towards food insecure communities serves as a mechanism to serve at-risk populations as well as prevent further waste.

Alachua County Comprehensive Plan

The Alachua County Comprehensive Plan addresses the agricultural and food sectors in detail. While climate is not the Comprehensive Plan's main focus, many of its objectives, policies, and targets are in line with establishing resilient agriculture and food systems. Specific areas addressed include encouraging, promoting, and supporting:

- Sustainable local food production and processing,
- Food security and resilience,
- A local foodshed and food economy,
- The use of locally grown and/or processed foods in County facilities where food is provided,
- Community gardens and edible landscapes,
- Local, sustainable agricultural practices, including organic farming,
- Educational strategies on the benefits of purchasing locally grown and/or processed foods,
- Access to healthy, affordable, and nutritious food,
- Food security and public health by encouraging locally based food production, distribution, and choice,
- Food banks, pantries, and other sources that help provide food assistance to low-income residents,
- Partnerships with local organizations and developing standards to promote community food systems,
- Development of standards for produce stands, farmers' markets, and food cooperatives to facilitate the location of fresh produce providers within or near residential areas,
- Utilization of economic development tools, including public/private partnerships and site facilitation, to promote the location of grocery stores and Farmer's Markets in proximity to underserved areas,
- Working to implement the 2009 Hunger Abatement Plan and future updates and shall provide technical assistance for community food access studies. Seeking to eliminate food insecurity in Alachua County by 2050, and in the next 5 years, increase community partnerships to meet food security goals,
- Edible landscaping (i.e., fruit trees and shrubs) for landscaping requirements through appropriate policy and standards of the ULDC,
- The use of schools as food distribution sites to increase food security for students and families, and

- The location and expansion of sustainable food production and processing industries as part of the County's economic development efforts

The purpose of this chapter is to further the Comprehensive Plan's targets while also adding to them by incorporating a climate focus.

Past and Current Efforts

Assessment of Vulnerability to Climate Change

Alachua County has invested in researching how climate change will impact the agricultural sector. This research predicts what will happen to some of Alachua's most-grown crops through the Vulnerability Assessment. Corn, for example, is likely to experience a significant reduction in yield due to heat and water deficit stress. Livestock will also be negatively impacted as they become more prone to heat stress. Dairy cow production is likely to decline as a result. Snap peas are expected to maintain yields until 2040, while Bahia grass grown for forage is expected to do well, with increasing yields. [14]

Agricultural Runoff

Many fertilizers contain nutrients such as phosphorus and nitrogen, which can cause significant ecological damage by running off into waterways and springs. This leads to algae blooms or dead zones.

Alachua County avoids these pollutant fertilizers to minimize the effects of agricultural runoff. Notably, these policies do not impact bona fide agricultural operations, as local governments are precluded from regulating their use.[15] However, from July through February, nitrogen fertilizers are banned for residential and commercial use. All nitrogen fertilizers must be at least 50% slow-releasing. The County has also prohibited the use of phosphorus fertilizers, only allowing them under exceptional circumstances. These actions help protect Alachua's soil and surface water, springs, and clean groundwater from algae blooms (see the Water Chapter for more information).

Food Waste and Food Insecurity Driving Food System Responses

Food waste and food insecurity are interconnected challenges within Alachua County's food system. The impact of food waste on the environment and the system's vulnerability to disruptions

[14] Bermuda grasses are also used for hay production, but the report does not mention impacts to this variety.

[15] Agricultural producers are regulated by FDACS and are encouraged to enroll in BMPs

is evidenced by the increase in food insecurity during the COVID-19 pandemic. The County has key initiatives to address these challenges, including reducing food waste through the Zero Waste Initiative, supporting small farmers through grant programs, connecting local producers with institutional buyers through the Fresh Food Pathways Food Hub project, and developing the culinary workforce alongside support for small farmer value-added food production. These initiatives demonstrate a commitment to building a more resilient, secure, and accessible food system that addresses environmental and social concerns.

Zero Waste Initiative

Alachua has developed the Zero Waste Initiative in conjunction with the City of Gainesville to eliminate waste by 2040. Part of this is accomplished via outreach to businesses and food recovery organizations, learning more about their needs. By supporting several policies and the Commercial Zero Waste Ordinance, progress has been made in establishing more sustainable practices. The climate implications and strategies to address organic food waste are more comprehensively discussed in the Waste Management and Resource Consumption Climate Action Plan. Food that is wasted contributes to greenhouse gas emissions and represents a resource that could address hunger in the community, especially during times of crisis.

During the COVID-19 pandemic, food insecurity increased from 13.9% in 2018 to 15.4% in 2020.[16] This need highlighted the community food system's vulnerability to sudden shocks. Alachua County created several responses to this crisis, addressing immediate food needs, workforce, new farmer development, value-added entrepreneurship, small farmer support grants, and an ongoing study to establish a Food Hub. Food system insecurities continue year-round, and the County needs long-term, comprehensive strategies to address them.

Helping Small Farms Become More Productive

The Small Farmer Grant program financially supports small-scale agricultural producers with $5000 mini-grants.[17] Grants are used to invest capital and equipment to make these farms more financially viable. In 2025, Alachua County will distribute another $100,000 in grants.

Linking Local Producers to Big Purchasers

The Fresh Food Pathways project aims to create a thriving food hub that benefits the community, local farmers, and institutional food purchasers.[18] A food hub is an aggregation and distribution facility that emphasizes purchasing from local producers to sell to institutional purchasers, such as

[16] FLHealthCHARTS, Food Insecurity Rate, 2023.

[17] Alachua County Resiliency Office, Small Farmer Grant.

[18] Office of Sustainability, Equity, Economic and Strategic Development, Program Manager Services for Alachua County's Fresh Food Pathways Program, 2024.

the Alachua County Public Schools, County Jail, UF, UF Health, and North Florida Regional Medical Center. Kicked off in 2025, this 30-month effort will create a roadmap to a potential public-private partnership and a strategy to target supporting capital grants and appropriation requests.

Culinary Workforce and Farmer Value-Added Product Development

The Food System Workforce program involves partnerships between Working Food, community partners, and other organizations to support farmers and create employment opportunities.[19] Low-income youth are introduced to high-level culinary arts and certification programs. At the same time, local small farmers are given access to commercial kitchen space and business consultation to develop shelf-stable, value-added food products. Based on the December project update, the economic returns for the kitchen program in December 2024 were as follows: Gross revenue generated by farmers: $8,466.48. This figure represents the total income generated by the three active farmers who utilized the Working Food Commercial Kitchen during that month.

Small Garden Plots and Community Gardens

A cultural relationship to food is essential to creating a resilient food system. As practiced in World War II Victory Gardens, growing food on a small scale in community gardens or backyard plots creates affordable options for individuals while building an appreciation for the effort required to grow population-sustaining food. Across Alachua County, people utilize the UF IFAS Agricultural Extension Services, children participate in 4H Youth Clubs to learn best practices in food production, and Master Gardener volunteers work in community and school gardens.

Gainesville, Florida, boasts a vibrant community gardening scene, providing residents with green spaces to grow vegetables and engage in healthy outdoor activities. The City of Gainesville initiated its first Community Gardens Project in 1998 at Southeast Fourth Avenue. Since then, the program has expanded to include five gardens around Gainesville, thanks to the collaboration between the City of Gainesville's Parks, Recreation, and Cultural Affairs Department and the dedicated efforts of Gainesville residents. These gardens are Dreamers' Garden in the Grove Street Neighborhood, Green Acres Park Community Garden, McRorie Community Garden, NE 31st Avenue Community Garden, and SW 40th Place and SW 30th Terrace Community Garden. Gainesville has at least 12 community gardens across the city, demonstrating their importance in fostering community interaction and providing fresh produce.

Additionally, Alachua County supports agriculture through farmers' markets and pick-your-own farms, further enriching the community's access to fresh, local produce. Markets like the Haile Village Farmers Market and Union Street Farmers Market, along with farms offering organic

[19] Dixon and McLendon, Food System Workforce Development Program Mid-Project Update, 2024.

fruits, vegetables, and blueberries, provide residents with various options to engage in local agriculture. Based on these successes, farmers' markets and farm stands can now be found throughout Alachua County.

These initiatives highlight a commitment to engaging in agriculture in a way that promotes a culture of sustainability, health, and community development. They serve as models for other cities to create productive, inclusive spaces.

Agricultural Land Protection Strategies

The Board of County Commissioners, in its 2023 Strategic Guide, identified “Invest in and Protect Our Environment” as a guiding principle and has named “Continue Wild Spaces and Public Places and include agricultural lands as well” as a program action in support of this principle. These strategies recognize that development pressures and climate change impacts threaten both ecologically significant and farming lands.

Over the past 50 years, Alachua County has lost over 50% of its farmland, and much of the remaining agricultural land is at a high risk of conversion to housing and suburban development. The conversion of these agrarian lands impact local food production networks and remnant wildlife habitats, increasing stormwater runoff, pollutants transported by runoff, and water consumption. Furthermore, much of the remaining agricultural land in the western part of Alachua County contains sandy, high-recharge soils, which are essential for the future viability of the Upper Floridan Aquifer that provides fresh drinking water and feeds springs and rivers.

Through action by the Board of County Commissioners during a Special Policy meeting on February 7, 2023, an agricultural land protection strategy has been included in future land conservation priorities in Alachua County. Agricultural land protection was identified as a complement to the County’s geographic-corridor-based land conservation strategy, serving to strengthen existing Alachua County Forever (ACF) program priority corridors, expand protection of water quality and aquifer recharge, and enhance protection of local food production systems through increased acquisition of conservation easements on agricultural lands (see the Natural Resources Chapter for more information on ACF).

The current framework and process for conservation land protection through the ACF program prioritizes environmentally significant lands that protect water resources, wildlife habitats, and natural areas suitable for resource-based recreation based on ranked and prioritized program “project areas.” This framework includes protecting working agricultural lands that meet the ACF program mission due to location, connectivity with existing conservation lands, or other natural resource values. Expanded addition of agricultural land protection into the County’s land conservation program requires a separate and defined process developed with agricultural land protection as the focus, and with farm landowners' and stakeholders' involvement and input.

In September 2024, following a year-long community engagement and strategy development process, the Board of County Commissioners approved and authorized the Agricultural Land Protection Strategy for implementation through the Alachua County Forever Program. Strategy implementation is defined through Board resolution, and initial funding and staffing for the strategy was approved by the BOCC for fiscal year 2025.

The Agricultural Land Protection Strategy established an Agricultural Land Conservation Board (ALCB). This citizen board is comprised of 9 volunteers who serve 4-year terms. Six members must have education and experience in agricultural lands management, practices, or land protection, and four members will serve citizens-at-large and represent community interests. The ALCB serves to incorporate citizen participation into Alachua County agricultural policy. It is essential that citizen and agricultural professionals' thoughts and experiences have a place in County decisions. While the ALCB is new, it has great potential to improve agricultural conservation strategies and outreach.

Agricultural Land Transfer and Succession Planning

Recognizing the multi-generational aspect of agricultural land protection, particularly regarding lands with agricultural easements, Alachua County has been awarded a grant from the American Farmland Trust to participate in the American Farmland Trust (AFT) Land Transfer Navigator Program beginning in 2024. Staff from participating Navigator organizations will be trained in land access and farm/ranch transfer facilitation to provide tailored assistance to farmers, ranchers, and landowners. Capacity grants are awarded to these entities to assist farmers, ranchers, and landowners, support their training, and build institutional capacity to invest in their land access and transfer work.

Navigators train to:

- Provide technical assistance to facilitate farm and ranch transfers.
- Reduce language, legal, cultural, and other barriers to accessing or transferring agricultural land or businesses for historically underserved farmers and ranchers.
- Connect farmers, ranchers, and landowners with regional service providers.
- Increase the role agricultural conservation easement programs and partner organizations play in facilitating the transfer of farms to a new generation.

Program Highlight

Small Farmer Grant and Uplifting Alachua County Agriculture

Launched in 2021, the Alachua County Small Farmer Grant supports local agricultural producers earning less than $250,000 in gross cash income annually. This grant is specifically designed to assist with capital equipment needs for Alachua County residents operating small-scale, commercial agricultural operations within the county.

To qualify, producers must demonstrate a gross cash income of at least $1,000 and no more than $250,000 per year from the regular harvest and sale of products intended for human consumption, such as grain, honey, fruits, vegetables, dairy, and livestock. Priority is given to applicants whose annual gross income is $75,000 or less.

As of March 2025, the Small Farmer Grant has supported 65 small farmers. Small Farmer Grant applicants come from across Alachua County. The primary goal of the program is to strengthen the economic resilience of Alachua County's local food system by investing in its small-scale agricultural producers.

Agricultural Entrepreneurship and Business Planning Education Incentive

Alachua County actively supports the professional development of small-scale agricultural producers by covering the full course fee for up to 50 individuals per year to participate in the University of Florida Institute of Food and Agricultural Sciences (UF/IFAS) Agricultural Entrepreneurship Series and Farm Business Planning Short Course.

This educational program is designed for aspiring and beginning farmers, ranchers, and agricultural entrepreneurs seeking to build a strong foundation in farm business planning. In addition to gaining valuable skills, participants who complete the course may submit their finalized farm business plan as part of their Alachua County Small Farmer Grant application to earn additional incentive points during the scoring process.

Through this initiative, the County aims to promote farm viability, business planning, and long-term success for small producers in Alachua County.

Agritourism Workshop Series

Alachua County hosted its first Agritourism Workshop in 2022 and is planning to host the next installment in 2025. The workshop is designed for individuals involved in or exploring agritourism, including farmers, ranchers, landowners, and agricultural entrepreneurs, who are interested in generating additional income streams through on-farm experiences and visitor-based business ventures.

The County organizes this event to support local economic development by helping agricultural producers diversify their operations and strengthen their financial sustainability. The workshop

addresses critical considerations such as zoning, permitting, fire safety, marketing, and collaborative promotion. Subject matter experts from Alachua County Growth Management, Fire Rescue, and Tourism and Economic Development lead the sessions, providing attendees with direct access to regulatory guidance, public safety protocols, and marketing tools.

By facilitating these workshops, Alachua County aims to reduce barriers to entry for agritourism ventures, promote regulatory compliance, and encourage entrepreneurship in rural areas. The initiative aligns with broader County goals to enhance the resilience of the local agricultural economy and support landowners in maintaining productive, economically viable working lands.

Strategies and Action Items

Goal 1.1 – Strengthening Local Food Systems

STRATEGY 1.1.1 *– Increase local agriculture's access to markets.*

Strengthening Alachua County's food systems requires a combination of reducing reliance on long-distance transportation for delivering food and expanding local farmers' access to markets. The intent is to minimize the amount of distance between a farm and its consumers. This "farm to table" approach lowers GHG emissions from transporting the food and can result in a meaningful reduction and progress towards the County's net zero goals. It promotes seasonal eating, which tends to be less energy intensive and nutritionally dense than non-seasonal foods.[20] There are also immense benefits for local farmers to increase their revenue and diversify their income.[21]

Targeted programs are necessary to connect local farmers to markets. This can be done via food hubs such as the Fresh Food Pathways Project, but additional food hubs should be planned to reach more of Alachua County and more farmers. A particular focus must be put on getting fresh, local foods to food deserts to decrease food insecurity.

Table 1.1: Action Items for Increasing Local Agricultural and Food Security (Strategy 1.1.1)

Action Items	Jurisdiction	Pros	Cons	Status

[20] Bano, "Farm-to-Table: Exploring the Benefits and Challenges of Local Food Systems," 2024.

[21] *Ibid* footnote 19.

Support the development/ expansion of additional regional food hubs and processing facilities to improve local farmers' access to markets.	Alachua County Board of County Commissioners (in partnership with local farmers, institutional food purchasers, non-profits, and the private sector)	Creates local jobs, improves food security, reduces transportation emissions, and strengthens the local economy.	Requires significant investment and may face challenges in securing adequate funding and finding suitable locations.	Ongoing

STRATEGY 1.1.2 *– Incentivize climate-smart and sustainable agriculture.*

Climate-smart agriculture ensures that the local food system is resilient to shocks such as hurricanes and extreme heat. Such agricultural methods can decrease the amount of land required, incorporate mixed-uses for the land, and use more sustainable practices. Climate-smart or sustainable agriculture may include agroforestry, regenerative agriculture, precision agriculture, permaculture, aquaponics, agrivoltaics, vertical agriculture, etc. However, many of these are expensive to implement upfront, making it inaccessible for local farmers. The County can promote climate-smart agriculture by incentivizing and compensating farmers for transitioning towards sustainable, resilient farming practices.

Table 1.2: Action Items for Increasing Local Agricultural and Food Security (Strategy 1.1.2)

Action Items	Jurisdiction	Pros	Cons	Status
Create a program that incentivizes and compensates producers for enhancing ecosystem services on farming lands via climate-smart strategies, high-efficiency water resource management, and the use of recycled organic materials from the waste stream in lieu of synthetic fertilizers.	Alachua County Board of County Commissioners (in partnership with local farmers, institutional food purchasers, non-profits, and the private sector)	Enhances the economic viability of farms. Keeps local farms in production. Aligns to and compliments the County's agricultural easement initiatives.	May require ongoing funding and community engagement to ensure program sustainability.	Not Started

Goal 1.2 – Build Upon Workforce & Entrepreneurship Programs

STRATEGY 1.2.1 *– Collaborate with local and state partners to expand agricultural workforce, entrepreneurship and innovation programs.*

Increasing the amount of entrepreneurship and innovation within agricultural and food systems creates resilient solutions to climate change. Through collaborations such as those with UF/IFAS, there are opportunities to expand pilot workforce development programs to address emerging needs within the local food system. This can also counteract the ongoing issues of aging farmers and farm succession by bringing in new, young farmers or employees. Programs should focus on skills development, entrepreneurship, and climate adaptation. Alachua County can support the development of local food enterprises, particularly those owned by underrepresented populations.

Table 1.3: Action Items for Expanding Agricultural Workforce, Entrepreneurship, and Innovation (Strategy 1.2.1)

Action Items	Jurisdiction	Pros	Cons	Status
Expand the Food System Workforce Program as a high-skill jobs pipeline; include training modules on topics such as, but not limited to, food entrepreneurship, food safety certification, climate-smart agriculture, water conservation, and adapting to changing weather patterns.	Alachua County Board of County Commissioners (in partnership with CareerSource, Children's Trust, Alachua County Public Schools, UF/IFAS Extension, local community colleges, and private sector partners)	Develops a skilled workforce, supports local food businesses, and enhances the resilience of the local food system.	Requires ongoing funding, effective partnerships, and continuous evaluation to ensure program effectiveness.	Not started

"Agribusiness Incubator" program: Provide mentorship, business planning assistance, support ag-tech parks, best climate-smart practices, UF/IFAS Farm Plan adoption, and access to resources for aspiring small-scale farmers and food entrepreneurs (e.g., farmers market vendors and value-added food producers).	Alachua County Board of County Commissioners (in partnership with Food Incubators, SCORE, UF/IFAS Extension, local community colleges, and private sector partners)	Supports local farmers and businesses, emerging locally produced agricultural technology, creates jobs, and strengthens the local food economy.	Requires careful program design, risk assessment, and ongoing monitoring to ensure program effectiveness and financial sustainability .	Not started

Goal 1.3 – Commercial Organic Waste Composting & Local Fertilizer Use

STRATEGY 1.3.1 *– Incentivize the use of local organic waste compost as fertilizer on agricultural lands.*

Fertilizer for agricultural use contributes to runoff and a decrease in water and soil quality. While the County's robust fertilizer code applies to all fertilizer applicators in the unincorporated and incorporated areas of Alachua County, there are still opportunities to minimize its use by replacing it with compost. Using compost as fertilizer has also been shown to enhance soil health.[22] Transitioning to compost fertilizer at an agricultural scale can maximize sustainable farming practices and, if using local compost, decrease the amount of food waste produced by the County (see the Waste Chapter for individual/residential composting goals). Using locally produced compost also supports local businesses and contributes to a circular economy (see the Waste Chapter).

Table 1.4: Action Items for Incentivizing Local Compost and Local Fertilizer (Strategy 1.3.1)

Action Items	Jurisdiction	Pros	Cons	Status
Pilot Program for Commercial Food Waste Collection & Composting	Alachua County Solid Waste & Resource Recovery Department in	Reduces landfill waste and greenhouse gas emissions.	Requires initial investment in infrastructure and logistics.	Not started

[22] UF/IFAS Extension, *Composting for the Home Gardener.*

	collaboration with local businesses and a private sector composting facility.	Creates a market for local composting businesses. Provides valuable data for future program expansion.	May require financial incentives for businesses to participate. Needs to ensure proper food waste separation and contamination control.	
Facilitate connections between local farmers and compost producers.	Alachua County Board of County Commissioners (in partnership with UF/IFAS Extension, NRCS, and local farmers)	Promotes sustainable agricultural practices. Reduces reliance on synthetic fertilizers, improving environmental quality. Supports local businesses and strengthens the local economy.	May require financial resources for incentive programs. Requires ongoing outreach and education efforts to encourage farmer participation.	Not started
Develop a program to incentivize local farmers' use of locally produced compost (e.g., grants, cost-sharing programs)	Alachua County Board of County Commissioners (in partnership with UF/IFAS Extension, NRCS, and local farmers)	Promotes sustainable agricultural practices. Reduces reliance on synthetic fertilizers, improving environmental quality.	May require financial resources for incentive programs. Requires ongoing outreach and education efforts to encourage farmer participation.	Not started

Educate farmers on the benefits of compost (improved soil health, reduced reliance on synthetic fertilizers, improved water retention)	Alachua County Board of County Commissioners (in partnership with UF/IFAS Extension, NRCS, and local farmers)	Promotes sustainable agricultural practices. Reduces reliance on synthetic fertilizers, improving environmental quality. Supports local businesses and strengthens the local economy.	May require financial resources for incentive programs. Requires ongoing outreach and education efforts to encourage farmer participation.	Not started

Goal 1.4 – Build a Local Food System Culture through Engagement and Agritourism

STRATEGY 1.4.1 *– Develop a Farm to Table education program in Alachua County.*

Local food systems are strengthened and reinforced by support from the community. Several community groups and initiatives already exist in Alachua County to promote local food systems, educating citizens on the benefits of buying local produce and strengthening the local agricultural sector. Through collaboration with such groups, the County recommends the development of a Farm to Table education program to integrate knowledge of the local food system into the education system. Learning about sustainable farming practices, local produce, and the health benefits of eating locally from a young age can foster a new generation of engaged, well-informed citizens.

Table 1.5: Action Items for Developing a Farm to Table Program in Alachua County (Strategy 1.4.1)

Action Items	Jurisdiction	Pros	Cons	Status
Integrate farm-to-table education into school curricula (e.g., gardening programs, nutrition education, cooking classes using local ingredients).	Alachua County Public Schools, in partnership with the Children's Trust,	Increases awareness and appreciation for local food among youth.	Requires ongoing funding and coordination between multiple stakeholders.	Not started

	UF/IFAS Extension, local farmers, food incubators, and community organizations.	Promotes healthy eating habits. Fosters a connection between students and their local food sources.	May require teacher training and curriculum development.	
Organize field trips to local farms for students to learn about food production and connect with farmers.	Alachua County Public Schools, in partnership with the Children's Trust, UF/IFAS Extension, local farmers, food incubators, and community organizations.	Increases awareness and appreciation for local food among youth. Promotes healthy eating habits. Fosters a connection between students and their local food sources.	Requires ongoing funding and coordination between multiple stakeholders. May require teacher training and curriculum development.	Not started
Develop educational resources for teachers and students on topics such as sustainable agriculture, food systems, and the importance of supporting local farmers.	Alachua County Public Schools, in partnership with the Children's Trust, UF/IFAS Extension, local farmers, food incubators, and community organizations.	Increases awareness and appreciation for local food among youth. Promotes healthy eating habits. Fosters a connection between students and their local food sources.	Requires ongoing funding and coordination between multiple stakeholders. May require teacher training and curriculum development.	Not started

STRATEGY 1.4.2 *– Promote Agritourism in Alachua County.*

Agritourism presents an opportunity to increase revenue for local farmers while promoting the local culture of Alachua County. Agritourism generated over $630 million in economic impact for Alachua County in 2021.[23] Having a well-established agrotourism sector can also preserve these lands, addressing the 50% loss in farmland in the last 50 years. More emphasis must be put into boosting the agritourism sector by increasing farms' visibility and promotion.

Table 1.6: Action Items for Promoting Agritourism in Alachua County (Strategy 1.4.2)

Action Items	Jurisdiction	Pros	Cons	Status
Develop and promote agritourism trails and maps highlighting local farms, farm-to-table restaurants, and other agritourism destinations.	Alachua County Board of County Commissioners (in partnership with farms, restaurants, breweries, UF/IFAS Extension, municipalities, and private sector partners)	Boosts local tourism and economic development. Provides additional income streams for farmers. Promotes awareness of local agriculture and its importance to the community.	Requires ongoing marketing and promotional efforts. May require additional resources for infrastructure development at some farm locations.	Not started
Organize annual "Agritourism Weeks" or festivals to showcase local farms and connect visitors with the agricultural community.	Alachua County Board of County Commissioners (in partnership with farms, restaurants, breweries, UF/IFAS Extension, municipalities, and private sector partners)	Boosts local tourism and economic development. Provides additional income streams for farmers. Promotes awareness of local agriculture and its importance to the community.	Requires ongoing marketing and promotional efforts. May require additional resources for infrastructure development at some farm locations.	Not started

[23] "Alachua County Agritourism Conference," 2022.

Encourage the development of unique agritourism experiences (e.g., farm stays, farm-to-table dinners, educational workshops).	Alachua County Board of County Commissioners (in partnership with farms, restaurants, breweries, UF/IFAS Extension, municipalities, and private sector partners)	Boosts local tourism and economic development. Provides additional income streams for farmers. Promotes awareness of local agriculture and its importance to the community.	Requires ongoing marketing and promotional efforts. May require additional resources for infrastructure development at some farm locations.	Not started

Goal 1.5 – Expand Protection of Agricultural Lands

STRATEGY 1.5.1 – *Implement Agricultural Land Protection Strategy under the Alachua County Forever Program to increase conservation of farmlands through acquisition of agricultural conservation easements.*

Similar to the threats posed to environmentally significant conservation lands, agricultural lands are also under threat from development and other pressures. Development of agricultural lands impacts local food production networks, remnant wildlife habitat, and increases stormwater runoff, pollutants transported by runoff, and water consumption. Furthermore, much of the remaining agricultural land in the western part of Alachua County contains sandy, high recharge soils, which, as mentioned previously, are essential for the future viability of the Upper Floridan Aquifer.

The Climate Vulnerability Assessment identified the multiple policy, planning and finance actions recommended to help manage impacts from climate change on agricultural lands, workers, crops and practices. The implementation of an agricultural land conservation strategy will help ensure the diverse landscape of Alachua County is preserved into the future. This is one of the measures Alachua County can use to effectively address the impacts of climate change, mitigate risks, and enhance the quality of life for current and future residents.

Table 1.7: Action Items for Implementing Agricultural Land Protection Strategy (Strategy 1.5.1)

Action Items	Jurisdiction	Pros	Cons	Status

Implement the Agricultural Land Protection Strategy in accordance with Board Direction established through Board Resolution.	Alachua County	Protection of agricultural land; preservation of agricultural jobs; preservation of Alachua County Culture	None.	Emergent
Acquire agricultural land conservation easements on priority lands within the County, in partnership with willing landowners.	Alachua County	Protection of agricultural land; increased partnership with local farmers	Cost; landowner pushback	Current with emerging expansion

Triple Bottom Line

People

Investing in local agriculture bolsters community health in a variety of ways. Small farms, farmers markets, community gardens, and other local food sources promote access to fresh produce and other healthy foods, decreasing food insecurity and food deserts in Alachua County. The nutritional quality of local produce tends to be higher than produce brought from long distances, which lose some nutritional value.[24] Additionally, when farmers transition away from synthetic fertilizers or pesticides, people are less exposed to chemicals.[25]

Farmers, volunteers, students, or communities who participate in growing food also benefit from physical activity and better mental health. These gardens are not only about food production; they are spaces where residents can cultivate friendships and enjoy the therapeutic benefits of gardening. They offer an educational opportunity for families to teach their children about gardening and support local agriculture, enriching the community's social fabric and promoting sustainable living practices. They also preserve agriculture as an essential part of Alachua County

[24] *Ibid* footnote 19.
[25] *Ibid* footnote 19.

culture. Incorporating such values and practices into the school system can foster the next generation of agriculture farmers, entrepreneurs, innovators, and culinary professionals.

A pressing issue after natural disasters is the availability of food. Local agriculture supplies a reliable source of food when supply chains are disrupted due to events like pandemics and natural disasters.[26] As climate change impacts grow more intense, ensuring a strong, resilient food system can provide people with nutritious food when it would otherwise not be available.

Profit

The benefits of a strong agricultural sector are Countywide. By increasing farmers' access to markets, they can sell more agricultural products, generating more profit. This is especially beneficial because, according to the 2022 USDA Census, 44% of farmers make less than $2,500 in value of sales, and 65% of farmers make less than $10,000 in value of sales.[27] It provides opportunities not only to increase their profit, but to expand their agricultural production. Agriculture in Alachua County has produced over $280 million in business sales, and every dollar in sales generates $1.80 for other sectors in the local economy. [28] Additionally, more access to markets and sales allows farmers – especially those who are older – to have the opportunity to hire farmworkers or begin the next generation of farmers. Every job in agriculture in Alachua County generates another 1.12 jobs.[29]

The viability of these farms and jobs is dependent on how they react to future climate impacts. Increasing the number of farmers who use climate-smart farming techniques can ensure that agriculture remains resilient against shocks, protecting farmers' jobs, livelihoods, and the sector as a whole.

Promoting agritourism also has economic benefits. As mentioned, agritourism generated over $630 million in economic impact for Alachua County in 2021, showing the potential to earn more if the industry has the proper foundations, infrastructure, and marketing. This is valuable not just for farms, but for the general tourism, ecotourism, and recreation industries within Alachua County. Visitors would also support local restaurants and other services.

Those not working in the agricultural sector can also benefit due to the decreased costs in local food items. Minimizing factors such as travel can decrease the price of local produce and crops. Promoting community gardens and farmer's markets also makes food more economically accessible by providing lower-cost goods compared to large, commercial retailers.

[26] Papanek et al., "Social and Community Benefits and Limitations of Urban Agriculture."
[27] *Ibid* footnote 1.
[28] Florida Farm Bureau, "Alachua County Agricultural Stats"
[29] *Ibid* footnote 27.

Planet

Protecting agricultural lands via easements has immense environmental benefits. It promotes carbon sequestration not only because many farmlands are surrounded or close to forests or wetlands but also because healthy soils store carbon in the form of organic matter. Such protections prevent these lands from being developed, which would increase GHG emissions and eliminate crucial carbon sinks within the County.[30]

Protection of agricultural lands also protects pollinators, an often-overlooked aspect of agriculture. Pollinators are necessary for the functioning of entire ecosystems, but climate change, development, and lack of pollinator plants threaten them.[31] Many crops commonly grown in Alachua County are reliant on pollinators for adequate yields. These include squash and pumpkins, blueberries, strawberries, watermelons, cucumbers, specialty citrus, eggplant, field tomatoes, green beans, and peppers. Beyond these specific crops, it's worth noting that pollinators are crucial for the reproduction of about 75% of flowering plants and nearly 75% of crops that people rely on for food. This highlights the broad impact of pollinator health on agriculture in Alachua County and beyond. Transitioning from synthetic fertilizers to local compost can also protect pollinators because many of those fertilizers are detrimental to them.

Community Engagement

Florida Master Gardener Volunteer Program

This program, run by the University of Florida's Institute of Food and Agricultural Sciences (UF/IFAS), trains volunteers to provide horticultural education to residents. Educating friends, families, and neighbors is a significant first step towards getting involved in community gardens and encouraging residents to grow their produce.

Composting

Alachua County has several composting services available to the public:

- Beaten Path Compost has two drop-off locations at 409 SW 4th Ave and 231 NW 10th Ave.
- Gainesville Giving Garden has a drop-off location at 225 NW 12th Ave.

[30] American Farmland Trust, “AFT Releases New Paper on the Climate Benefits of Agricultural Conservation Easements,” 2024.

[31] United States Department of Agriculture, “Wildlife and Pollinators.”

- UF Field and Fork Farm has a drop-off location at 2656 Museum Road.
- UF Student Compost Cooperative has a drop-off location at the Energy Research and Education Park.
- Find composting locations at a local community garden.

Alternatively, wire compost bins are available for free by collecting free wire rolls at the Alachua County Public Works Office at 5620 NW 120th Lane.

Support Local Farmers and Dietary Changes

Individuals can support local farmers in a variety of ways. Attending and shopping at farmer's markets is an easy way to get access to local agricultural products such as vegetables, eggs, and meats. The following is a non-exhaustive list of farmers' markets in Alachua County:

- **Alachua County 441 Farmers Market** – Saturdays from 8:30 am – 12:30 pm
- **Haile Plantation Farmers Market** – Saturdays from 8:30 am – 12:00 pm
- **High Springs Farmers Market** – Fridays from 3 pm – 7 pm.
- **Union Street Farmers Market** – Wednesdays from 4 pm – 7 pm
- **Grove Street Farmers Market** – Mondays from 4 pm – 7 pm

Dietary changes can also make a difference in individual carbon footprint. As mentioned, buying local minimizes the transportation of goods, avoiding transportation-related GHG emissions. It also avoids purchases from large-scale or industrial farms, which produce more GHG emissions (mostly from land use change) and require more fertilizer and pesticides than the typical small farm in Alachua County. There are further opportunities to lower individual carbon footprint by decreasing the amount of meat a person consumes and eating more vegetables and legumes.[32]

[32] Gibbs and Cappuccio, "Plant-Based Dietary Patterns for Human and Planetary Health," 2022.

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2. Energy Security and Efficiency

Purpose

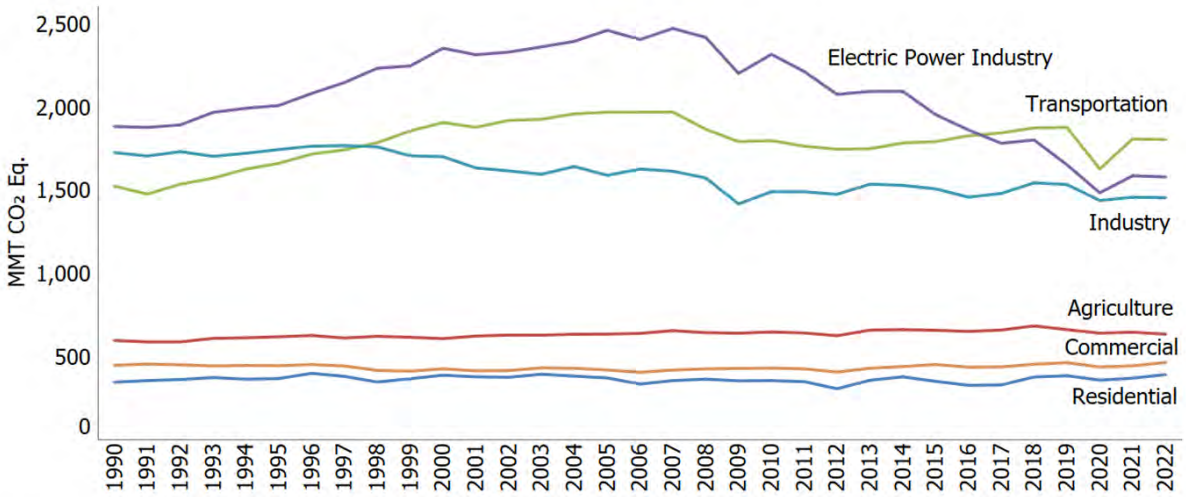
Accelerate progress towards net zero greenhouse gas emissions by transitioning from non-renewable energy fuels, purchasing from renewable energy sources, and increasing energy efficiency in buildings and infrastructure.

Introduction

Energy and Climate Change

The energy sector, through its reliance on fossil fuels, makes up the largest source of anthropogenic GHGs globally, primarily through transportation, electricity generation, and industry (Figure 2.1). In the United States, the electric power industry made up 25% of the country's GHG emissions in 2022, behind transportation (28%).[1] The commercial and residential sectors made up 7% and 6%, respectively (not including indirect electricity end-use emissions).[2] Between 2021 and 2022, only the commercial and residential sectors increased in GHG emissions, driven by higher demand for heating and cooling in buildings.[3] Because energy is a supply and demand side issue, there are many opportunities to decrease GHG emissions and decrease overall contribution to climate change.

[1] United States Environmental Protection Agency, *Data Highlights- Inventory of US Greenhouse Gas Emissions and Sinks: 1990-2022*, 2024, 6.
[2] *Ibid* footnote 1, 6.
[3] *Ibid* footnote 1, 6.



Note: Emissions and removals from Land Use, Land-Use Change, and Forestry are excluded from figure above. Excludes U.S. Territories.

Figure 2.1: GHG emissions by sector, United States between 1990 to 2022[4]

According to the IPCC AR6, the two primary mechanisms for lowering energy demand and its associated emissions come from 1) reduced use of energy, or energy efficiency, and 2) generating new energy from non-fossil sources such as renewables.[5] Energy efficiency is typically much more financially and technically feasible for most communities, but alone it cannot completely reduce GHG emissions from energy. The transition towards renewable energy is also necessary for net zero, though it is a difficult and costly process.

Alachua County and Energy

Context and Limitations

It is important to first establish Alachua County's capabilities and limitations regarding the energy sector. The Alachua County government does not directly own or operate a utility company and is not considered a utility provider, choosing to work instead with local energy providers for residents' electricity needs (see Figure 2.2). In addition, the County faces certain challenges around local energy regulations due to State preemptions. The County thus has a limited ability to make significant changes to the energy sector without collaboration with utility companies, whose priority is to provide reliable, safe energy for their customers. Transitioning towards renewable

[4] EPA (2024). "Chapter 2: Trends in Greenhouse Gas Emissions and Removals." *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2022*. U.S. Environmental Protection Agency, EPA 430R-24004. https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2022.
[5] Clarke et al., "Energy Systems," *IPCC Sixth Assessment Report*, 2022.

energy is often technically and logistically difficult, making it hard for utility companies to quickly phase out non-renewables without jeopardizing energy supply.

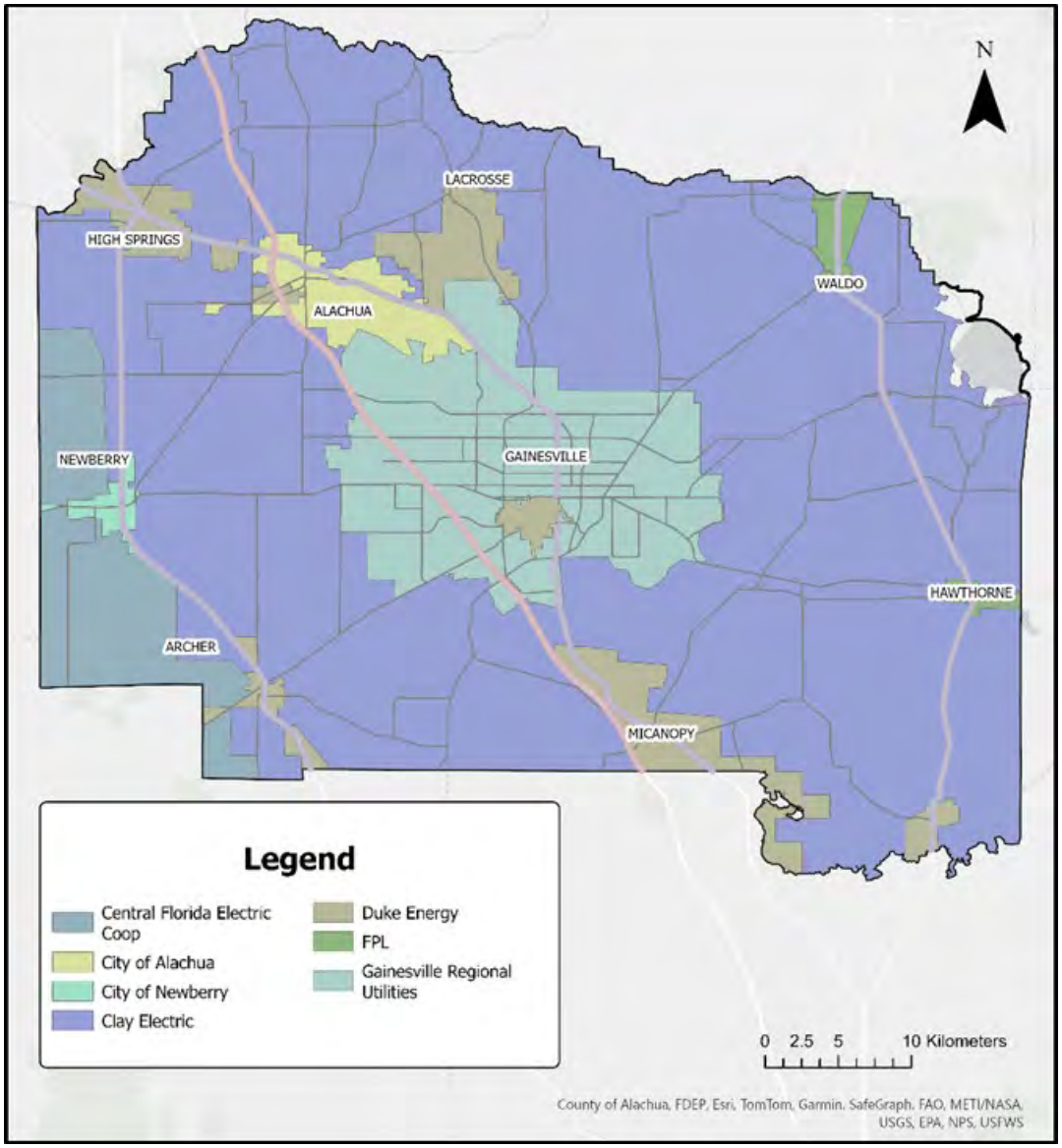


Figure 2.2: Utility Providers in Alachua County

Staying within the County's realm of influence, this CAP focuses on renewable energy, electrification, and energy efficiency, with energy use relating to transportation addressed in a different chapter on Land Use and Transportation (although electric vehicle infrastructure is included as part of the County's electrification strategies).

GHG Emissions from Energy

The 2022 Alachua County Greenhouse Gas Inventory, which used 2019 data, updated the County's emissions data from the first 2001 report, issued using 1998 data. The County's 2009 report did not include countywide data. Figure 2.3 below shows a countywide comparison between those sectors which were measured during both reports.

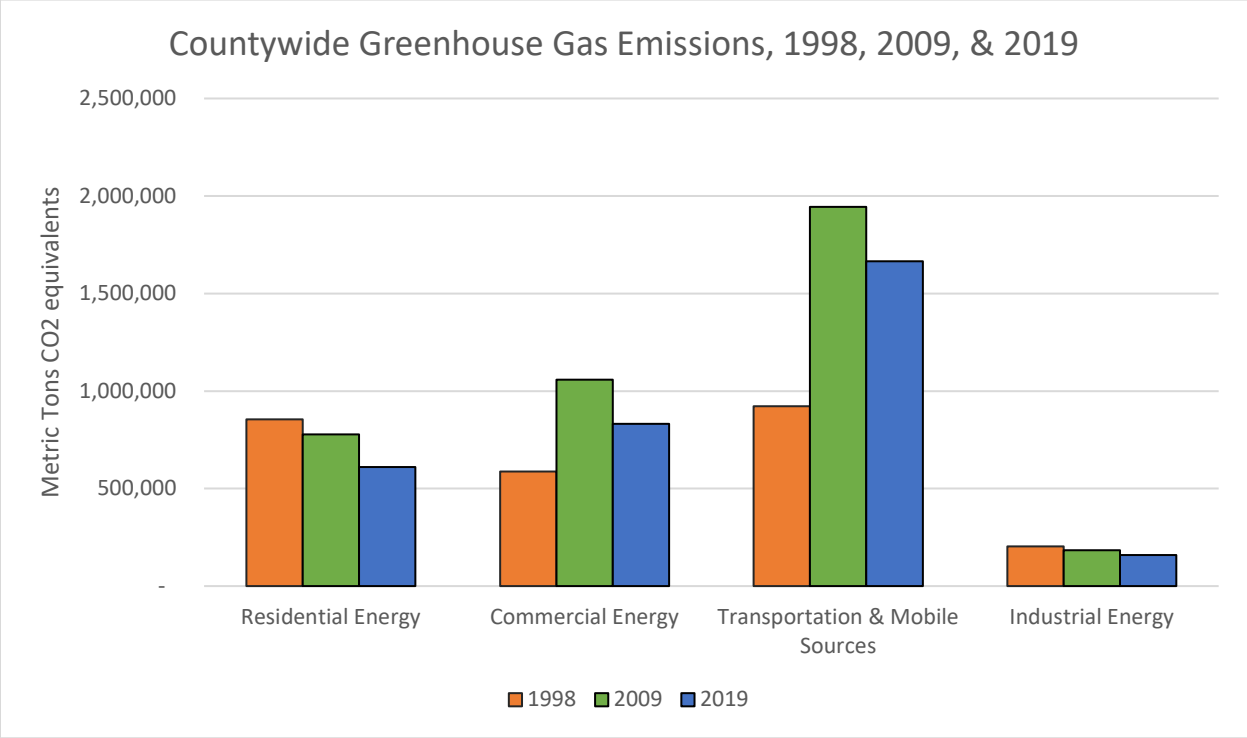


Figure 2.3: Countywide Greenhouse Gas Emissions in 1998, 2009, and 2019 as reported in three ICLEI reports commissioned by Alachua County

The last 20 years have shown a decrease in energy-related emissions production within the residential and industrial sectors and an increase in commercial and transportation-related emissions. While the International Council for Local Environmental Initiatives (ICLEI) (the orgnaization which completed all three reports) did not provide margins of error, the data can provide general guidance for understanding changing emission vectors over time.

Figure 2.3 shows only the sectors which are the same between the three reports; however, the 2019 report contains data on two additional sectors, "Water & Wastewater" and "Process & Fugitive Emissions" which provide additional context for countywide energy-related emissions production. Figure 2.4 shows where these and the above sectors rank proportionately in terms of greenhouse gas production.

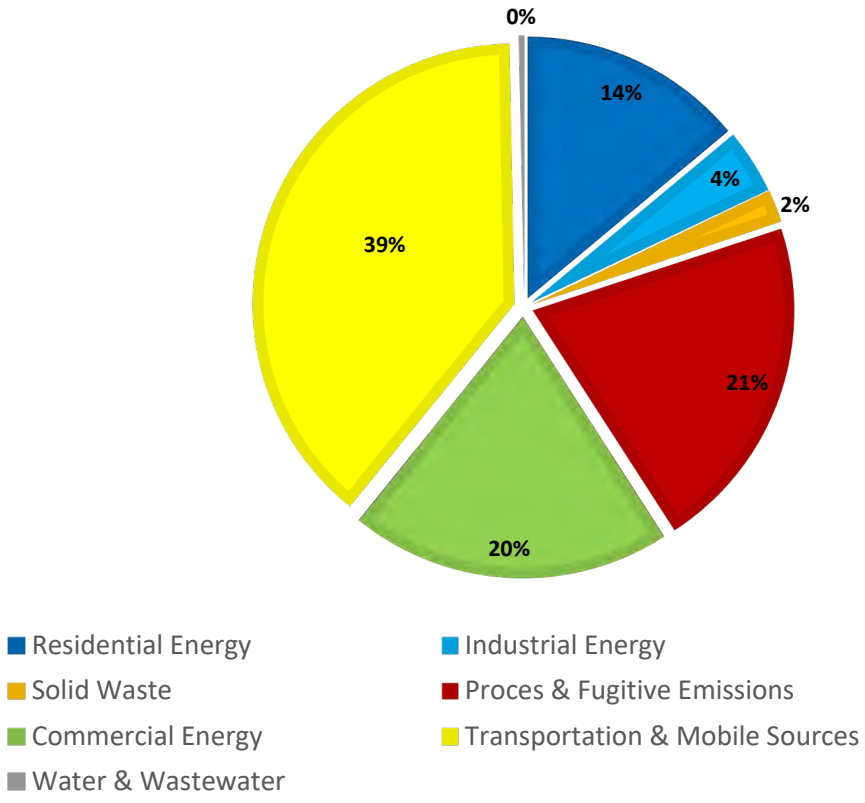


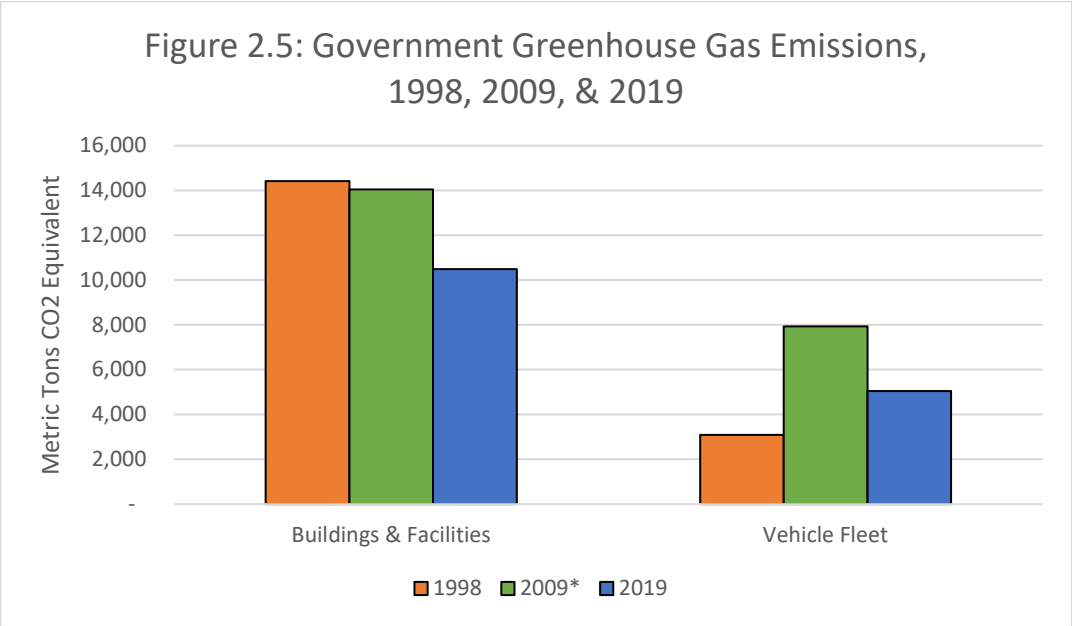
Figure 2.4: Countywide Emissions by Sector from the 2019 Greenhouse Gas Inventory

Alachua County's energy strategy is strongly based on where the municipal government has direct influence. For example, Alachua County does not own the local bus service, making the highest emitting sector, "Transportation & Mobile Services" (39%), difficult to impact directly (strategies around transportation infrastructure more broadly can be found in the Land Use and Transportation Chapter of this document).[6] The next highest emitter, "Process & Fugitive Emissions" was not included in the 1998 or 2009 reports, and the 2019 report links these emissions primarily to energy production related to local utilities.[7] While the County has sent representatives when requested to Integrated Resource Planning (IRP) exercises with local utilities, the County government has little influence on energy production at local utilities. As you will see in this chapter, Alachua County has developed strategies prioritizing overall greenhouse gas impact in areas where the County exercises the strongest jurisdiction.

Alachua County's influence is greatest over its own internal operations. Alachua County is dedicated to being a leader in climate mitigation and adaptation, and as such has tracked its own

[6] International Council for Local Environmental Initiatives, *2019 Inventory of Community and Government Operations Greenhouse Gas Emissions*, 2022, 6.
[7] *Ibid* footnote 6, 6.

energy-related greenhouse gas production over the last twenty years (Figure 2.5). Emissions tracking across these three reports varies widely, with items such as streetlights appearing in early reports but not later ones. In the 2019 analysis, ICLEI indicates that only two sectors have strong across-time comparability, and these are outlined in Figure 2.5.



*2009 data was adjusted by ICLEI between the 2009 and 2019 report to standardize the computation practices to AR5 Global Warming Potentials. 2009 data in chart is drawn from the 2019 report.

Figure 2.5: County Government Greenhouse Gas Emissions in 1998, 2009, and 2019 as reported in three ICLEI reports commissioned by Alachua County

A full breakdown of County government emissions (Figure 2.6) identifies County buildings and facilities as producing over half (53%) of total government operations emissions, attributed directly to electricity use. Second to that was the energy used to power the County fleet (25%), followed by the carbon price of employee commutes (20%).[8]

[8] *Ibid* footnote 6, 6.

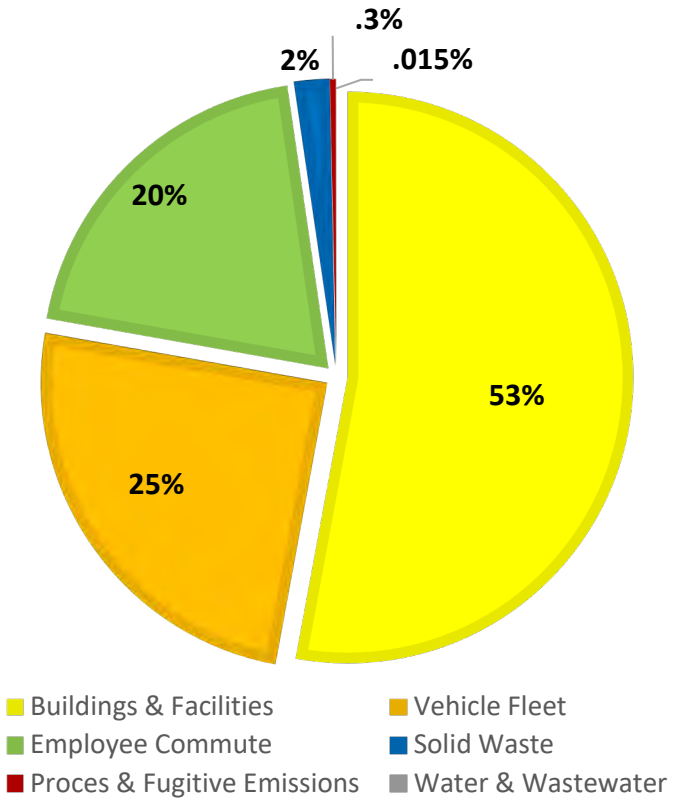


Figure 2.6: Alachua County Government Operations by Sector, 2019 Greenhouse Gas Inventory

Energy Infrastructure, Efficiency, and Affordability

Due to aging infrastructure and the cost premium of many energy-efficient products, Alachua County's lowest-income residents regularly experience the highest energy usage and utility bills. This phenomenon, known as "energy burden" occurs when a household is spending over 6% of their income on energy bills, and a severe energy burden is when a household spends over 10%.[9] Twenty-two (22) Census Tracts in Alachua County are considered to have a "high" or "severe" energy burden, with residents in these communities paying a higher percentage of their income towards utilities than 85% of other Americans. Seven (7) of these Census Tracts pay more than 95% of their fellow Americans (Figure 2.7).

[9] American Council for Energy Efficient Economies, *Energy Burden Report*, 2020.

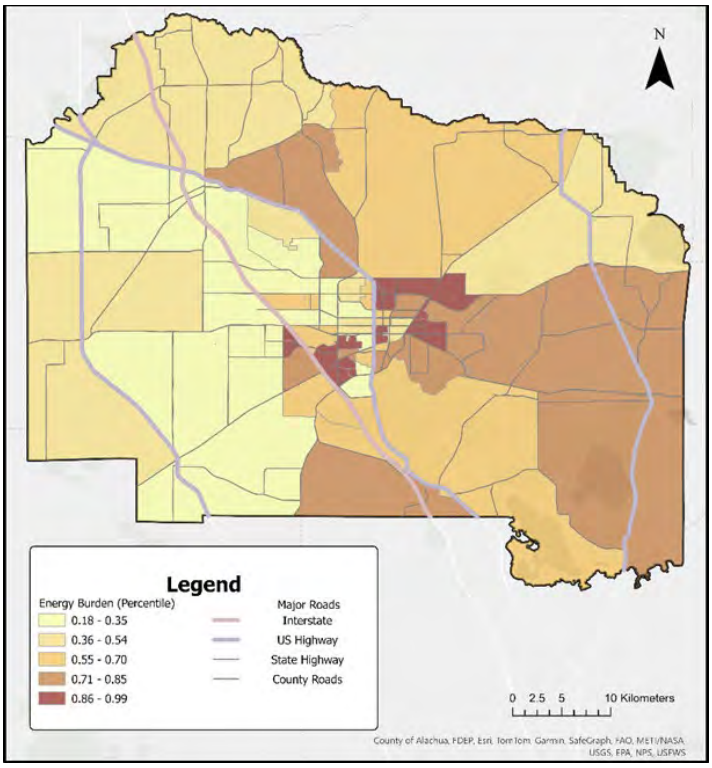


Figure 2.7: Energy burden by Census Tract, Alachua County, FL. Energy burdened percentile is relative to other Census Tracts nationally.

Energy burden can be addressed most effectively by increasing energy efficiency in households, a mechanism which can decrease utility bills substantially (reducing some financial strain) while also lowering GHG emissions (see the "Past and Current Efforts" section of this document, for more information on how Alachua County is addressing this). In addition, bringing down the cost of electricity, such as through increasing the amount of solar energy on the electrical grid (which has a consistent, low-cost of inputs compared to fossil fuel sources, and has become increasingly affordable to construct), can be a secondary, long-term goal of addressing these high energy burden communities.

Alachua County Comprehensive Plan

Alachua County's Comprehensive Plan has a chapter devoted to energy, which establishes the following goal:

"Reduce greenhouse gas emissions and fossil fuel consumption; mitigate the effects of rising energy costs; and promote the long-term economic security of Alachua County through energy conservation, energy efficiency and renewable energy production."

The Plan lays out three priorities as part of its reduction strategy:

1. Practice energy conservation
2. Maximize energy efficiency
3. Promote and invest in renewable energy production

Energy conservation refers to reducing energy use by changing behaviors and habits. This work involves education and information campaigns directed at the public, as well as Alachua County employees to reduce energy usage internally. Energy efficiency involves using technology to use less energy. This can involve things like building upgrades, as well as integrating passive design principles into new construction and major renovations. Finally, renewable energy refers to energy generation through renewable sources such as solar and biomass.

The County's Comprehensive Plan also identifies a specific energy reduction target to "reduce countywide greenhouse gas (GHG) emissions by 80% from 2009 baseline emissions by 2050."[10] To meet this goal, the Comprehensive Plan identifies target areas, the following of which will be addressed in this chapter:

- the built environment (including both the public and the impact of County government buildings);
- renewable energy generation;
- education and public information;
- intergovernmental and community collaborations.

For a full accounting of the County's energy-related policies and objectives, see Appendix B.

Past and Current Efforts

The Built Environment: Energy Efficiency

Alachua County Energy Efficiency Program (ACEEP)

Alachua County leads the country in energy efficiency programs for low-income residents. Through American Rescue Plan Act funding (also known as COVID-relief dollars), the County developed an innovative program aimed at improving the home energy efficiency of the County's lowest-income residents. Lowest-income residents are energy-burdened renters making 50% Area Median Income (AMI) or less. This program provides up to $15,000 per housing unit for energy

[10] Alachua County Comprehensive Plan, Energy Element, Objective 1.1.

efficiency improvements including insulation, new HVAC systems, new water heaters, and certain new Energy Star appliances. In return, landlords sign an agreement with the County to not raise rent beyond inflation for up to 7 years, and to keep their rental unit on the market for the entirety of that time. The program was awarded a technical assistance grant from the American Council for an Energy-Efficiency Economy, which helped to develop the program with the help of national experts, using the best practices from similar programs across America.

After a two-year pilot, ACEEP was approved to move into a full program in November 2024. In addition to working with existing residents, the program allows small business owner landlords to bring new units onto the market through the program, helping to create new, energy-efficient affordable housing options locally.

Cenergistics: Alachua County Customized Energy Conservation Program

To help the County with internal energy use, the Alachua County government contracted with Cenergistics LLC to provide energy specialists to develop a customized energy conservation program for County facilities. This contract uses machine learning to analyze County energy use patterns and develop resources and use that data to educate employees and the community about energy-saving practices and to encourage behavioral changes that can lead to significant reductions in energy consumption. Alachua County set a goal of a 10% energy reduction by 2025. By 2023, Alachua County government buildings reached a 27% reduction in non-renewable energy use per square foot, also known as Energy Use Intensity (EUI), down from 2019 levels, the earliest data from Cenergistics tracking (Figure 2.8). While some percentage of this increase can be attributed to the general shut down of County buildings during the COVID-19 pandemic, the lower rates of energy use remained stable in 2023 when County personnel had largely returned to the office.

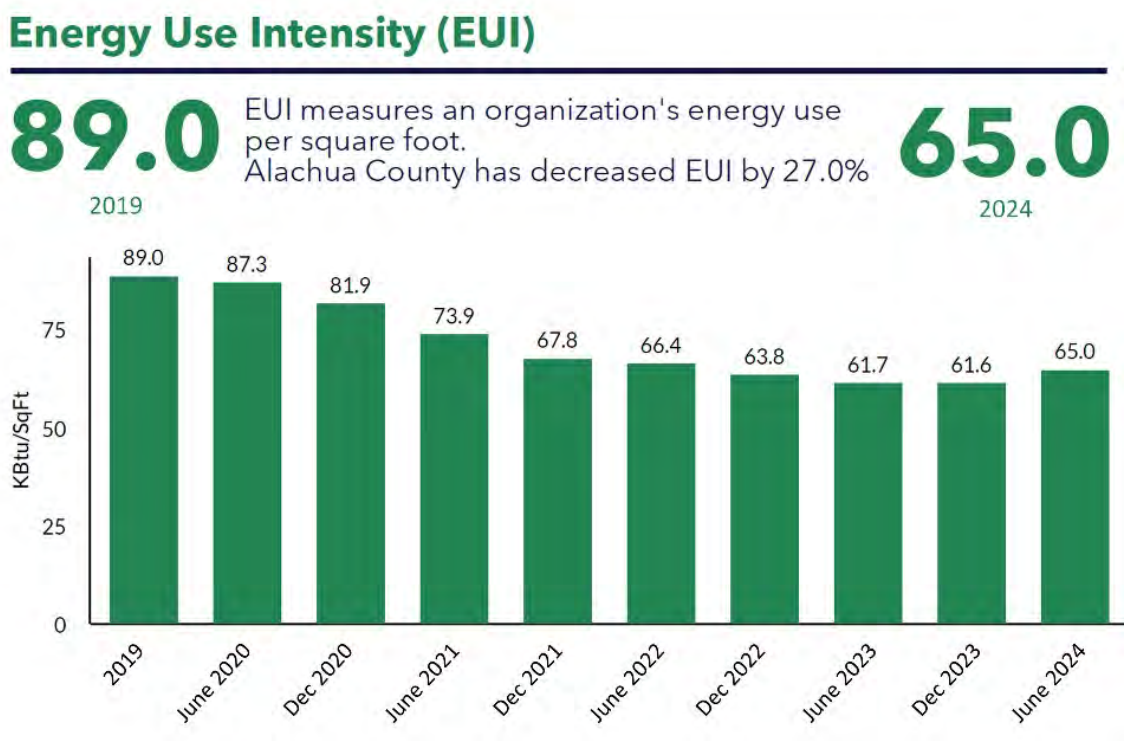


Figure 2.8: Alachua County Bi-Annual Energy Use Intensity (EUI) from Government Buildings, 2019 – 2024. EUI is calculated based on energy use per square foot for all County Government Buildings. EnergyCAP Database, via Cenergistics LLC

Cenergistics calculated the carbon dioxide emissions reduction of this effort to be 11,287 metric tons of CO_2 avoided, equivalent to the avoided burning of over 12 million pounds of coal.

Renewable Energy

The County's Comprehensive Plan outlines the following goal for renewable energy:

The County's goal by 2030 is that 100% of energy purchased or produced for County facilities be from solar photovoltaic sources, with an interim target of 50% by 2025.

Alachua County is currently pursuing two strategies for meeting this goal: constructing County-owned solar installations, via the Energy Conservation Investment Program (ECIP) and other funding sources and working with energy providers to produce solar energy for purchase as part of the larger energy grid.

Current Solar Installations

Alachua County has eight (8) solar installations on or at facilities, totaling 654.64 kW of installed solar (Figure 2.9).

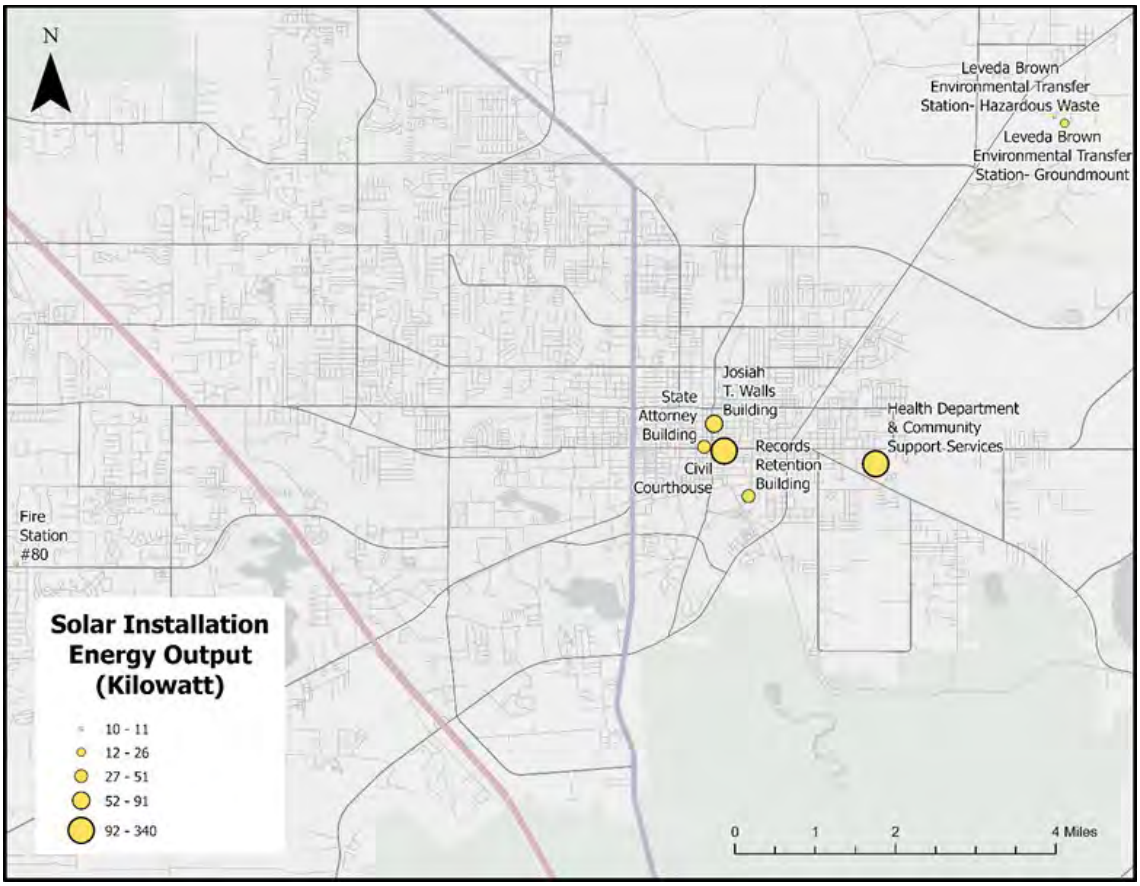


Figure 2.9: Current solar installations on County-owned buildings, including size of system (kW)

Energy Conservation Investment Program

The Energy Conservation Investment Program (ECIP) funds capital projects that meet the County's energy and utility objectives as found in the Comprehensive Plan and Financial Policies. This program aggregates the utility savings from existing solar installations and uses them to fund new solar installations. Currently, five (5) of the existing eight (8) installations were funded all or in part from ECIP funds.

The Inflation Reduction Act provides the option for local governments to receive rebates for solar installations. Currently, two of Alachua County's largest solar installations, the Health Department and Civil Courthouse, are eligible for this rebate in fiscal year 2024. The rebate, which would likely total 30% of project costs, would open the option to begin a new installation in the next few years.

Purchased Energy

Clay Electric

Clay Electric is a cooperatively owned not-for-profit energy company that covers the majority of the unincorporated areas of Alachua County (see Figure 2.2). The company is one of nine co-ops which collectively own the Seminole Electric Cooperative, which generates the energy distributed by the company.[11] Per their website, Seminole Electric Cooperative retired one of their coal-fired power generation facilities in 2023,[12] but continue to generate 736 MW of coal-fired energy today as of this writing. They operate two (2) gas-powered combined-cycle facilities which produce approximately 1,970 MW of power, and one (1) 2.2 MW solar facility. In addition, Seminole has a Power Purchase Agreement with four (4) solar power installations named Columbia County Solar, Gadsden County Solar, Gilchrist County, and Tupelo Solar in Putnam County totaling 298 MW of renewable solar energy.[13] Based on these numbers, Clay Electric customers on average receive approximately 10% of their electricity from solar energy.

Duke Energy

Duke Energy is the primary energy provider for several Alachua County small municipalities including High Springs, LaCrosse, parts of Alachua, Archer, and Micanopy, as well as providing electricity to much of the University of Florida (see Figure 2.2). Duke Energy produced around 750 MW of solar for Florida counties from 2022 to 2024 through the creation of ten (10) solar energy sites in the State, with one of those sites, the High Springs Renewable Energy Center, completed in Alachua County in April 2023. The 74.9 MW facility brings Duke Energy's total carbon-free energy production to 1.2GW nationwide.[14]

Gainesville Regional Utilities (GRU)

Because Gainesville Regional Utilities (GRU) is the primary energy provider for County facilities, their percentage of renewable energy impacts the County's sustainable use of energy. Renewables currently make up 31.4% of GRU's generated energy. The Deerhaven Renewable Generating Station produces the majority of this energy (30%) by using wood waste (biomass). GRU also captures landfill gas and converts it into enough energy for 2,100 homes for a year. While this power is considered renewable, it is not "from solar photovoltaic sources" per the County's goal in the Comprehensive Plan.

As of June 2025, the leadership at GRU is being determined by the courts after a ballot initiative passed in November 2024 which would turn GRU leadership over to the City of Gainesville.

[11] Clay Electric, "Quick Facts"
[12] Seminole Electric Cooperative, "2023 Year in Review," 2023.
[13] Seminole Electric Cooperative, "Generation."
[14] Reitz, "Duke Energy cuts ribbon on High Springs solar site," *Main Street Daily News,* 2023.

Because this is an ongoing legal question, it is not possible to predict the organization's future in renewable energy.

SolSmart Silver Awardee

In 2019, the County was recognized as a SolSmart Silver Awardee, signifying a commitment to reducing barriers to solar adoption. This designation reflects the County's efforts to streamline permitting processes, modernize zoning codes, and foster a supportive environment for residential and commercial solar energy.

Community Collaborations and Programming

Project EMPOWER

In order to minimize the energy sector's impact on climate change, Alachua County has engaged actively with the community to promote sustainable energy resiliency. Through the Department of Energy's (DOE) Communities Local Energy Action Program (LEAP), Alachua County departments and residents developed the EMPOWER Coalition, a community-led project that "evaluates the benefits and challenges of developing solar project in low-income neighborhoods." EMPOWER ensures that the voices of communities who are often unheard are amplified in conservations and policies surrounding sustainable energy. The EMPOWER Coalition recently received a second round of technical assistance through the DOE Communities LEAP Second Cohort.

Energy Services for Renters, ACEEE Technical Assistance Grant

The County's work with the Alachua County Energy Efficiency Program caught national attention when it was awarded the American Council for an Energy-Efficient Economy (ACEEE) technical assistance grant. This grant has allowed the County and its contractors, Rebuilding Together North Central Florida and the Community Weatherization Coalition, to conduct survey work for both landlords and renters to get their feedback on the program and energy use more broadly. Additional focus groups with landlords were conducted to get more detail on the survey results in order to build a program build on best practices nationally.

Weatherization Coordination Task Force

Alachua County has been leading monthly conversations between organizations doing weatherization and energy efficiency improvements for County residents. This group includes representatives from the Community Weatherization Coalition, Gainesville Regional Utilities LEEP^{Plus} program, and the City of Gainesville Community Reinvestment Area. This regular meeting has allowed the organizations to share ideas, develop outreach materials, and workshop strategies for addressing weatherization and energy efficiency needs in the County.

Program Highlight

ACEEP and Community Partners

ACEEP would not have been possible without the help of community partners. During the pilot program phase of ACEEP, Alachua County contracted with Rebuilding Together North Central Florida and the Community Weatherization Coalition (CWC) to identify property owners and complete individual projects. This collaboration assisted in the process of developing the final version of ACEEP by collecting feedback from program participants. Under the current ACEEP contract, Rebuilding Together assists in coordinating between property owners, tenants, and local contractors to determine the quotes for the energy efficiency upgrades. Rebuilding Together and the CWC also record output measures by periodically following up with program participants and each upgrade that was made.

14.7 tCO_2e is equivalent to:

1,650 gallons of gasoline consumed

5.1 tons of waste recycled instead of landfilled

16,201 pounds of coal burned

Reductions from 17.2 acres of US forests in one year

The combination of local organizations, County staff, and funding have greatly assisted in collecting the information necessary for the success of the program. Since July 25, 2025, 86 ACEEP tune-ups were completed and 19 units completed upgrades. The average cost of energy efficiency upgrades is around $13,760 (under the $15,000 maximum). After 7 years, each unit on average saves over 28,000 kWh of energy, $2,800 on utility bills, and 14.7 tons of CO_2 equivalent (tCO_2e). For the 19 units that participated in ACEEP, over 250 tCO_2e will be avoided (this number includes several units which will participate for only 5 years).

Programs such as ACEEP sit at the intersection of climate mitigation, climate adaptation, and affordable housing. The energy efficiency upgrades provided by the program reduce the amount of greenhouse gases being emitted by residential homes that would otherwise be the least likely to receive weatherization investment, while also improving the ability of the home to retain livable conditions through extreme heat and storms. By focusing the program on rental units and tying in an affordability commitment by the landlords to minimize rent increases, affordable homes are kept on the market, contributing to affordable housing in a way that new development cannot. As discussed in the Introduction Chapter, this program reinforces critical climate success factors by maintaining and supporting current organizations who are already doing on-the-ground work for their communities.

Strategies and Action Items

Goal 2.1 – Energy Efficiency and Conservation

STRATEGY 2.1.1 – Emphasize energy efficiency and conservation to maximize cost efficiency and social responsibility

In their 2021 paper, "Optimal strategies for a cost-effective and reliable 100% renewable electric grid," NREL researchers point to demand-side strategies as a critical bridge to move communities towards renewable energy-dominated electrical grids.[15] In other words, how much energy residents use and when they use it makes a big difference in what a renewable energy grid could look like. Energy efficiency (for example, energy-efficient lightbulbs) and conservation behaviors (such as turning off lights when not in use) can play a major role in reducing energy demand without sacrificing comfort and affordability.

For Alachua County, this goal represents a win-win-win for people, the environment, and the economy. According to the US Department of Energy (DOE), between $200 and $400 of the $2,000 Americans spend on energy each year comes from "waste from drafts, air leaks around openings, and outdated heating and cooling systems."[16] This is not only money that can be saved by residents, but energy that can be saved by utilities. While County programs such as ACEEP are addressing this, achieving Countywide maximum energy efficiency will require more intensive energy efficiency programs for municipal, commercial, and residential buildings.

It is important to ensure that energy reductions are made without sacrificing the comfort and convenience of homes or buildings. The hotter days and stronger storms anticipated in the coming decades have made it clear that cool, sealed homes are essential, not a luxury. The following action items are recommendations to strengthen the Comprehensive Plan's goals of lowering emissions and promoting energy efficiency.

Table 2.1: Action Items for Emphasize Energy Efficiency and Conservation to Maximize Cost Efficiency and Social Responsibility (Strategy 2.1.1)

Action Items	Jurisdiction	Benefits	Barriers	Status
Reduce energy use in County-owned buildings without sacrificing government services or	Local government	Most cost-effective mechanism for meeting energy	Efficiency gains (in energy and taxpayer	**Current**

[15] Houssainy and Livingood, "Optimal strategies for a cost-effective and reliable 100% renewable electric grid," Journal of Renewable and Sustainable Energy, 2021.
[16] United States Department of Energy, "Why Energy Efficiency Matters."

the healthiness of the workplace		goals. Capitalizes on vertical integration of solar energy production goal by reducing the energy load that panels need to cover. Improves efficiency of taxpayer dollars.	dollars) are not obvious to residents. Retrofitting existing locations can be expensive.	
Improve private sector energy efficiency: Commercial & Residential	Private owners, government incentives in some jurisdictions, State-level preemptions	Quick returns on investment for owners who secure upgrades.	State-level preemptions prevent building code upgrades for larger-scale adoption.	**New/Not started**
Promote energy efficiency locally as a mechanism to promote affordable housing (with a focus on rentals and low-income homeowners)	Private owners, government incentives in some jurisdictions, State-level preemptions	Quick returns on investment. Prioritizing low-income units keeps affordable housing on the market and helps homes that are otherwise unlikely to upgrade.	For rented spaces, there is a disconnect between property owner with authority to install & tenant who pays utility bills.	**Current**

Goal 2.2 – Electrification

STRATEGY 2.2.1 – Promote energy independence through electrification.

Electrification is the process of transitioning from fossil fuels to electricity as an energy source. Alachua County considers this a key pathway towards energy independence, energy affordability, and climate action for the following reasons:

- Renewable energy is domestically produced (even locally produced) energy and very price stable. This makes it the most dependable, economical option for Alachua County residents in times of international or national trade uncertainty.

- Locally generated renewable energy is available even in times of local fuel uncertainty. Having electric infrastructure powered by distributed renewable energy in key locations such as emergency shelters builds resilience in times of extreme weather.
- In keeping with the County's renewable energy goals, it is anticipated that more of the electrical grid will be powered by renewable energy sources in the coming decades. As the grid becomes more renewable, all the electricity on that grid becomes more renewable.
- Utility-scale electricity generation, even that generated using fossil fuels, follow strict regulations on emissions. In many cases, this makes the burning of fossil fuels for electricity less harmful for the environment than burning these same fuels in homes or commercially.
- Making the choice to invest today in natural gas and oil-based County infrastructure sets the County on a timeline spanning years or even decades before that infrastructure is replaced with electric and can benefit from the County's investment in municipal solar.

The County has the potential to fully electrify all County-owned buildings. However, commercial and residential electrification requires opt in from businesses, homeowners, renters, and other residents. The County is committed to internal electrification and helping to facilitate larger infrastructure, such as electric vehicle charging and renewable energy permitting that can make electrification effective.

Table 2.2: Action Items for Promote Energy Independence through Electrification. (Strategy 2.2.1)

Action Items	Jurisdiction	Pros	Cons	Status
Improve local electric vehicle (EV) infrastructure for public use at County facilities	Local government, within utility policies	County facilities are placed throughout the County, and locations like parks are ideal places for charging installations	Retrofitting existing locations can be expensive. Full implementation of this strategy will likely follow scheduled infrastructure improvements over time.	**Emergent**
Build a 100% hybrid and electric County fleet	Local government	Decreased fuel and maintenance costs for County fleet. Capitalizes on vertical integration between solar installation	Some supply limitations for larger vehicles. Current lack of EV infrastructure requires trade-off evaluations for vehicles with	**Emergent**

		goals. Improves efficiency of taxpayer dollars.	higher (all day) use demands.	
Improve private sector electrification: Commercial & Residential	Private industry, government incentives in some jurisdictions	General electrification locally allows renewable energy grid improvements to extend greenhouse gas reduction impacts.	Limited government capacity for influence	**New/Not started**

Goal 2.3 – Renewable Energy

STRATEGY 2.3.1 – Become an institutional leader in renewable energy adoption.

While energy efficiency is the most short-term, cost-effective solution for reducing carbon emissions, long-term energy planning requires a move to an energy-generation infrastructure that operates on fewer fossil fuels. Like electrification, the County has the most control over its own buildings and activities, making County-owned buildings a primary target for implementing solar panels. Increasing access to solar for residential and commercial buildings is complex due to upfront costs, the structure and age of buildings, and opt-in from utilities (when community solar).

There is also potential to scale solar to the utility level via solar farms. Alachua County has played a strong role in permitting current and planned utility-scale solar installations and has learned a lot about the need for community input in these decisions when they impact local communities. The County is committed to continuing to work closely and utilities and communities to help site utility-scale solar in Alachua County's unincorporated areas through careful planning and location selection, community conversations, and considering the tradeoffs of the land.

Table 2.3: Action Items for Become an Institutional Leader in Renewable Energy Adoption (Strategy 2.3.1)

Action Items	Jurisdiction	Pros	Cons	Status
Include solar panel installation(s) on all new County buildings and on roof replacements	Local government	County buildings have large roof decks for large installations;	Residents individually see minimal benefit	**Emergent**

		utility savings improve the efficiency of taxpayer dollars		
Promote access pathways to renewable energy for residential properties	Private residents, with government regulations, utility restrictions, and/or incentive programs	Strong local business community of solar providers, creates high-paying local jobs in installation and maintenance	Utility restrictions; grid infrastructure capacity prevents entire neighborhoods from participating; longer ROIs reduce implementation interest from short-term residents	**Emergent**
Facilitate grid-level renewable energy installations in Alachua County in collaboration with local municipalities and communities	Local zoning requirements, utility policies, state-level regulations	A solar-focused grid reduces greenhouse gas emissions for everyone; renewables are increasing the cheapest energy production option, reducing utility bills for all residents	Difficulty in identifying land for utility-scale installations; large start-up costs; unreliability of renewable energy generation without more advanced battery technology	**Current**

Goal 2.4 – Energy Infrastructure Resiliency

STRATEGY 2.4.1 *– Build an energy infrastructure that is resilient to extreme heat and storms.*

Power outages during extreme storm events are more than an inconvenience—for residents with specific medical needs, refrigeration needs, and heat sensitivity, it can be life and death. Alachua County is committed to working with interlocal institutions to be continually striving to reduce the number of power outages experienced during extreme weather events, and to ensure that residents in all parts of the County have access to regular, reliable energy even in emergencies.

Table 2.4: Action Items for Build an Energy Infrastructure that is Resilient to Extreme Heat and Storms (Strategy 2.4.1)				
Action Items	**Jurisdiction**	**Pros**	**Cons**	**Status**
Leverage locally distributed renewable energy and battery back-ups to promote energy resiliency before, during, and after extreme weather events, including exploring mobile energy possibilities	Local governments, utility policies	Renewable energy with battery back-ups can provide energy resilience in cases of grid-level power outages. This can be critical for vulnerable populations with critical resilience needs such as refrigeration, medical equipment, cell phones for communication, and transportation via electric vehicles in a gas shortage.	Alachua County manages, but does not own shelter locations. Interlocal collaboration will be necessary to establish resilience locations with secure energy systems.	**New/Not Started**
Improve resilience of energy infrastructure for extreme weather events including extreme heat and storms	Local governments, utilities, state-level policies	Considering extreme heat and storm implications in development plans, choosing tree-planting locations, and building design can reduce the likelihood of power-loss during extreme storm events and reduce energy demands during	These considerations constitute another level of development planning. State-level preemptions limit what local government can require. Refurbishing existing infrastructure may be cost-	**New/Not Started**

		extreme heat events.	prohibitive in many cases.	
Ally with local organizations and municipalities to promote strategic energy planning for all of Alachua County	Local governments, local non-governmental organizations	Clear energy strategies developed by local municipalities helps interlocal partnerships better serve the needs of residents. More participating municipalities can generate benefits of scale.	Developing energy strategies requires expertise not always found at the local level, and can cost money as well as time applying for grant dollars.	**Current**

Triple Bottom Line

People

Energy powers homes, businesses, and transportation. Alachua County residents rely on it not only to make their lives more convenient, but as part of their jobs, recreation, and civic involvement. Alachua County remains committed to ensuring energy continues to be widely available, highly reliable, and as affordable as possible.

Energy efficiency, electrification, and renewable energy generation are three parts of a larger whole that move the County and its residents towards climate resiliency and healthier lifestyles. Energy efficiency, as already demonstrated through ACEEP, can dramatically reduce costs of energy while improving the comfortability of a person's home. Electrification improves indoor air quality, as gas appliances have been shown to emit indoor pollutants that can be harmful to respiratory health and have been found to increase respiratory illnesses like asthma.[17] Renewable energy not only has climate mitigation impacts, but provides locally produced, reliable energy even during extreme weather events or other types of disruptions to natural gas and oil access.

[17] Lewis, "The Health Risks of Gas Stoves Explained," *Scientific American*, 2023.

Profit

Through its installation of over 300kWh of renewable energy on municipal buildings, Alachua County has already started to see the very real economic benefits of solar energy. Utility savings due to these installations in 2025 are estimated at over $60,000. These savings go even farther when combined with energy efficiency and conservation programs such as the County's Cenergistics contract, which has reduced internal energy consumption by 27%. As the County moves to invest in more electric vehicles, powered by the County's solar panels, the cost savings of these systems will continue to grow.

These same savings are seen when applied by local residents and businesses. Homes which have enrolled in ACEEP have already seen reduced energy costs for these low-income households. A report by the American Council for an Energy-Efficient Economy (ACEEE) found that electrification in residential areas could save households $96 billion in energy costs if both low- and high-income areas are electrified.[18]

Electrification and renewable energies can reduce public health costs by reducing indoor and outdoor air pollution. An Energy Efficiency Impact Report found that $430 million in healthcare costs were saved due to air pollution reduction from energy efficiency.[19] These energy strategies also create jobs and boost businesses by increasing worker productivity and satisfaction, business revenue, and asset values.[20][21] Energy efficiency jobs make up 40% of all traditional energy jobs, totaling 2.2 million in 2021. 70% of energy efficiency workers are employed by small businesses, showing an opportunity to boost local businesses in Alachua County. Critically, these jobs cannot be outsourced—it is not possible to remotely blow insulation into someone's attic, or to remotely clean pollen off solar panels. These jobs can grow in Alachua County and stay in Alachua County.

Planet

Switching to renewable energy sources is one of the pivotal steps towards net zero, as it catalyzes the phasing out of fossil fuels. Energy efficiency also lowers GHGs by reducing the amount of energy required to power the County. Efficiency, electrification, and renewables are a critical combination to move the County's energy use towards a more sustainable environmental footprint.

Community Engagement

[18] American Council for an Energy Efficient Economy, *The Value of Prioritizing Equitable, Efficient Building Electrification,* 2024.
[19] Alliance to Save Energy, American Council for an Energy Efficiency Economy, and the Business Council for Sustainable Energy, *Energy Efficiency Impact Report,* 2022.
[20] EPA State and Local Energy Program, *Clean Energy and the Economy: Assessing the Many Benefits of State and Local Clean Energy Initiatives.*
[21] *Ibid* footnote 20.

Community Weatherization Coalition

All Alachua County residents, both homeowners and renters, can take advantage of energy tune-ups from the Community Weatherization Coalition (CWC). In addition to being the County's contractor for the Alachua County Energy Efficiency Program, the CWC provides free energy tune-ups which can reduce energy-related utility bills by more than 10% on average.[2] Tune-up energy coaches focus on both behavioral and technological changes that can benefit residents, including walking through their utility bills to help residents understand their energy habits, and conducting an inspection to determine points of energy inefficiency. Coaches replace inefficient faucets and lightbulbs, insulate pipes, clean appliance cooling coils, and conduct other energy efficiency improvements free of charge. For those residents who are handier, there is an option to do a DIY tune-up where participants pick up the supplies and follow videos online.

More information on receiving a tune-up or doing a DIY tune-up can be found on the CWC website: https://communityweatherization.org/

Alachua County Energy Efficiency Program

Low-income renters (or landlords with low-income renters) of a home or apartment in Alachua County may be eligible for ACEEP, which can provide weatherization and energy efficiency upgrades up to $15,000.

More information about the program can be found here:

https://alachuacounty.us/Depts/Sustainability/Pages/ACEEP.aspx

Financial Incentives for Energy-Efficiency and Renewables

The Inflation Reduction Act provides a variety of ways to receive tax credits for purchasing renewable and energy efficient technologies. This is a new program with rules and regulations that can change over time. For the most up-to-date information, see the IRS website at https://www.irs.gov/credits-deductions/home-energy-tax-credits. Alachua County cannot provide tax advice regarding these incentives.

The State of Florida has a Property Tax Abatement for Renewable Energy program, which prevents increases in property taxes for several renewable energy sources (ex. solar, wind, geothermal heat pumps). The State of Florida also has a sales tax exemption for solar energy systems which can reduce the upfront costs of a solar installation. The application for the tax exemption can be found here: https://floridarevenue.com/taxes/tips/documents/TIP_19A01-09.pdf

The Solar and Energy Loan Fund (SELF), in partnership with Solar United Neighbors (SUN) and The Nature Conservancy in Florida, won $156 million in Solar for All funds from the

Environmental Protection Agency aimed at bringing solar and energy efficiency to low-income, energy burdened neighborhoods. The Solar for All funds will be distributed as grants versus loans based on the applicant's income level, allowing many residents who might not otherwise qualify for solar lending to access solar energy at a residential level. For more information, please visit the SELF website: https://solarenergyloanfund.org/

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3. Flood Management and Infrastructure

Purpose

Reduce the impact of flooding and extreme weather events on citizens, businesses and critical infrastructure by developing a multidisciplinary plan and action strategy to maintain a resilient community.

Introduction

Flooding and Climate Change

In Florida, the threat of hurricanes, tropical storms, and severe thunderstorms is well-known by residents. Climate change, however, is exacerbating their intensity, making storms stronger and more frequent. This is in part due to rising global temperatures causing an increase in evaporation rates, leading to more precipitation.[1] Humid areas such as Florida are expected to be most at risk for increased flooding as climate change worsens.[2] While much of Florida's newer infrastructure is designed to withstand flooding and high amounts of precipitation, many recent extreme weather events have exceeded the capacity of either natural or artificial drainage systems. This signifies a need to focus not only on infrastructure, but preparedness during extreme climate events.

Flooding in Alachua County

Alachua County will experience more extreme events (higher daily totals) due to additional energy in storms and a warmer atmosphere that can hold more moisture. The 2024 high-resolution flood model for Alachua County revealed that the changing rainfall characteristics pose a greater risk of flooding (Table 3.1). This projected increase in flood risk is particularly high in areas with internally drained basins as shown in Figure 3.1.

Asset Category	Total Number of Physical Assets	Number and Percentage of Assets Impacted by 100-Year Rainfall-Induced Flooding

[1] NASA, "How Does Climate Change Affect Precipitation?"
[2] Tabari, "Climate Change Impact on Flood and Extreme Precipitation Increases with Water Availability," *Scientific Reports*, 2020.

		2020	*2040*	*2070*
Critical Infrastructure	735	116 16%	134 18%	141 19%
Critical Community and Emergency Facilities	1,955	383 20%	467 24%	515 26%
Natural, Cultural, and Historic Resources	7,361	543 7%	804 11%	910 12%
Residential	73,765	5700 8%	9080 12%	10921 15%
Commercial	5,059	658 8%	881 10%	904 11%
Services - Other	811	137 16%	179 21%	205 24%
Undeveloped Land (Exposure Only)	14,009	7161 51%	8434 60%	8939 64%

Table 3.1. Vulnerability Assessment Projection- 100-year Rainfall-Induced Flooding Risk for Asset Categories in 2020, 2040, and 2070

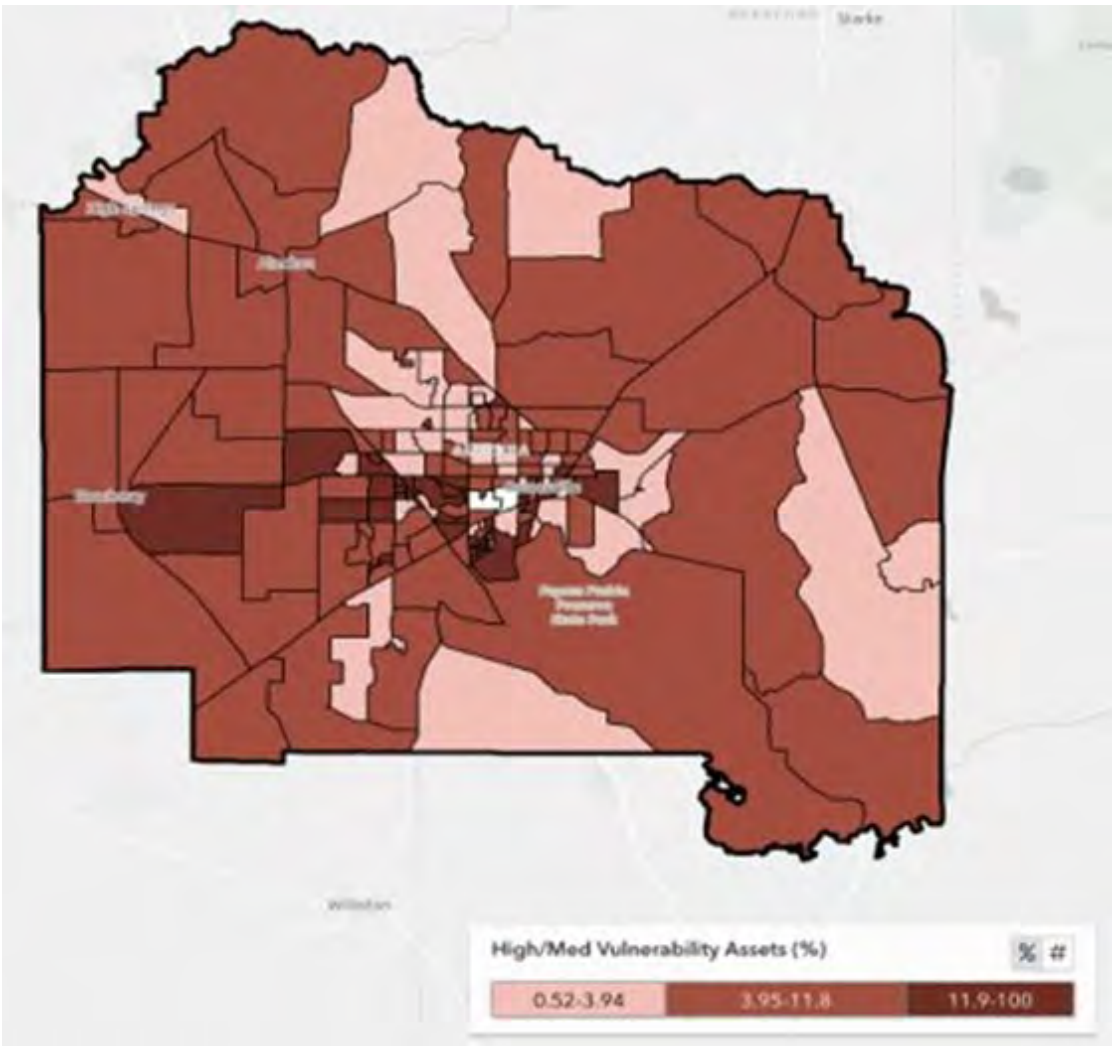

Figure 3.1. Percent of Residential Properties Highly Vulnerable to Current 100-Year Rainfall-Induced Flooding by Census Block Group

The most obvious impact in Alachua County is the risk of flooding during heavy rainfall or storms. As Hurricane Irma demonstrated, floodwater can inundate neighborhoods, causing household property damage, displacing residents, and disrupting daily life. There are notable disproportionate impacts to assisted living and affordable housing including manufactured housing. The Vulnerability Assessment revealed that 12% of naturally occurring affordable housing (NOAH) and subsidized housing is highly vulnerable to current rainfall-induced flooding.[3]

Floodwater can also damage critical infrastructure such as roads, bridges, utilities, community services, and environmental assets. Frequent flooding in a neighborhood can also lead to decreased property values. Businesses may suffer losses due to property damage and disruption of operations.

[3] NOAH consists of existing rental properties that are affordable to low-income households without public subsidy.

Repairs and reconstruction can be costly and time-consuming, impacting the local economy and community services.

Repeated flooding in floodplain areas may force residents to relocate, causing population shifts and altering the demographics of the affected neighborhoods. Given flood pressures in other parts of the State, population increase in Alachua County due to climate migrants will start measurably increasing around 2040 to an additional 26,000 people by 2100 and beyond. This is a concern of 68% of survey respondents for the Vulnerability Assessment Survey.[4]

Floodwater poses risks to public health by contaminating water sources with pollutants, sewage, or chemicals. Additionally, flood events may require emergency evacuations, risking residents' safety. Flooding can also damage or destroy cultural resources, resulting in cultural heritage and identity loss. Flood prevention that alters the natural water flow or encroaches on these areas can disrupt wildlife habitats and reduce biodiversity, signifying a need to find solutions that take human and the environment's needs into consideration.

Flooding Resiliency

Flooding disproportionately impacts communities with inadequate or old infrastructure that are unable to withstand high levels of precipitation. These communities are often the ones who have the least means to repair the damage resulting from flooding, signaling a need to address differences in quality of flooding infrastructure throughout the County. There are many other facilities with vulnerable populations, such as nursing homes or assisted-living facilities. Children, who are still developing and consume more contaminants "than adults in proportion to their body size," are also at high risk if they come in contact with contaminated waters or mold.[5]

Alachua County Comprehensive Plan

Alachua County Comprehensive Plan

Understanding the urgency of flooding, the Alachua County Comprehensive Plan dedicates an entire section (also known as an Element) to stormwater management. The three strategies for flooding are: Avoid, Minimize, and Mitigate. Its goal is to protect natural drainage features and the quality of waters as well as protect new and existing developments in accordance with adopted levels of service for floodplain management, water quantity and water quality. It also establishes stormwater management standards for different types of facilities. Please see Appendix B for the Comprehensive Plan's objectives regarding stormwater and flooding relevant to this chapter.

[4] Alachua County Vulnerability Assessment Final Report, 2024, 26.
[5] EPA, "Protecting Children in Aftermath of Hurricanes and Floods."

Past and Current Efforts

Physical Infrastructure

In Alachua County, efforts have been made to update and implement physical infrastructure that can withstand high levels of precipitation and flooding. Large pump stations have been installed in areas with recurring flooding. The County also prepared to install temporary pumps in other areas of recurring flooding. Additionally, the County is buying out properties with repeated flooding. Refer to Table 3.2 for specific examples of Physical Infrastructure Action Plan Components.

Communication

One of the first steps of addressing flooding is ensuring that the public is aware of any risks or upcoming intense weather so that they can make preparation and avoid any hazards. Staff developed AlertAlachua to provide real-time weather information to residents via text message. Text ALACHUA to 888-777 to receive real-time County updates during a large-scale incident or emergency.

Another alert system enables the County to provide residents with critical information quickly in a variety of situations, such as severe weather, unexpected road closures, missing persons, and evacuations of buildings or neighborhoods. Residents will receive time-sensitive messages wherever they specify, such as their home, mobile or business phones, email address, text messages and more. Visit AlachuaCountyReady.com to stay up to date.

Floodplain Management

Alachua County has an active floodplain management program. The program identifies the County as Class 5 under the Community Rating Systems (CRS) resulting in a discount on flood insurance policies for residents (more information under Strategy 3.2.3). The County provides base flood elevations (BFE) for Special Flood Hazard Areas that do not have a BFE assigned by Federal Emergency Management Agency (FEMA) (Zone A). BFE is used to build structures at a height above where the floodwaters are expected to reach during a 100-year flood event. The County has regulations to avoid building in flood prone areas as well as providing for BFE to help avoid flooding for habitable structures.

Land development regulations have been implemented that require floodplain avoidance and compensating storage for filling in the floodplain. The code requires the equivalent storage volume of the existing floodplain area lost to be provided by the development, usually through stormwater ponds.

Florida Building Code and Land Conservation Program

Alachua County adopted the Florida Building Code with floodproofing standards, which includes:

- 4-foot elevation requirement for manufactured housing/mobile homes
- Anchoring required for propane tanks.

The County also adopted SRWMD current (as of 2023) rainfall depths that are consistent with near future rainfall conditions. Future conditions inundation modeling was performed as part of the Vulnerability Assessment referenced earlier in this chapter.

The County's Land Conservation Program (see Natural Resources Chapter for more information) incorporates floodplain conservation, underpinning the value of floodplains to ecosystems and safety.

Finance

The Resilient Florida Grant program, funded by the State of Florida, was designed to provide funding to increase climate resilience, especially in regard to sea level rise and flooding. Alachua County has received Resilient Florida Grants for the Vulnerability Analysis, Adaptation Planning and for specific resiliency projects. The County has received matching funds for property purchases from the Resiliency Grants and counties to pursue other Grants such as Hazard Mitigation Grant Program (HMGP), Flood Mitigation Assistance Program (FMA), and Hurricane Loss Mitigation Program (MLMP) when available.

Program Highlight

Resilient Florida Adaptation Grant to help Identify Critical Infrastructure Threatened by Future Flooding

The County's consultant, Jones Edmunds developed a countywide TUFLOW model (a simulation software) and completed simulations for the 100-year/1-day, 100-year/10-day, 500-year/1-day, and 500-year/10-day storm events under multiple land use scenarios including existing conditions, 2040, and 2070 projections. The model outputs include floodplain extents, which help identify areas susceptible to erosion along channelized creek and river systems.

Jones Edmunds also conducted an analysis of County-owned roadways and culverts to assess overtopping and potential failure risks. This led to the identification of over ten candidate locations for Capital Improvement Projects (CIPs) focused on upsizing culverts to improve system resilience against future flooding. They have also begun identifying areas for potential ditch rehabilitation

using data to target locations most vulnerable to erosion. The results and strategies of this information will be discussed by the County Commission in 2026.

Future Strategies and Action Items

Goal 3.1: Improve Physical Infrastructure

STRATEGY 3.1.1 *– Expand stormwater and flooding infrastructure in Alachua County.*

The most critical way to improve flooding resilience is by improving and expanding the current physical infrastructure. The Vulnerability Assessment recommended that the County "Construct or improve flood control structure like levees, dams, and stormwater infrastructure and basins."[6] New installations and projects should focus on low-impact design to minimize impact on the local environment, and efforts need to be made to retrofit and improve the already-existing infrastructure. Due to the costs of implementing new infrastructure, the County will also continue to apply for grants that go towards low-impact design projects.

It is important to keep in mind that as climate impacts worsen, Alachua County is projected to be more at risk for flooding. This means that physical infrastructure improvements need to be made under the pretense that the County will experience more 100-year flooding events.

Table 3.2 Action Items for Expanding Physical Infrastructure (Strategy 3.1.1)

Action Items	Jurisdiction	Pros	Cons	Status
Expand Green Stormwater Infrastructure/Low Impact Design in areas already developed; includes large-scale retrofits by the County and small-scale retrofits by individual property owners.	County, Local governments, WMD	Decreases flooding and improves water quality issues	Requires support from all review agencies	Not started
Installation of permanent pumps in areas with recurring flooding.	County and local governments	Quick response to a known local flooding issue, reduces flooding of	Costly to maintain	Current

[6] *Ibid* footnote 4, 27.

		existing homes		
Include a flood mitigation component to water quality projects where possible.	County	Address flooding with water quality improvement	Could add costs and additional agency review and oversite	Ongoing/ Emerging[7]
Apply for Local Mitigation Strategy funds	County, Local governments	Reduces flooding impacts to infrastructure	Only available for public projects	Ongoing

Goal 3.2: Expand Stormwater Planning

STRATEGY 3.2.1 *– Add requirements for developments near floodplains and flood-prone areas.*

The Vulnerability Assessment recommended that the County expand stormwater planning by implementing floodplain management strategies, particularly regarding land-use planning and zoning.[8] This involves changing land development patterns, particularly in and around floodplains and flood-prone areas. An effective way to ensure citizens' safety and minimize risk to flooding is by implementing requirements for new constructions to be built outside of floodplains. This would require buy-in and likely take a long time to implement, however.

Table 3.3 Action Items for Stormwater Planning (Strategy 3.2.1)

Action Items	Jurisdiction	Pros	Cons	Status
Require all new construction to be outside of floodplains except under special circumstances.	Alachua County	Reduces the potential for flooding in future development, saves significant money in long-term	Reduces available developable area; major timeframe	Emerging
Add setback to large natural floodplains with no existing	Alachua County	Reduces the potential for flooding from	Reduces available	Emerging

[7] Flood mitigation was being considered in the High Springs and Headquarter library retrofits, though the projects did not move forward
[8] *Ibid* footnote 4, 27.

stormwater ponds (e.g., at Kanapaha Prairie)		future storms, saves significant money in long-term.	developable area	

STRATEGY 3.2.2 – Protect critical infrastructure.

The County must put specific emphasis on protecting critical infrastructure from flooding events. Effective planning cannot be done without specific knowledge of the area being affected by flooding. The County recommends doing intensive flood studies to identify vulnerable areas and plan accordingly for the impacts they may face. This opens possibilities to implement new codes and protections for flood-prone areas.

Table 3.4 Action Items for Increasing Flood Studies (Strategy 3.2.2)

Action Items	Jurisdiction	Pros	Cons	Status
Develop planning strategies for protecting critical infrastructure.	Alachua County, Local Government	Study funded through a recently awarded Resilient Florida Grant to be completed in early 2026	Costs could be significant to address concerns	Currently completing Adaptation analysis to identify at risk critical infrastructure
Develop a list of top ten infrastructure under flooding threat.	Alachua County	More focused planning	Challenge with quantifying needs and benefits to prioritize projects	Currently completing Adaptation analysis to identify at risk critical infrastructure
Coordinate with FEMA on new flood studies and possible funding for studies.	Alachua County, local governments	Support for additional funding to reduce costs	Extends project timelines	Ongoing; County is currently participating in the Waccassassa Flood Risk Map study and Santa Fe Study

Initiate new flood study areas in coordination with other jurisdictions.	Alachua County	Projects are more inclusive of entire impacted areas not beyond a single jurisdiction	Require additional funding sources	Emerging

STRATEGY 3.2.3 *– Develop an Alachua County Watershed Masterplan.*

The National Flood Insurance Program provides flood insurance to participating communities, cities, and counties. Through the Community Rating System (CRS), the County is eligible for flood insurance discounts depending on the quality and comprehensiveness of its floodplain management practices. The County is currently deemed a Class 5 under the CRS with a 25% discount. Developing a Watershed Masterplan can bump the County to a Class 4, which has a 30% discount.

A Scope of Work for the Watershed Masterplan was completed July 2025 by *Jones Edmunds*, which includes collecting location data and updating TUFLOW models. Another next step is to select a watershed for study. Assuming the municipalities are doing their own watershed analyses, the watershed will be majority located in unincorporated Alachua County.

Given all the data necessary for a Watershed Masterplan, it is a costly process to collect all of the information. Alachua County must apply to grants to develop the Watershed Masterplan.

Table 3.5 Action Items for Developing Alachua County Watershed Masterplan (Strategy 3.2.3)

Action Items	Jurisdiction	Pros	Cons	Status
Apply to Florida Resiliency Grant.	Alachua County	Fund Watershed Masterplan development and other efforts.	None.	Emerging
Select watershed for study and develop Watershed Masterplan.	Alachua County	Potential to become Class 4 in the CRS; comprehensive planning for flood events	Cost	Emerging

Goal 3.3 – Expand Stormwater and Flooding Policy

STRATEGY 3.3.1 *– Adopting policies that facilitate low-impact development of stormwater infrastructure.*

Supporting infrastructure and planning are effective policy decisions that prioritize minimizing flooding risks and facilitate smart stormwater design. Codifying sustainable infrastructure requirements sets a precedent for all future developments and makes the process of incorporating flood prevention design easier.

Table 3.6 Action Items for Stormwater and Flooding Policy (Strategy 3.3.1)

Action Items	Jurisdiction	Pros	Cons	Status
Incentivize Low Impact Development (LID) in new development with runoff quantity credit.	County	Provides more options for developers	Requires coordination with WMD reviewers	Emerging
Allow certain areas to have stormwater storage in large events sites like athletic fields and open space.	County, Local Governments	Increases the multifunctionality of land, reduces potential runoff from development	May limit uses during and after rain events, may require more upkeep	Emerging
Require specific setbacks for large floodplains.	County	Provides a protective buffer as increased flooding becomes more common, reduces flooding of existing and future development potentially reducing homeowners and flooding	Reduced developable land	Emerging

		insurance rates		
Adopt rainfall and require future conditions change factors when available for critical duration analysis.	County	Increase accuracy	Increases complexity of analysis	Emerging

Goal 3.4 – Improve Flooding Communication

STRATEGY 3.4.1 *– Provide informative, accessible data on potential flooding risks.*

The most important aspect of flooding resilience is ensuring the safety of citizens and providing the most up-to-date information about flooding hazards. While the County has already developed an alert system for citizens, the more citizens are informed, the more prepared they can be for when an emergency occurs. Particularly helpful to citizens would be flooding models and knowledge of which areas are at most risk for flooding so they can prepare accordingly.

Table 3.7 Action Items for Flooding Communication (Strategy 3.4.1)

Action Items	Jurisdiction	Pros	Cons	Status
Make inundation models available to public.	County	More accurate and latest data available for everyone, reduces loss of life and injuries due to flooding	Misuse or misunderstanding of information	Emerging

Goal 3.5 – Financing Flood Prevention Projects

STRATEGY 3.5.1 – *Increase financing for flood projects.*

Financing flood prevention ensures that projects are insured and completed efficiently. Without funding from sources such as grants, many resilience projects would not be possible. The County must continue to apply for grants and obtain funding for projects.

Table 3.8 Action Items for Financing Flood Prevention Projects (Strategy 3.5.1)

Action Items	Jurisdiction	Pros	Cons	Status
Create special assessment districts for known flooded areas.	County, City of Gainesville	Increase funds available to address specific areas with flooding problems	Increase costs for residents in these areas	Emerging
Submit additional grant applications for State and Federal grants.	County, Local Government	Helps reduce local expenses for projects	Additional oversite and staffing needs	Ongoing

Triple Bottom Line

People

Flooding can have serious consequences on people's livelihoods and health. Flooding can damage properties, even destroying homes. Flooding can also increase the risk for infectious and cardiovascular disease, injuries, and death.[9] In Florida, warnings have been issued to stay away from floodwaters due to increased risk of *Vibrio vulnificus*, a life-threatening infection.[10] The amount of mosquitoes, and thus mosquito-borne illnesses, may increase due to more still water in the County (see the Heat Chapter). The stress of such events can also impact people's mental health and stress levels (see Heat Chapter).

By implementing smart floodplain management practices and increasing community awareness, these threats can be prevented. Additionally, strategies targeting improving current infrastructure, particularly in vulnerable neighborhoods, can minimize further damages to those properties and infrastructure.

Profit

Florida has some of the most expensive flood insurance rates in the country due to the high risk of flooding from hurricanes and intense rainfall. Those without insurance must bear the cost of flooding damage, which is unaffordable for many citizens in Alachua County. The County can lower insurance rates and protect its citizens by decreasing its CRS class to class 4 and getting a

[9] Lynch et al., "Large floods drive changes in cause-specific mortality in the United States," *National Library of Medicine*, 2025.
[10] Florida Department of Health, "FDOH Urges Floridians to Avoid Floodwaters and Prevent Exposure to Vibrio Vulnificus," 2024.

30% discount on flood insurance. Additionally, by investing now in stormwater and flooding management for 100-year flooding events, the County is preventing future costs of flood damage.

Planet

Smart flood management and stormwater infrastructure can protect wildlife and biodiversity in Alachua County. It also encourages protection of floodplains and other nature-based climate solutions that help absorb floodwaters.

Community Engagement

Sign Up for Text Alerts

Staying aware of the potential flooding risks in communities can help create a plan of action during emergencies. To stay up to date on potential flooding risks, sign up for severe weather alerts via AlachuaCountyReady.com and Alert Alachua.

Purchase flood insurance as part of home insurance policy for property in areas that have a high potential of flooding in the future, even if it is currently not in a floodplain.

Install cisterns, rain barrels, and other stormwater capture systems and reuse water for irrigation needs. Consider building rain gardens to capture roof runoff or from other impervious areas to help reduce local flooding issues.

Elevate Florida Program

Elevate Florida is a statewide program headed by the Florida Division of Emergency Management. Its goal is to protect homes and communities from damage caused by hurricane and flooding events. The program provides construction services and prioritizes the most at-risk units or homes, with Alachua County being identified as one of their priority counties. As of July 2025, the application is closed but may open again in the future. Please visit the Elevate Florida website to check whether the application porta has re-opened: Elevate Florida | Florida Disaster

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4. Heat and Health

Purpose

Build collaboration, awareness, and capacity to address climate-related public health impacts and implement solutions that improve community health outcomes.

Introduction

Heat, Health, and Climate Change

The gradual increase in global surface temperatures can have a dramatic impact on the health and stability of communities. Extreme heat events are periods of excessively hot and/or humid weather that can last for multiple days. This can lead to heat-related illnesses such as heat stress or heat stroke. Both can be life-threatening if not treated quickly. According to the World Health Organization (WHO), "approximately 489,000 heat-related deaths occur each year," with many of them occurring during unprecedented heat waves.[1] Florida is especially at risk to extreme temperatures due its high temperatures and humidity. Combined, this creates apparent temperature, defined by what the temperature feels like rather than what it is. The heat index chart, which is the same as apparent temperature, shows how hot it will feel depending on the temperature and humidity (Figure 4.1). In summer 2025, new records were set in many Florida cities. Images like the one below, from July 31, 2025, were common occurrences in July and August 2025.

[1] World Health Organization, "Heat and Health," 2024.

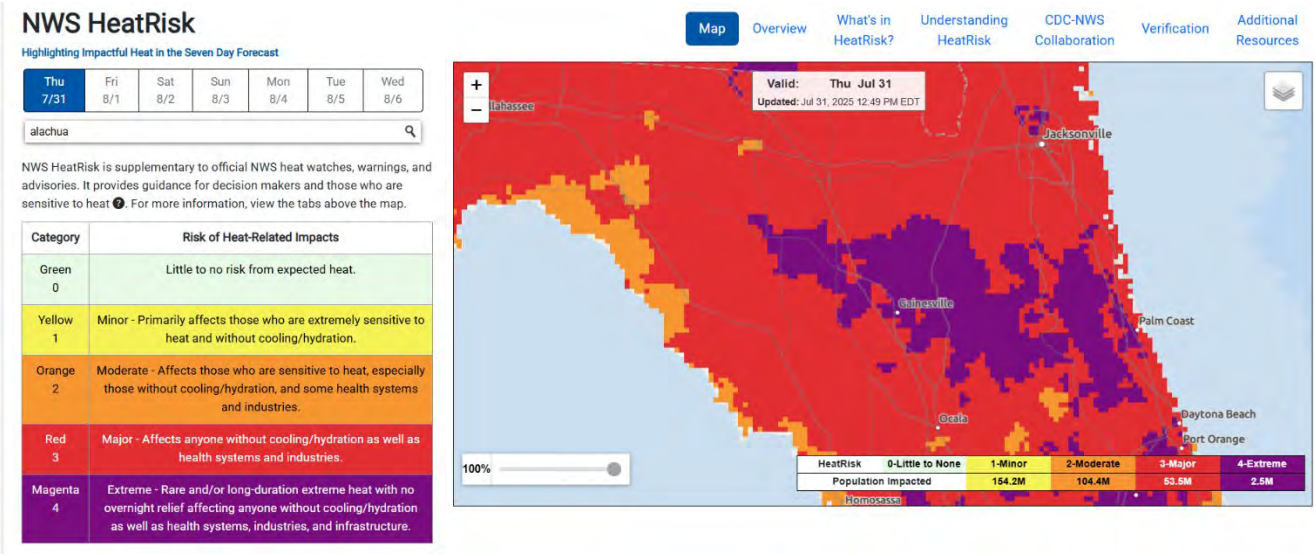

Figure 4.1: National Weather Service Heat Risk for July 31st, 2025[2]

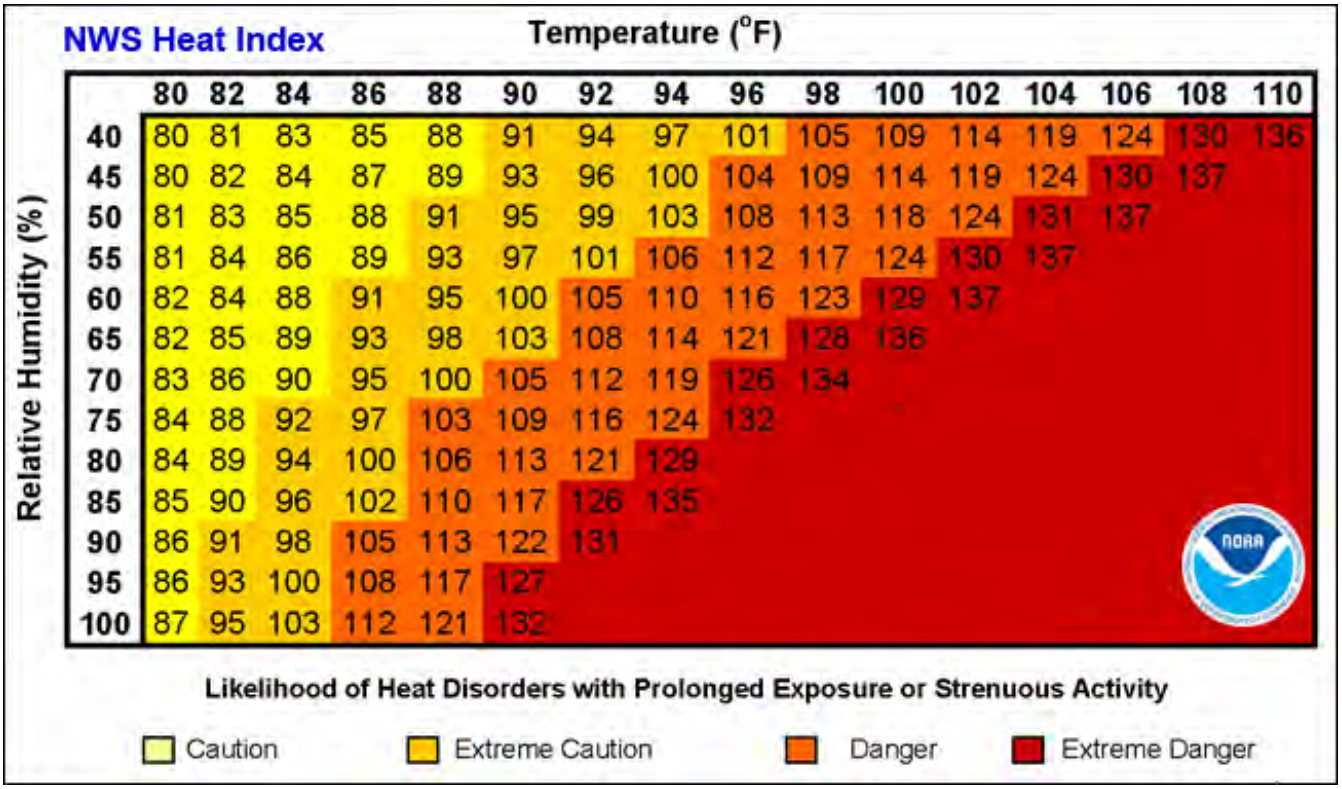

Figure 4.2 National Weather Service Heat Index Chart[3]

[2] National Weather Service, "NWS Heat Risk," 2025.
[3] National Weather Service, "What is the heat index?"

Another consequence of climate change is the increase in vector-borne diseases, or diseases that are spread by vectors such as mosquitoes or ticks. Increased heat is associated with higher rates of mosquito development, bites, and the amount of time the mosquitoes incubate the disease.[4] Additionally, as temperatures and humidity increase, vector populations can migrate and new diseases can be introduced into local environments. Some mosquito-borne diseases that have begun to spread into Florida include dengue fever, malaria, yellow fever, the West Nile virus, and Eastern Equine Encephalitis (EEE).[5,6] Ticks, which have also expanded in geographical range due to temperature increases, can spread diseases such as Lyme disease, southern tick-associated rash illness (STARI), and ehrlichiosis.[7,8]

Changes to mental health are an often-overlooked impact of climate change. The term climate anxiety describes the deep sense of fear and loss many people experience in response to climate change. While climate anxiety is a healthy response to a crisis, it can be so intense that it interferes with daily function, produces maladaptive behaviors, exacerbates or intertwines with existing mental disorders, or triggers mental disorders like post-traumatic stress disorder (PTSD).[9] While many experience anxiety relating to climate change as a whole, localized impacts of climate change can also cause extreme stress.[10] For instance, extreme heat and sea level rise may cause individuals to consider relocating or force them to. Displacement can take a significant toll on emotional wellbeing and heighten economic stress, factors that can impact mental health. Studies also show that factors such as extreme heat or displacement are correlated with increased violence or aggression.[11, 12]

Heat in Alachua County

The Climate Vulnerability Assessment shows that extreme heat events in Alachua County will continue to be more intense (hotter, more frequent, and longer lasting). The average daily maximum temperature is projected to increase by approximately 6°F by the end of the 21st Century.[13] The project data also show that the number of extremely hot days will increase by ten times by 2100.[14]

These are not impacts that will only be felt in the future – they are being felt now. From January to September 2024, the County experienced 35 days above an apparent temperature of 90°F.[15] The apparent

[4] EPA, "Climate Change Indicators: West Nile Virus."
[5] Florida Department of Health, "Dengue Fever."
[6] Florida Department of Health, "West Nile Virus (WNV)."
[7] EPA, "Climate Change Indicators: Lyme Disease."
[8] UF/IFAS, "Ticks and Disease in Florida."
[9] Clayton, "Climate Anxiety: Psychological responses to climate change," *Journal of Anxiety Disorders*, 2020.
[10] *Ibid* footnote 9.
[11] Plante and Anderson, "Global Warming and Violent Behavior," *Association for Psychological Science*, 2017.
[12] Amin, "Climate change and lethal violence: a global analysis," *International Journal of Climate Change Strategies and Management*, 2025.
[13] Alachua County Spatial Vulnerability Assessment Report, 2024, 2.
[14] *Ibid* footnote 13, 2.
[15] CDC, "Heat & Health Tracker," *Climate and Health Program.*

temperature in 2024 in Alachua County was higher than the historical average, indicating a pressing need to address heat-related illnesses (see Figure 4.1).

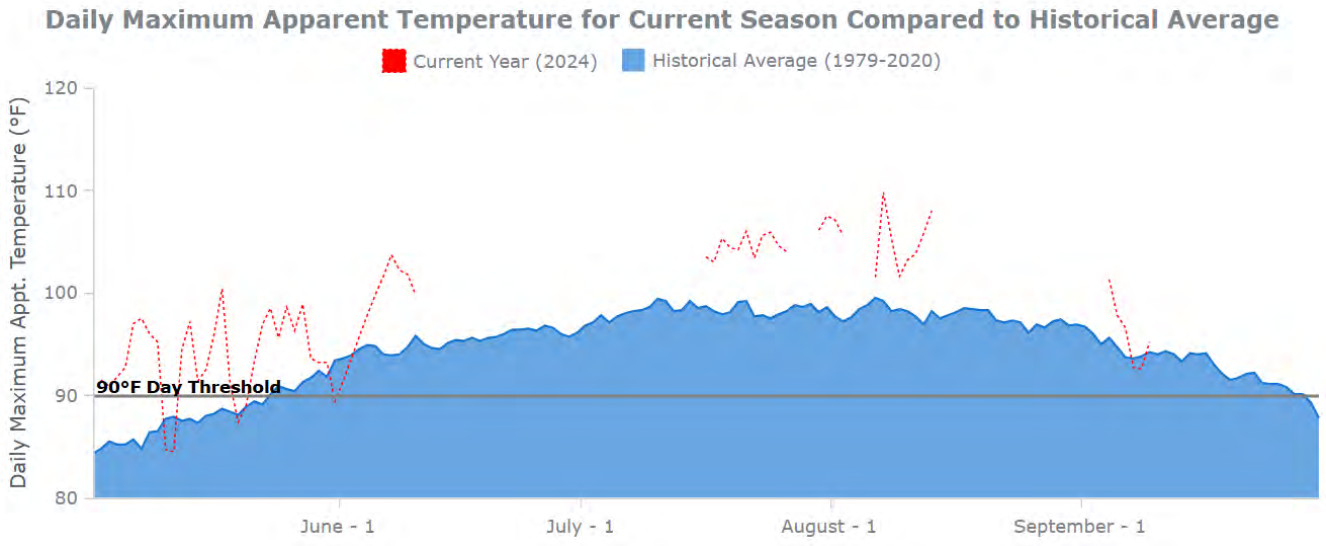

Figure 4.3: Alachua County's Daily Maximum Apparent Temperature for 2024 Season Compared to Historical Average[16]

Heat Resilience and Vulnerability

Extreme heat events are not felt uniformly throughout the County. Dense, urbanized areas of the County experience hotter temperatures than the surrounding rural areas because buildings and other impervious surfaces like parking lots absorb and retain more heat compared to natural land covers. This is known as the urban heat island effect (UHI) (see the Natural Resources and Land Use and Transportation Chapters on recommendations to tackle UHIs).

In Alachua County, heat-related illnesses disproportionately impact those prone to heat-related illnesses and those without access to adequate cooling and hydration. Those prone to heat-related illnesses include infants and people over 65, who between 2013 and 2022 experienced around "108% more days of heatwave per year than in 1986-2005."[17] Another group that will be impacted are student athletes who practice outdoors, or anyone else who spends large amounts of time exerting themselves outdoors. Arduous exercise outdoors, especially right after school hours in the mid-to-late afternoon, increases the risk of heat stroke or stress and dehydration. Figure 4.2 shows extreme heat vulnerability throughout Alachua County, showcasing concentration in urban areas.

One of the most impacted groups, however, are the unhoused who lack access to cooling centers and regular hydration, as well as those who lack working HVAC systems. Figure 4.3 highlights the significant

[16] Ibid footnote 13.
[17] Romanello et al., "The 2023 Report of the Lancet Countdown on Health and Climate Change: The Imperative for a Health-Centered Response in a World Facing Irreversible Harms." *Lancet Countdown*, 2023.

gaps in cooling centers within the County. In Gainesville, many cooling centers are in a concentrated area in the east part of the city. However, no nearby cooling centers exist in high heat-vulnerability areas toward south or west of 30 Gainesville along the I-75 corridors, making access difficult to the unhoused and those with limited mobility options. To address this concern, heat mitigation and management strategies that reduce extreme heat exposure and prioritize interventions in areas most vulnerable to heat are necessary.

Figure 4.4: Alachua County Heat Advisory on July 27, 2025

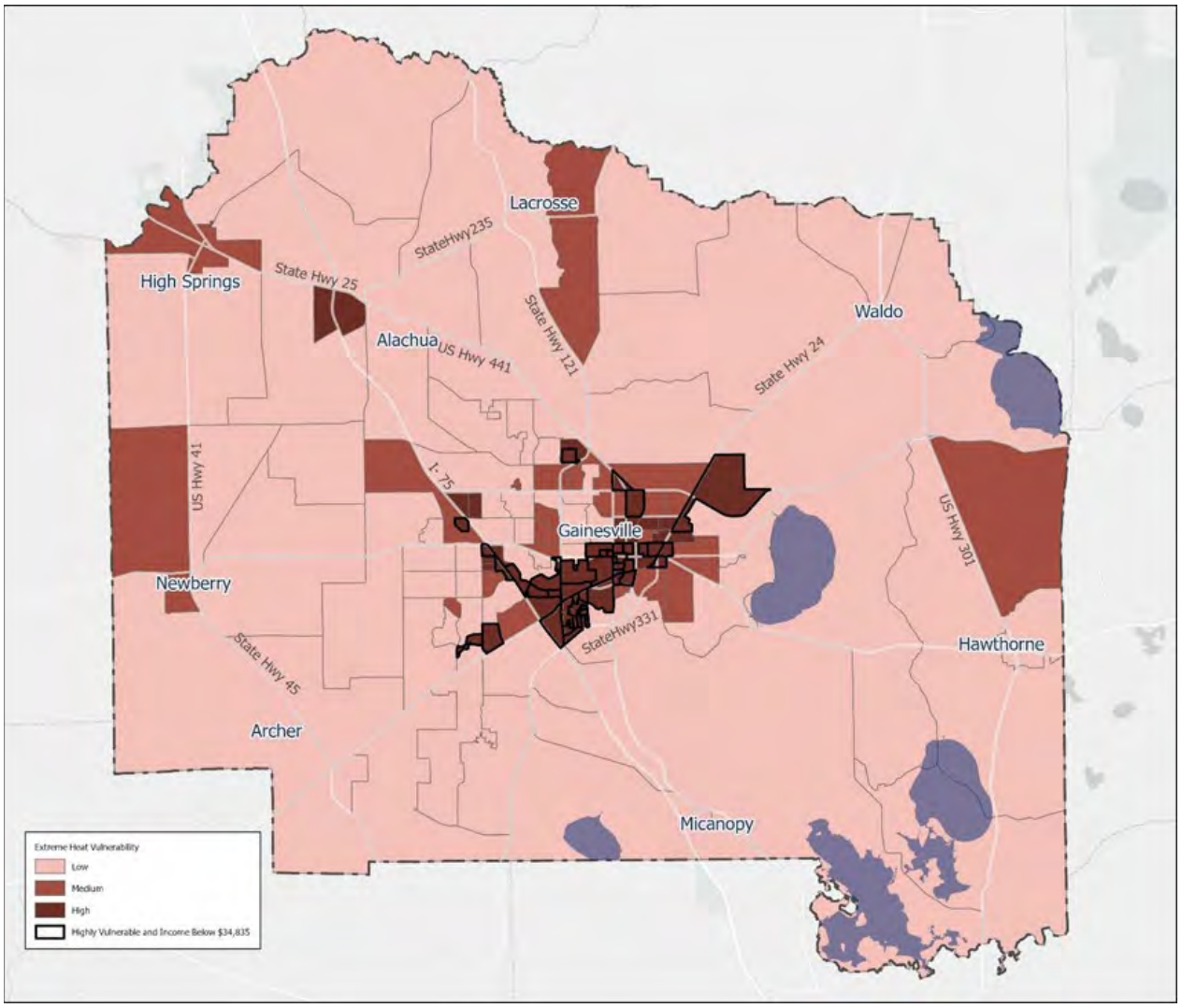

Figure 4.5: Extreme heat vulnerability (low, medium, and high colored) for residential areas by census block group in Alachua County.

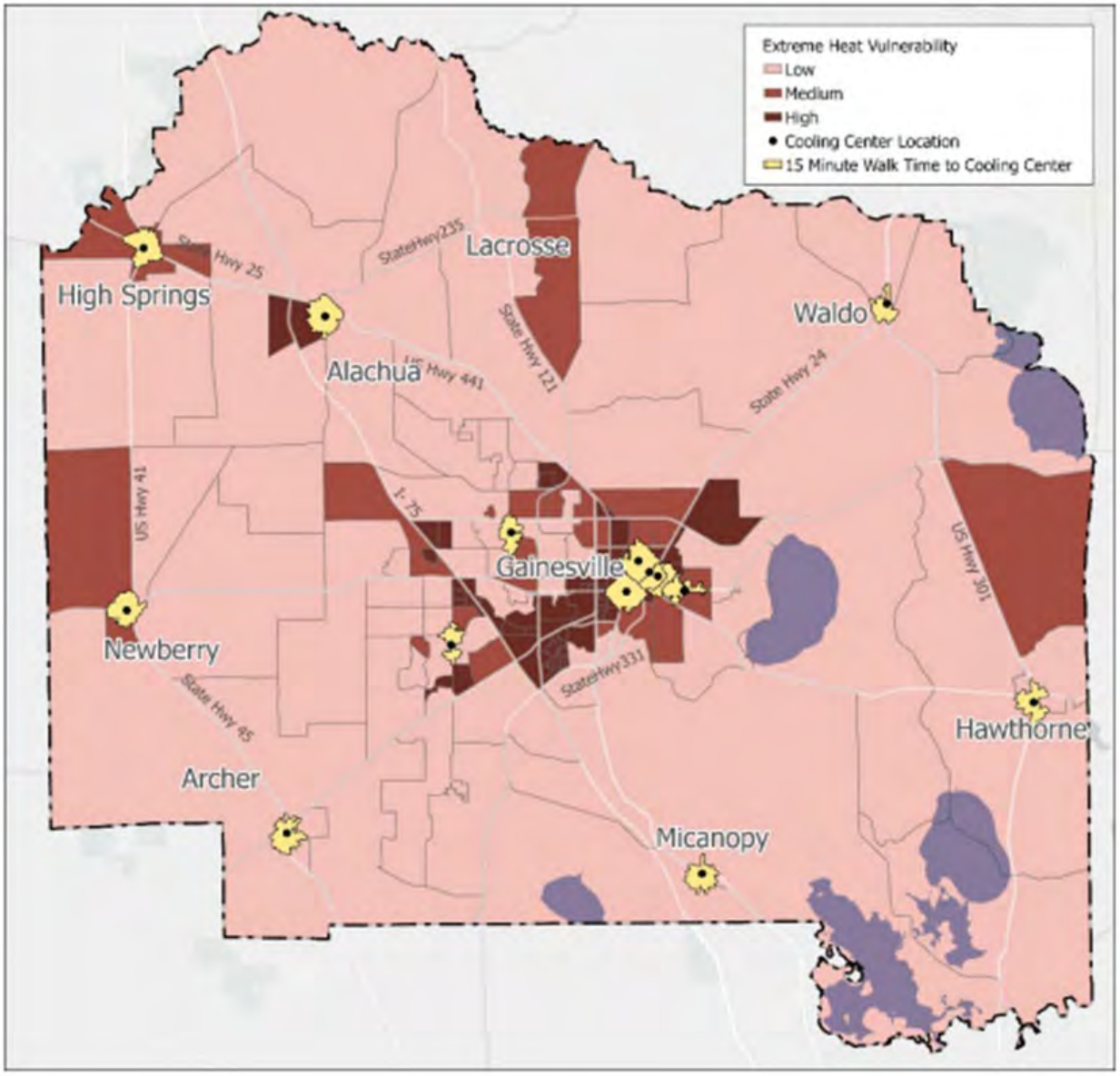

Figure 4.6: Extreme Heat Vulnerability and Cooling Center Access. Areas within a 15-minute walking distance to cooling facilities are shown in yellow

Vector-Borne Diseases in Alachua County

Alachua County is at risk of vector-borne diseases due to high apparent temperatures and abundant standing water.[18] The last health advisory that was put out to announce that chickens within the County were testing positive for West Nile virus was in 2021.[19] However, it is likely that these events will increase in frequency as climate change worsens, apparent temperatures increase, and more frequent flooding

[18] Florida Department of Health, "Mosquito-Borne and Other Insect-Borne Diseases."
[19] Health Officials Issue Mosquito-Borne Illnesses Advisory

events create more standing water for mosquitos to breed on. Tick-borne diseases are also a risk as they spread in geographical range, thriving in high temperature and humid environments such as Alachua County.

Mental Health Resilience and Demographics

Studies show that climate anxiety disproportionately impacts younger generations. A national poll in 2019 found that "57 % of teens said that climate change makes them feel afraid."[20] Another poll from the American Psychological Association found that almost half of respondents from ages 18-34 "(47%) say the stress they feel about climate change affects their daily lives."[21] However, anyone – particularly those interested in environmental issues – can experience climate anxiety.[22] Alachua County does not have data on local climate anxiety, but by providing accessible services, staff can begin the process of understanding the best ways to address it. Deteriorating mental health, stress, and aggression has significant impacts on individuals, affecting their daily lives, habits, and relationships. For this reason, Alachua County is taking proactive measures to provide services to those experiencing eco- or climate anxiety as well as increased violence or aggression.

Alachua County Comprehensive Plan

The Alachua County Comprehensive Plan does not include any specific targets aiming to combat heat-related illnesses, though many of its goals indirectly address it. Additionally, there are goals focusing on providing general health and mental health services and resources, particularly for at-risk populations. While there is a lack of specifically addressing mental health issues relating to climate change, the CAP provides an opportunity to provide recommendations that can be codified into the Comprehensive Plan. Developing policy from a climate perspective would allow planning for a future with climate impacts in mind, making the County better prepared to face these issues.

Past and Current Efforts

[20] *Ibid* footnote 9.
[21] American Psychological Association, "Majority of US Adults Believe Climate Change Is Most Important Issue Today," 2020.
[22] *Ibid* footnote 9.

Cooling Centers

A cooling center is a location – typically an air-conditioned or cooled building – that has been designated as a site to provide relief and safe shelter during extreme heat days. The County has designated 15 different locations as cooling centers including all Alachua County public libraries and three community centers. These include:

- **Alachua Branch Library**: 14913 NW 140th St., Alachua (Monday – Friday 10 a.m. – 6 p.m., Saturday 10 a.m. – 5 p.m., and Sunday noon – 5 p.m.)
- **Archer Branch Library**: 13266 SW SR 45, Archer (Mon & Sun closed, Tues. – Fri. 10 am – 6 pm, Sat. 10 am. – 5 pm)
- **Clarence R Kelly Center**: 1701 NE 8th Ave., Gainesville (Mon – Sat, 9 am – 6 pm, Sun closed)
- **Cone Park Branch Library**: 2801 E. University Ave., Gainesville (Mon – Fri 10 am – 6 pm, Sat 10 am – 5 pm, Sunday closed)
- **Eastside Community Center at Cone Park**: 2841 E. University Ave., Gainesville (Mon – Fri 9:30 am – 6:30 pm, Saturday and Sunday closed)
- **Hawthorne Branch Library**: 6640 SE 221st St., Hawthorne (Mon – Fri 10 am – 6 pm, Sat 10 am – 5 pm, Sun noon – 5 p.m.)
- **Headquarters Library – Gainesville**: 401 E. University Ave., Gainesville (Mon and Fri 10 am – 6 pm, Tues – Thurs 10 am – 7 pm, Sat 10 am – 5 pm, Sun noon – 5 pm)
- **High Springs Branch Library**: 23779 W. US HWY 27, High Springs (Mon – Fri 10 am – 6 pm, Sat 10 am – 5 pm, and Sun noon – 5 pm)
- **Library Partnership Branch – Gainesville**: 912 NE 16th Ave., Gainesville (Mon – Fri 10 am – 6 pm, Sat 10 am – 5 pm, Sunday closed)
- **Micanopy Branch Library**: 706 N.E. Cholokka Blvd., Micanopy (Mon and Sun closed, Tues – Fri 10 am – 6 pm, Sat 10 am – 5 pm)
- **Millhopper Branch Library**: 3145 NW 43rd St., Gainesville (Mon 10 am – 6 pm, Tues – Thurs 10 am – 7 pm, Fri 10 am – 6 pm, Sat 10 am – 5 pm, Sunday noon – 5 pm)
- **MLK Center**: 1028 NE 14th St., Gainesville (Mon – Fri 7 am – 7 pm, Sat 10 am – 6 pm, Sun 2 pm – 6 pm)
- **Newberry Branch Library**: 110 S. Seaboard Drive, Newberry (Mon – Fri 10 am – 6 pm, Sat 10 am – 5 pm, Sun noon – 5 pm)
- **Tower Road Branch Library**: 3020 SW 75th St., Gainesville (Mon and Fri 10 am – 6 pm, Tues – Thurs 10 am – 7 pm, Sat 10 am – 5 pm, Sun noon – 5 pm)
- **Waldo Branch Library**: 15150 NE US HWY 301, Waldo (Mon and Sun closed, Tues – Fri 10 am – 6 pm, Sat 10am – 5pm)

Disease Prevention

The Florida Department of Heath Disease Control Unit is tasked with surveilling human diseases and their spread. Over 90 different kinds of diseases may be reported to the Disease Control Unit to notify them of any potential outbreak or spread. The Alachua County Department of Health monitors and addresses mosquito-borne diseases by using flocks of chickens placed throughout the County to detect the West Nile Virus or EEE.[23] If detected, a Mosquito-Borne Illness Advisory is released to warn the public of confirmed cases. Alachua County also prevents mosquito spread by treating mosquito breeding retention ponds with naturally occurring larvicide.[24]

Crisis Center Community Support

The Crisis Center provides Mobile Response Teams (MRT) to support community members and students in the County who are struggling with mental health concerns. They also provide counseling services for individuals, couples and families. The Center also works closely with other social service programs to connect people to resources. The center can be reached 24/7 by contacting the **Crisis Line (352-264-6789)**.

Crisis Center Trainings

The Crisis Center provides 311 training to all volunteers and staff to help them attend to community members' concerns about weather-related disasters. Additionally, the Crisis Center has an 80-hour training for volunteers and a 40-hour training for law enforcement and 911 dispatchers that focuses on suicide prevention, de-escalation and active listening.

They also have 4 staff members and 4 volunteers trained in NOVA's Florida Crisis Response Team (FCRT). FCRT responds to mass casualties and natural disasters across the state as well as nationally to assist those affected.

Program Highlight

Alachua County Crisis Center's Impact and Volunteers

The Alachua County Crisis Center opened in 1975, making it one of the oldest crisis centers in Florida. The Center responds to around 45,000 calls on crisis lines annually with the help of over 100 volunteers. These volunteers are the reason why the Center can help as many people as it does. Without them, it would not have been possible to respond to the over 40,000 calls received during the 2004 hurricane season, or

[23] Florida Department of Health in Alachua, "Mosquito Prevention."
[24] *Ibid* footnote 23.

the 9,000 calls from the National 988 Suicide and Crisis Lifeline annually. Together with staff, they volunteer over 52,000 hours annually to support and operate these programs.

The Crisis Center has won several awards for its efforts to assist those in need, including:

- The 2025 National Association of Counties Achievement Award (awarded to the MRT)
- The 2021 Pete Fisher Humanitarian Award from the Florida Counseling Association
- The 2017 National Association of Counties Health Achievement Award (awarded to the Victim Services and Rape Crisis Center's HIV Post-Exposure Prophylaxis Program)

Strategies and Action Items

Goal 4.1 – Increase Citizen Awareness of Heat and Heat-Related Illnesses

STRATEGY 4.1.1 *- Recommend BMPs for outdoor workers, student athletes, and others who engage in strenuous exercise.*

Heat-related illnesses disproportionately impact individuals who spend hours outside. Best management practices (BMPs) are recommended to employers with outdoor workers, such as providing shade, water, and breaks when the heat index is high. BMPs are also recommended for schools and sports teams when athletes are engaging in strenuous exercise outdoors. For the general public, BMPs are recommended through heat advisories that are posted on several platforms.

To prevent heat-related illnesses, the County should specifically recommend and encourage employers, schools, and individuals to use BMPs when the heat index is high (90˚F or higher). These BMPs should be tailored to these different audiences to understand the benefits of implementing BMPs (e.g., encouraging BMPs to employers and explaining that it can improve worker productivity). It is also critically important that information can also be given in other languages to reach the entire community.

Table 4.1 Recommendations for BMPs for outdoor workers and student athletes (Strategy 4.1.1)

Action Items	Jurisdiction	Pros	Cons	Status
Recommend use of BMPs (shade, water, rest) by employers and school administrations during times of high heat index,	State level	Prevent heat-related illnesses and deaths for outdoor workers and employers	Cannot *require* worker heat protection standards	In progress (through heat advisories)

Recommend BMPs (shade, water, rest) to outdoor workers and students during times of high heat index.	County	Prevent heat-related illnesses and deaths for outdoor workers and students.	None.	In progress (through heat advisories)
Develop information campaign about BMPs for the general public.	County (Communications)	Increases awareness of BMPs and prevents heat-related illnesses for general public.	Funding, need to reach media such as social media	Not started

STRATEGY 4.1.2 *– Expand Alachua County Ready to include heat advisories and warnings.*

Heat advisories and warnings can easily be missed by residents. The County can protect its citizens by providing more avenues for these advisories and warnings to be advertised, increasing the number of people who see them. This can be done by including heat advisories and warnings in the Alachua County Ready program, which provides real-time updates during large-scale incidents or emergencies. The Alachua County Ready website shows WeatherStem stations that describe the weather (including temperature) in several areas, including University of Florida, Archer, Hawthorne, High Springs, Santa Fe, Sweetwater, the School Board, and Waldo. However, alerts for high or extreme heat would be a more efficient way for people to get the information and act quickly.

Table 4.2 Action Items for Inform Citizens of Heat (Strategy 4.1.2)

Action Items	Jurisdiction	Pros	Cons	Status
Add extreme heat outlooks, heat advisories, extreme heat watches, and extreme heat warnings to Alachua County Ready alerts.	Alachua County	More informed on dangerous heat levels; prevents heat-related illnesses	Cost, staff time	Not started

Goal 4.2 – Increase the amount of Cooling Centers in Alachua County.

STRATEGY 4.2.1 – Identify buildings throughout the County that can be used as cooling centers.

The Vulnerability Assessment recommended that the County expand cooling centers.[25] As mentioned previously, Alachua County cooling centers are not dispersed evenly, with many areas lacking any within a 15-minute walking distance. Efforts should be made to expand and add more cooling centers throughout the County. It is extremely costly and resource-intensive to build new buildings solely for the purpose of being a cooling center. The County must focus on already-existing buildings and infrastructure that could serve as a cooling center, especially those within walking distance from bus stops. Collaborating with organizations who also have buildings would also increase the amount of cooling centers without having to build new ones. Another cost-efficient cooling mechanism is increasing natural cooling spaces within the County via outdoor shading and natural landscapes, which is described in more detail in the Natural Resources and Land Use and Transportation chapter.

The Vulnerability Assessment also mentions the increase in nighttime temperatures and humidity with climate change. It outlines how neighborhoods with insufficient cooling face health risks, increased energy burden, and increased healthcare costs. Unhoused people are one of the most at risk populations. Currently, the cooling centers listed above have limited nighttime hours and there are no emergency shelters for extreme heat at nighttime.

Table 4.3 Increasing the amount of Cooling Centers (Strategy 4.2.1)

Action Items	Jurisdiction	Pros	Cons	Status
Conduct research on potential additional public cooling centers within the County	Alachua County, cities, municipalities	More cooling centers; avoid building/developing more facilities	Only have jurisdiction over County buildings	Not started
Collaborate with organizations with buildings (e.g., churches, synagogues, etc.)	Alachua County, cities, municipalities, local organizations	More cooling centers; avoid developing new buildings; increase community collaboration	Potential resistance from organizations	In progress

[25] Alachua County Vulnerability Assessment Final Report, 2024, 24.

Establish nighttime emergency shelters for extreme heat.	Alachua County	Provides cooling for vulnerable populations with increasing nighttime temperatures.	Difficulty finding buildings, funding, staff.	Not started
Establish shuttles between cooling centers and emergency shelters lacking public transportation access.	Alachua County	Provide transportation during dangerous heat events.	Difficulty finding vehicles, funding, staff.	Not started

STRATEGY 4.2.2 – Educate citizens about Alachua County cooling centers.

Citizens can only access cooling centers if they know about them. Through the development of the CAP and receiving community feedback, staff found that knowledge of the existing cooling centers was limited. It is thus imperative to educate citizens about existing and future cooling centers, particularly in areas vulnerable to heat-related illnesses. An education campaign about cooling centers should not be restricted to digital advisories and advertisements, as many who suffer from extreme heat may not have access to the internet. It is also important to educate citizens on the signs of heat stroke or stress, so they can act quickly and get to a cooling center if needed.

Table 4.4 Increase Education of Cooling Centers (Strategy 4.2.2).

Action Items	Jurisdiction	Pros	Cons	Status
Information campaign about current cooling centers	Alachua County	Increased awareness of available resources and heat-related illness prevention	Cost	Info currently provided in press releases
Heat-related illness education campaign	Alachua County	Increased awareness of the signs of heat-related illnesses	Cost	Not started
Create an interactive map with all the Cooling Centers	Alachua County	Easier to find closest cooling center	Cost	Not started

Goal 4.3 – Prevent the Spread of Vector-Borne Diseases

STRATEGY 4.3.1 – Increase awareness of Vector-Borne Diseases and Prevention

There are many ways to prevent mosquito- and tick-borne diseases, from covering skin to using insect repellant to draining standing water. It is important that the public is educated on such matters and is able to prevent a widespread outbreak. An information campaign about mosquito- and tick-borne diseases is necessary to protect citizens and provide them with the knowledge they need to protect themselves.

School nurses play an important role in preventing and treating vector-borne diseases.[26] The CDC provides continuing education training for nurses to learn about tick-borne diseases, including prevention, diagnosis, and treatment. School nurses and other school officials can use this information to reduce mosquito and tick populations on school grounds and educate parents and guardians about vector-borne diseases.

Table 4.5 Action Items for Preventing the Spread of Vector-Borne Diseases (Strategy 4.3.1)

Action Items	Jurisdiction	Pros	Cons	Status
Develop an information campaign about preventing mosquito-borne diseases.	Alachua County Department of Health	Reduces spread of mosquito-borne diseases; encourages safe, natural methods to get rid of mosquitoes	Cost	Currently provided in press releases when mosquito populations are high.
Develop an information campaign about preventing tick-borne diseases.	Alachua County Department of Health	Reduces spread of tick-borne diseases; encourages safe, natural methods to get rid of ticks.	Cost	Not started

[26] Marquard et al., "The Role of the School Nurse in Addressing Climate-Associated Illnesses: Vector-Borne Diseases," *NASN School Nurse, 2024.*

Expand collaboration with UF and other partners for vector-borne disease surveillance and management.	Alachua County Department of Health	Increases data on vector-borne diseases.	Staff, funding	Not started
Train school nurses to recognize and treat tick-borne diseases.	Alachua County Department of Health, Alachua County Public Schools	Reduces spread of tick-borne diseases in children and young people and ensures proper treatment.	Staff, funding	Not started

Goal 4.4 – Crisis Center Phone Lines

STRATEGY 4.4.1 – Increase County preparedness and understanding of psychological impacts of climate change.

The crisis center currently provides 24/7 crisis and 988 (Suicide and Crisis phone lines) phone lines. They also operate 311 Critical Information phone lines during natural disasters to address community members' concerns. However, for staff to adequately address climate-related mental health illnesses and aggression, more specialized training and actions are required. Collaborating with local organizations who are knowledgeable about climate change and its psychological impacts can also help staff develop a more comprehensive understanding of how to address these issues.

Table 4.6 Increasing County preparedness for psychological impacts of climate change (Strategy 4.4.1)

Action Items	Jurisdiction	Pros	Cons	Status
Provide ongoing training for staff and volunteers on the biological, psychological and social effects of climate change	Alachua County Crisis Center	Increase efficacy and confidence of staff and volunteers to support our clients through the implementation of	None	Not started

		evidence-based strategies		
Connect and join other organizations who are conducting outreach events related to climate change	Alachua County Crisis Center	Reach a larger audience	None	Not started
Maintain a systems approach to understanding how migration is impacting infrastructure needs in our community	Alachua County Crisis Center	Understand the needs of our community	None	Not started
Connect individuals to groups/resources related to climate change	Alachua County Crisis Center	Meet the needs of our clients	None	Not started
Increase staffs' knowledge of the intersection of climate and mental health	Alachua County Crisis Center	Meet the needs of our clients	Funding	Not started
Have a greater number of staff/volunteers NOVA trained	Alachua County Crisis Center	Enable staff to respond to those affected by natural disasters	Funding	Emerging/ Ongoing

Triple Bottom Line

People

Goals such as increasing the number of cooling centers throughout the County can protect citizens from heat-related illnesses and improve comfort, particularly for the unhoused or those without working HVACs. It is important that these cooling centers are strategically located to target communities with high heat vulnerability, and that they are accessible (e.g., close to public transportation, within walking distance, etc.). Additionally, transforming locally owned buildings into cooling centers allows the County to engage more with community partners, getting a better understanding of citizens' needs.

Providing the resources to combat heat can serve as a mechanism to decrease heat-related violence. One study found that each 1°C increase in average temperature can "yield a 6% increase in violent crime rates, as many as 25,000 more serious and deadly assaults per year in the United States…."[27, 28] Such violence can be avoided by either through cooling centers or better access to County mental health services.

The threat of vector-borne diseases will only grow as climate change impacts worsen. Ensuring Alachua County residents are informed and prepared can prevent outbreaks of potentially life-threatening diseases.

Profit

Citizens can save money through avoided hospital or medical bills from either heat-related illness, vector-borne diseases, or psychiatry. Extreme heat alone adds national health care costs of around $1 billion every summer.[29] Community participation in preventing mosquito reproduction can also help the County avoid the costs of spraying.

Planet

Emphasizing natural methods of mosquito control encourages the protection of the species that consume them as well as their habitats. Several bird species in Alachua County consume mosquitoes, including the Purple Martin, the Eastern Phoebe, and the Northern Cardinal. The University of Florida Bat House colony, which is made up of 450,000 to 500,000 bats, consumes around 2.5 billion insects per night.[30]

Research shows that climate anxiety or distress is mitigated by participation in collective climate action.[31] However, this response can only happen when healthy coping mechanisms are established. Meaning-focused coping is a helpful strategy that experts have identified for managing climate distress. It encourages individuals to find meaningful actions they can take to help the planet while making room for all the emotions they may experience in response to climate change.[32]

The strategies and action items discussed would raise awareness of heat-related health impacts in a warming world, increasing concern about climate change. If this is combined with the other action items to address the psychological impacts of climate change, it would encourage healthy coping strategies that empower people to engage in pro-environmental behaviors. Facilitating environmental engagement in the County is essential as broad support is needed to adequately address a rapidly changing climate.

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[27] Ibid footnote 12.
[28] Anderson and DeLisi, "Implications of global climate change for violence in developed and developing countries," *The Psychology of Social Conflict and Aggression,* 2011.
[29] Wolf et al., "The Health Care Costs of Extreme Heat," *Center for American Progress*, 2023.
[30] The Florida Museum, "About the Bats – University of Florida Bat Houses."
[31] Schmidt, "Climate Anxiety," *The Magazine of Harvard Medical School*, 2023.
[32] *Ibid* footnote 31.

Community Engagement

Education on the signs of heat-related illnesses

One of the best ways to prevent heat stroke and stress is by noticing the signs early and being able to distinguish between the two to appropriately respond to either. Signs of heat exhaustion include:

- Weakness, headache, dizziness, or fainting.
- Paleness.
- Unusually elevated heart rate.
- Fast and shallow breathing.
- Nausea or vomiting.
- Muscle cramps.

Signs of heat stroke include:

- Confusion, altered mental status.
- Slurred speech, loss of consciousness.
- Hot, dry skin, profuse sweating, seizures.
- Extremely high body temperature (above 103°F).

Noticing these signs early and taking action can save lives. For more information, see the County Website. Another source is the National Integrated health Information System https://www.heat.gov/, which includes Heat and Health Tracker by zip code.

Visit a Cooling Center

Those exposed to the heat or lack an adequate A/C system may use one of the 15 cooling centers open to the public:

- **Alachua Branch Library**: 14913 N.W. 140 Street, Alachua (Monday – Friday 10 a.m. – 6 p.m., Saturday 10 a.m. – 5 p.m., and Sunday noon – 5 p.m.)
- **Archer Branch Library**: 13266 S.W. State Road 45, Archer (Monday & Sunday closed, Tuesday – Friday 10 a.m. – noon, 1 p.m. – 6 p.m., Sunday noon – 5 p.m.)
- **Clarence R Kelly Center**: 1701 N.E. 8th Avenue, Gainesville (Monday – Saturday, 9 a.m. – 6 p.m., Sunday closed)
- **Cone Park Branch Library**: 2801 E. University Ave., Gainesville (Monday – Friday 10 a.m. – 6 p.m., Saturday 10 a.m. – 5 p.m., Sunday closed)
- **Eastside Community Center at Cone Park**: 2841 E. University Avenue, Gainesville (Monday – Friday 9:30 a.m. – 6:30 p.m., Saturday and Sunday closed)

- **Hawthorne Branch Library**: 6640 S.E. 221 Street, Hawthorne (Monday – Friday 10 a.m. – 6 p.m., Saturday 10 a.m. – 5 p.m., Sunday noon – 5 p.m.)
- **Headquarters Library – Gainesville**: 401 E. University Avenue, Gainesville (Monday and Friday 10 a.m. – 6 p.m., Tuesday – Thursday 10 a.m. – 7 p.m., Saturday 10 a.m. – 5 p.m., Sunday noon – 5 p.m.)
- **High Springs Branch Library**: 23779 W. U.S. Hwy 27, High Springs (Monday – Friday 10 a.m. – 6 p.m., Saturday 10 a.m. – 5 p.m., and Sunday noon – 5 p.m.)
- **Library Partnership Branch – Gainesville**: 912 N.E. 16 Avenue, Gainesville (Monday – Friday 10 a.m. – 6 p.m., Saturday 10 a.m. – 5 p.m., Sunday closed)
- **Micanopy Branch Library**: 706 N.E. Cholokka Boulevard, Micanopy (Monday and Sunday closed, Tuesday – Friday 10 a.m. – 6 p.m., Saturday 10 a.m. – 5 p.m.)
- **Millhopper Branch Library**: 3145 N.W. 43rd Street, Gainesville (Monday 10 a.m. – 6 p.m., Tuesday – Thursday 10 a.m. – 7 p.m., Friday 10 a.m. – 6 p.m., Saturday 10 a.m. – 5 p.m., Sunday noon – 5 p.m.)
- **MLK Center**: 1028 N.E. 14th Street, Gainesville (Monday – Friday 7 a.m. – 7 p.m., Saturday 10 a.m. – 6 p.m., Sunday 2 p.m. – 6 p.m.)
- **Newberry Branch Library**: 110 S. Seaboard Drive, Newberry (Monday – Friday 10 a.m. – 6 p.m., Saturday 10 a.m. – 5 p.m., Sunday noon – 5 p.m.)
- **Tower Road Branch Library**: 3020 S.W. 75th Street, Gainesville (Monday and Friday 10 a.m. – 6 p.m., Tuesday – Thursday 10 a.m. – 7 p.m., Saturday 10 a.m. – 5 p.m., Sunday noon – 5 p.m.)
- **Waldo Branch Library**: 15150 N.E. U.S. Hwy 301, Waldo (Monday and Sunday closed, Tuesday – Friday 10 a.m. – 6 p.m., Saturday 10 a.m. – 5 p.m.)

Prevent Mosquitos from Multiplying and Wear Protective Clothing

Draining standing water prevents mosquitos from multiplying. The Alachua County Department of Health recommends draining water from:

- Garbage cans,
- House gutters,
- Pool covers,
- Coolers,
- Toys,
- Flowerpots,
- And any other container where there may be standing water.[33]

If there are mosquito problems in a community, citizens may contact their municipality's mosquito control unit or the Florida Department of Health in Alachua County (call 352-334-7930). Additionally, to prevent mosquitos and ticks from biting, the Florida Department of Health recommends:

[33] Ibid footnote 23.

- Applying repellent,
- Walking in the center of trails,
- Wearing long-sleeved shirts and long pants that are tucked into shoes,
- Showering quickly after being outdoors,
- And checking skin, clothes, and pets for ticks[34]

Ask for Help

Those experiencing or know anyone experiencing climate anxiety and other climate-related distress should not hesitate to reach out and ask for help from a professional or use of the County's various mental health services described previously. This applies to those experiencing or knowing someone who is experiencing increased agitation or aggression because of climate change. The Crisis Center provides several services to handle such issues, including the 24/7 Crisis Line (352-264-6789). Other services can be found on the Alachua County Crisis Center Services website.

The Climate Psychology Alliance of North America also provides a directory for climate-aware therapists, including in Alachua County, that can help people address their concerns:

https://www.climatepsychology.us/climate-therapists

[34] Florida Department of Health, "Tick-Borne Disease Prevention"

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5. Land Use and Transportation

Purpose

Increase housing density while conserving undeveloped land and maximizing transportation choices to reduce greenhouse gas emissions and adapt to climate change impacts.

Introduction

Land Use, Transportation, and Climate Change

Both land development and transportation have a substantial impact on the environment and climate. Around "three-quarters of the Earth's land surface has been altered by humans within the last millennium," whether it be for agriculture, residences, or large urban infrastructure.[1] The process of extracting resources and developing the land for human use contributes to a significant amount of GHG emissions. It also removes necessary carbon sinks, which "take in" atmospheric CO_2, decreasing the amount of GHGs in the atmosphere.[2] Conservation of carbon sinks plays a large role in mitigating climate change (see the Natural Resources Chapter for more information).

Transportation is particularly interconnected with land development. Historically, transportation provided access to trade goods, migration, and previously unsettled areas, increasing the demand in those areas for housing, services, commerce, etc. This, combined with other factors, helped create car-dependent societies and urban sprawl. Transportation policy decisions can also contribute to climate change because vehicles emit GHGs. In 2022, transportation made up the largest percentage of GHG emissions in the United States (28%).[3] 57% of transportation emissions came from light-duty vehicles, which everyday people drive.[4]

[1] Winkler et al., "Global land use changes are four times greater than previously estimated," *Nat Commun*, 2021.
[2] United Nations Climate Change, "Land Use, Land-Use Change and Forestry (LULUCF)."
[3] EPA, *Fast Facts on Transportation Greenhouse Gas Emissions*, 2022.
[4] *Ibid* footnote 3.

Land Development and Transportation in Alachua County

While regulated in Alachua County, land development and transportation have had a notable impact on the environment and climate. The combination of an increasing population and more demand for housing and other services has made it difficult to minimize development.

Most developed land is concentrated in central Alachua County (due largely to the University of Florida as a major employment center). Land development is expanding westward, in part because of the favorable conditions, including better stormwater drainage, a relative lack of water bodies and wetlands, and the presence of relatively new water, sewer and transportation infrastructure (Figure 5.1). Most of this land development is for residential and commercial use (e.g., residential housing) and is guided by the Future Land Use Map adopted in the Alachua County Comprehensive Plan 2019-2040.

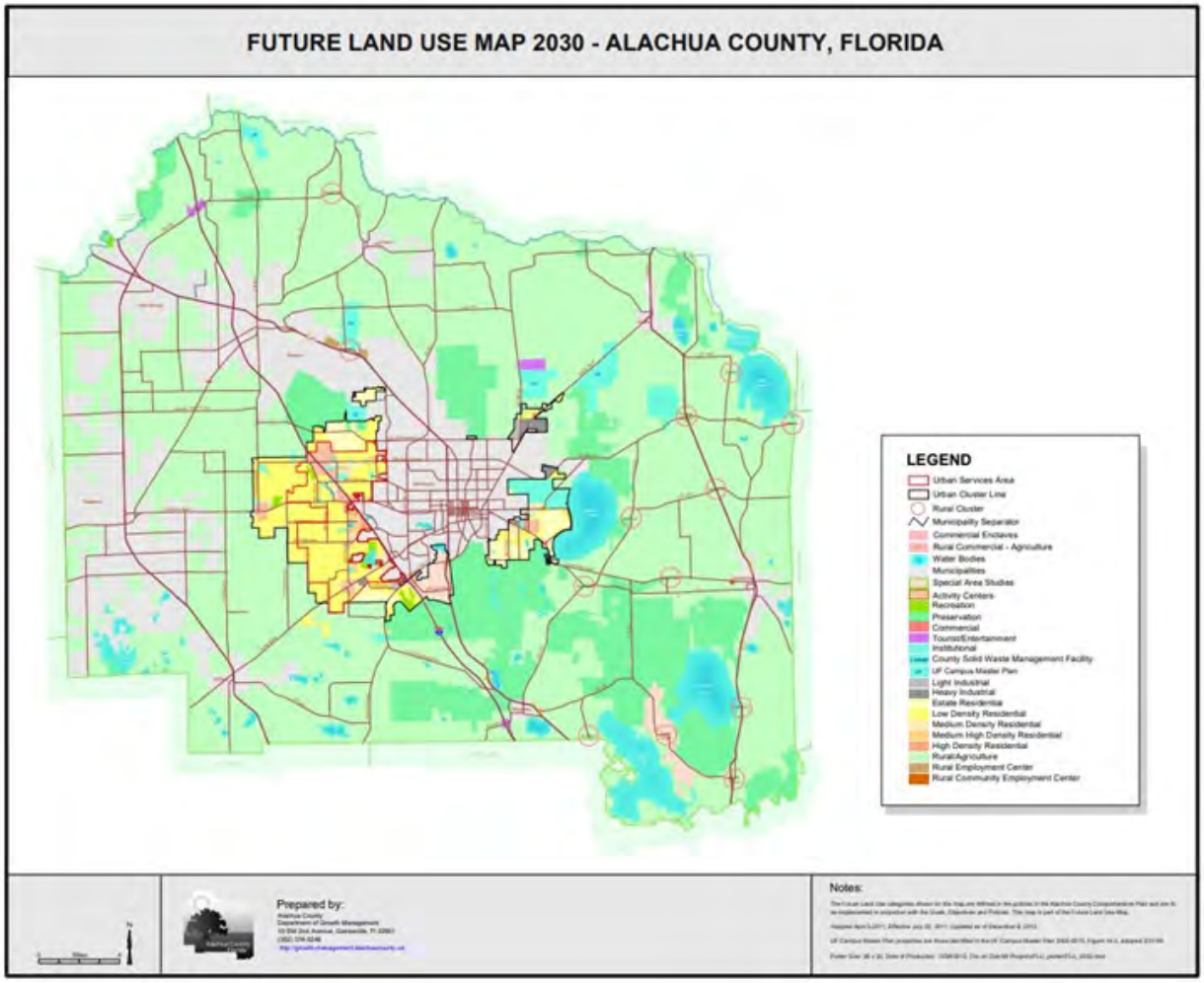

Figure 5.1: Alachua County Future Land Use Map 2030

The Future Land Use Map depicts areas within the unincorporated area of the County which are most appropriate for development as residential, commercial, industrial, agriculture, conservation, and includes other related categories. It includes the Urban Services Line, which maintains a distinction between urban development areas and rural or agricultural areas and limits the extension of urban services into the rural area. The Future Land Use element adopted in the Comprehensive Plan establishes the Principles, Goals, Objectives, and Policies that guide land use and development in the County.

Transportation in Alachua County is also of great concern. The Alachua County Greenhouse Gas Inventory Report found that 39% of total emissions within the County came from the transportation sector, the highest of any sector (including energy) in 2019. Most of these emissions came from private vehicles (cars and trucks), highlighting car dependency in Alachua County.

Alachua County Comprehensive Plan

Land Use and Transportation Policies

Recognizing the importance of the issues described above, the Alachua County Comprehensive Plan directly addresses both land development and transportation management in depth. Principles and objectives of the plan include promoting sustainable land development, establishing efficient and environmentally friendly transportation systems and infrastructure, and protecting natural and historic resources. For the complete language referenced in the Comprehensive Plan, see Appendix B.

Alachua County Mobility Plan

The Mobility Plan is a series of amendments to the Comprehensive Plan that aims to reduce vehicle miles travelled (VMT) and GHG emissions per capita. It provides for enhanced transportation mobility options, land use changes that bring services closer to residents, and development densities that are transit supportive.

Some key features of the plan include:

- **Traditional neighborhood developments (TND)** allow residents to walk and bike to a village center containing a mixture of commercial, residential, office and civic uses.
- **Transit-oriented developments (TOD)** contain a mix of uses and provide a higher density focal point for transit. They also will be the location of park and ride lots to serve residents in outlying areas.

- **Bicycle and pedestrian connectivity** include a connected bicycle and pedestrian network with new on-road bicycle lanes and off-road multi-use paths (Figure 5.2). These facilities will connect existing and future residential development to TODs, TNDs and Activity Centers.

For more information, please see the Alachua County website and Appendix B.

Past and Current Efforts

Bicycle/Pedestrian and Future Roadway Network

In line with the Comprehensive and Mobility Plan, the County is expanding bicycle and pedestrian roadways (Figure 5.2). This includes paved multi-use trails, and methods of providing bicycling facilities in combination with roadway maintenance or improvement projects.

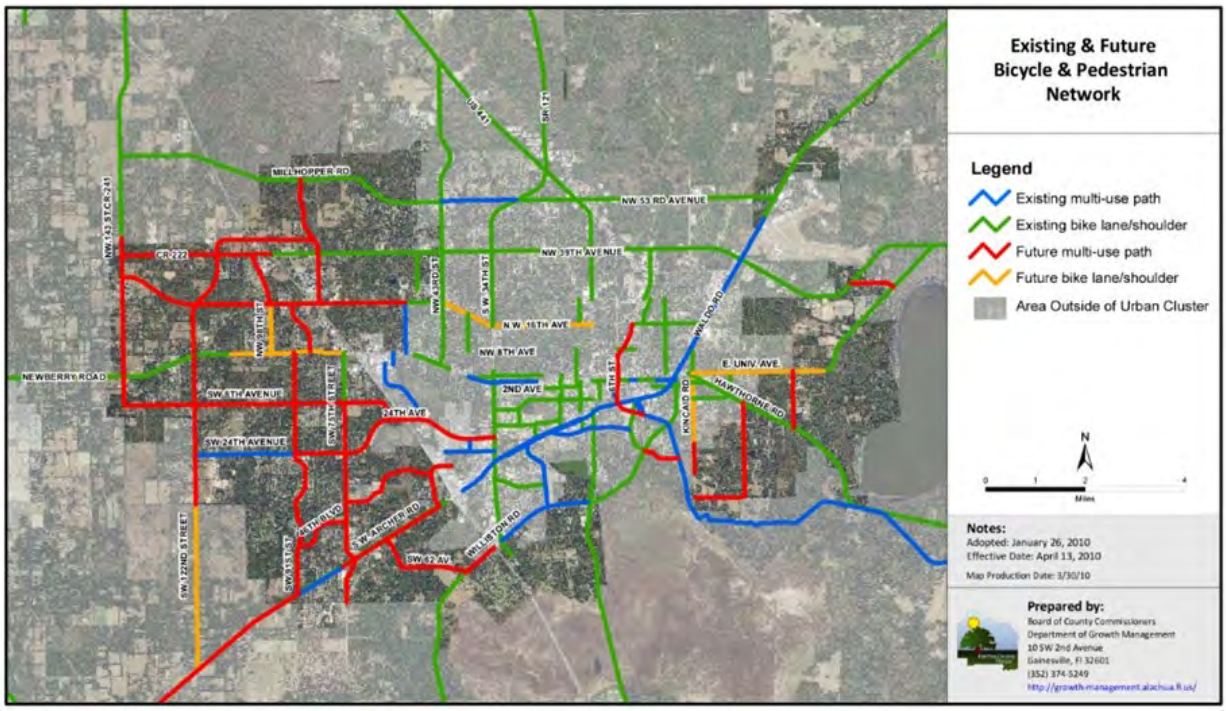

Figure 5.2 Alachua County Bike/Pedestrian Existing and Future Network

Greenways, Blueways, and Strategic Ecosystems

Greenways typically refer to undeveloped land used for recreation and/or conservation with a trail system and are near an urban area, Blueways are paddling routes or trails within lakes, rivers, and

streams. Alachua County's greenways and blueways are shown in Figure 5.3. Both systems were adopted as part of the 2019 update of the Comprehensive Plan, with the goal of identifying key corridors for investment. Some may be funded with State or Federal dollars. They are also included in Mobility Fee Update (included in Capital Infrastructure Projects in fall 2025).

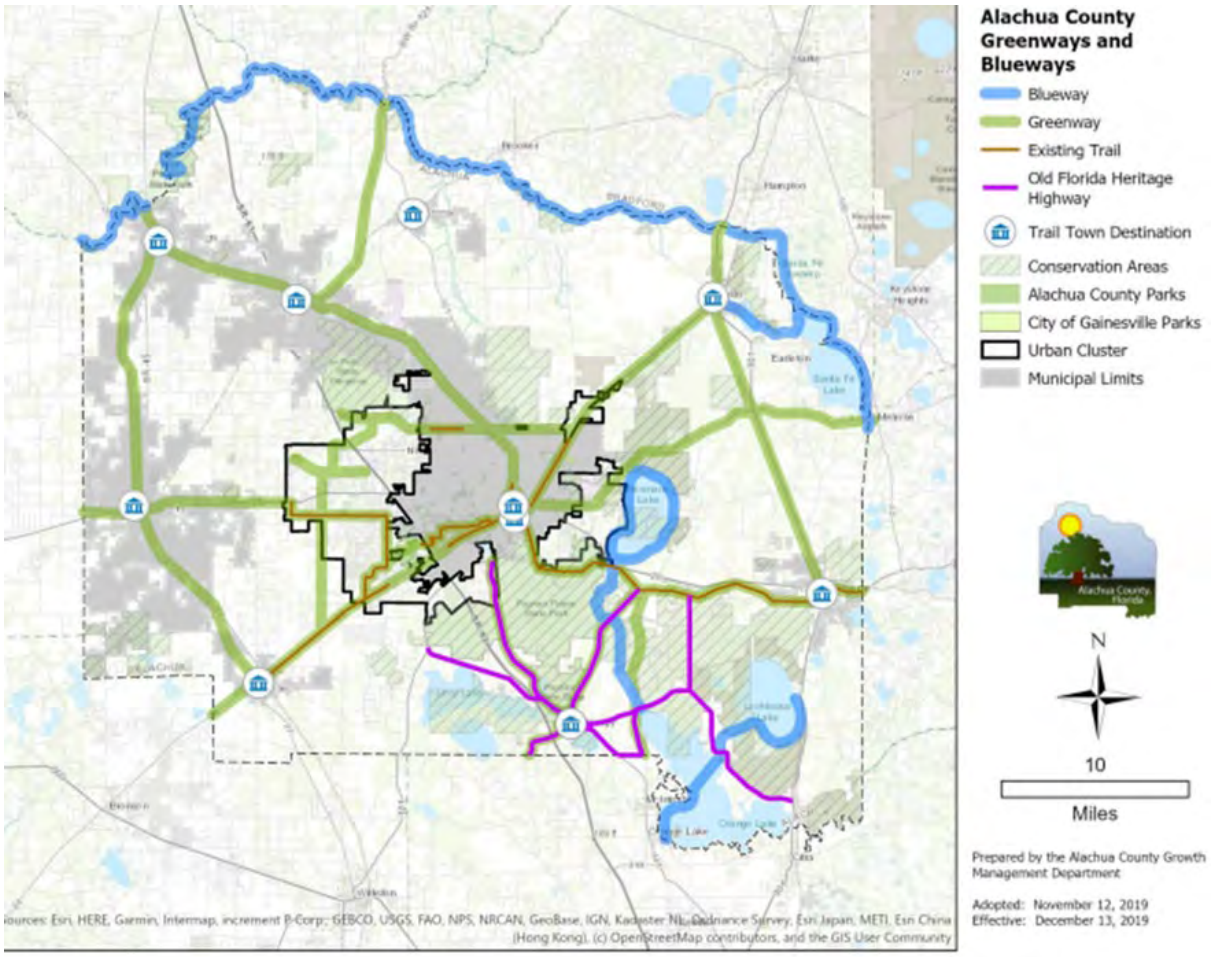

Figure 5.3. Alachua County Greenways and Blueways

Program Highlight

Pine Hills Forest Special Area Study

The Pine Hills Forest Strategic Ecosystem is one of the largest areas within the Urban Cluster that is identified as having outstanding examples of natural resources. Much of the approximately 1,200-acre planning area is designated in the County's Comprehensive Plan as a "Strategic Ecosystem," a designation which applies to the most significant contiguous natural resource areas

in Alachua County that remain in private ownership. The County's Comprehensive Plan calls for the County to conduct special area studies and plans for such areas to ensure that the natural resources of these ecosystems are protected while also recognizing existing property rights and future development expectations of landowners.

The Pine Hills Forest Special Area Study is intended to bring together landowners, neighbors and stakeholders, and local government representatives to collaboratively and proactively consider and evaluate the possible future land use and development scenarios for the area. The Special Area Study will identify natural resources within the Planning Area that are required to be protected in accordance with the County's Comprehensive Plan policies for Strategic Ecosystems and identify and plan for infrastructure needed to serve the Planning Area, such as roads, water, sewer, and stormwater facilities. Developing a collaborative vision for the community's needs will help ensure the goals are met, including natural resource protection, dense development patterns, multi-modal transportation network, reduction of greenhouse gas emissions, and minimization of flood risk.

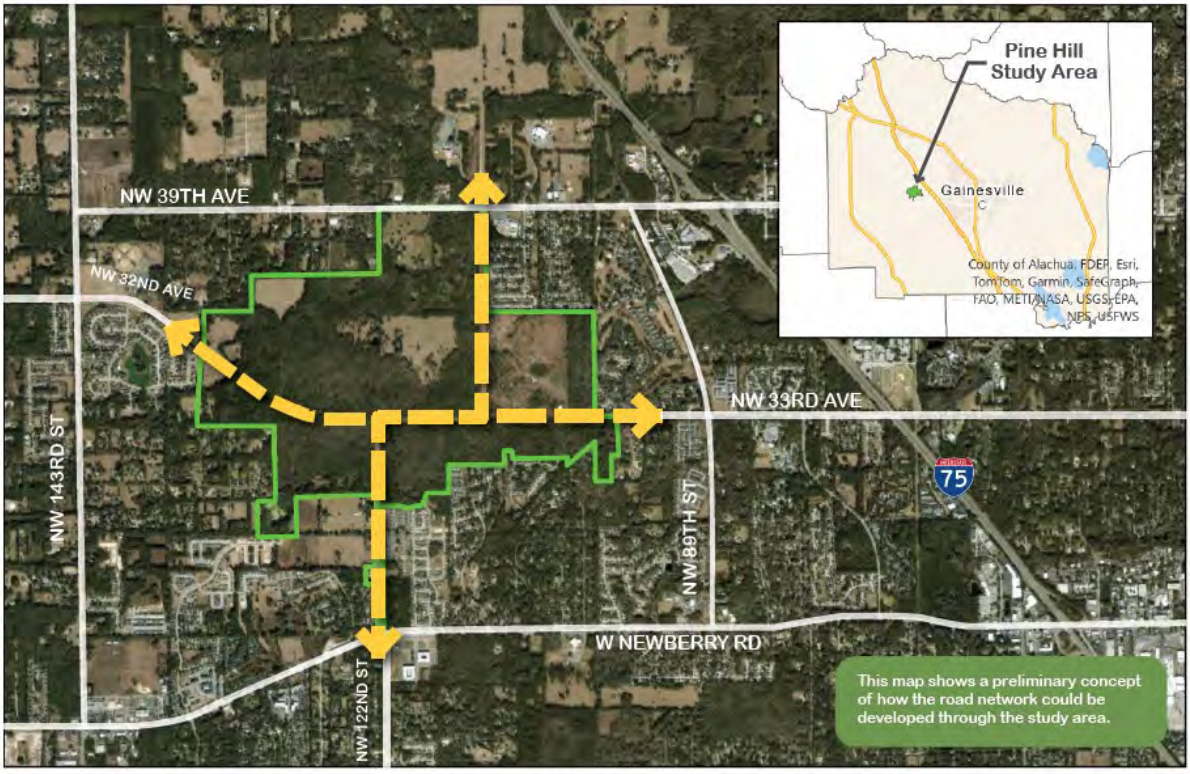

Figure 5.4: Preliminary Pine Hill Road Network Concept

Strategies and Action Items

Goal 5.1 – Acquiring Metrics

STRATEGY 5.1.1 *– Acquire metrics for developing timelines and targets for all strategies and action items within the Land Development and Transportation Chapter.*

The 2022 Greehhouse Gas Inventory includes transportation data for the County's government vehicle and equipment fleet and employee commute. However, as shown in Table 5.3, there are many transportation sectors that are not captured in the Greenhouse Gas Inventory. The Introduction Chapter of the CAP explains that many chapters are missing specified data sources, but acquiring these metrics will allow staff to develop specific targets. For instance, targets could set for achieving a 100% EV fleet by 20XX, which interim goals for 25%, 50%, and 75% by 20XX.

Table 5.1 Action Items for Acquiring Land Development and Transportation Metrics (Strategy 5.1.1)

Action Items	Jurisdiction	Pros	Cons	Status
Acquire necessary metrics (VMT, transit ridership, aviation, mode share, etc.) to develop more concrete strategies and action items for future versions of the CAP.	Alachua County	Quantitative data to measure progress	Costly, lengthy process.	Emerging.

Activity/Source	Data Source	Data Gaps/Assumptions/Notes
Communitywide		
Vehicle Miles Travelled	Google Environmental Insights Explorer	• VMT provided from Google EIE[13] represents all on-road private vehicles • Data does not include Gainesville Regional Transit System activity
Transit Ridership	Gainesville Regional Transit System	N/A
Aviation	Gainesville Regional Airport	GRA provided consumption but could not provide travel bounds
Off-Road	EPA National Emissions Inventory	The NEI does not provide N2O emissions for Off-Road
Freight Rail	Eastern Regional Technical Advisory Committee	N/A
Local Government Operations		
Government Vehicle And Equipment Fleet	Department of Public Works	• 21 vehicles had hours tracked, rather than mileage • Mileage for the 21 vehicles was estimated based on an average Miles Per Gallon
Employee Commute	382 Alachua County Employees	To collect Employee Commute data, Alachua County staff were surveyed to determine their commute mileage, vehicle type and fuel type. A 31.8% response rate was achieved for the survey and the mileage collected from the 31.8% of employees was extrapolated to estimate commute emissions for all 1,200 employees.

Table 5.2: Transportation Data Sources for 2019 GHG Inventory (ICLEI)

Goal 5.2 – Sustainable Future Land Development

STRATEGY 5.2.1 – Increase sustainable land development practices.

While land development is inevitable in a growing Alachua County, several policies, measures, and actions can be taken to do it in a sustainable and smart fashion. Maintaining land use development within the urban cluster boundary, or the geographical boundary for an urban area, can limit sprawl and increase density. Greater density within the urban cluster boundary spreads

the cost of infrastructure (water, sewer, roads, etc.) over a greater number of units or parcels, thus lowering cost per unit.

Table 5.3 Action Items for Sustainable Land Development (Strategy 5.2.1)				
Action Items	**Jurisdiction**	**Pros**	**Cons**	**Status**
Maintain urban cluster boundary	Alachua County	Increase density, reduce travel distances, increase affordable housing	Market pressure to expand urban cluster	Ongoing.
Incentivize higher residential densities	Alachua County	Efficient use of land & infrastructure, increased revenue	Market conflicts	Emerging.
Ensure development approval timed to supporting urban services (water, sewer, roads, transit, schools, etc.)	Alachua County, GRU, ACPS	Higher density, efficient provision of infrastructure, public health and safety	Conflicts between public benefit and private profit	Ongoing.
Encourage infill development and mixed-use redevelopment	Alachua County	Community revitalization, increased revenue, serve community needs	Greater development expense for demolition, infrastructure upgrades	Ongoing.
Create compact, connected neighborhoods with limited mixed uses at centers, and interconnected, mixed modal streets with pedestrian, bicycle, and transit friendly areas	Alachua County	Increase density, increase mobility choices, reduce travel distances, increase access to goods and services,	Higher design and construction costs, environmental protection may affect design and density, public perception and acceptance	Ongoing.

Integrate civic, institutional, and commercial activity in neighborhoods and districts	Alachua County	Efficient use of land & infrastructure, reduce travel distance, increase access to goods and services	Higher design and construction costs, limited demand, public perception and acceptance	Ongoing.
Diversify mix of land uses, housing types and densities	Alachua County	Increase density, greater choice in housing types, location, and design, greater mobility options	Higher design and construction costs for new and redevelopment sites, public perception and acceptance	Ongoing.

Goal 5.3 – Transportation Mobility Districts

STRATEGY 5.3.1– Implement and expand Transportation Mobility Districts in Alachua County.

Urban Transportation Mobility Districts encourage future land use and transportation patterns that emphasize mixed-use and interconnected developments, promote walking and biking, reduce vehicle miles of travel and per capita GHG emissions, and provide the densities and intensities needed to support transit and affordable housing. Creating a connectivity index can address connectivity for bicycles, pedestrians, and motor vehicles (See also, Comprehensive Plan, TME, Policy 1.1.6.1(c)).

There is also a need to address car dependency in rural areas, which lack the most interconnectedness due to physical distance and lack of resources. To protect and support agricultural activities, preserve the character of rural communities, and encourage development in areas where infrastructure can be provided in a financially feasible manner, the unincorporated area outside the Urban Cluster as identified in the Comprehensive Plan can be established as Rural Transportation Mobility Districts. Developments within Rural Transportation Mobility Districts are required to mitigate impacts on roadways within the Rural and Urban Transportation Mobility Districts as established in the adopted Mobility Fee.

Table 5.4 Action Items for Expanding Transportation Mobility Districts (Strategy 5.3.1)

Action Items	Jurisdiction	Pros	Cons	Status

Develop a connectivity index standard to ensure adequate internal connections as well as connections to adjacent and nearby uses.	Alachua County	Increased connectivity	None.	In development.
Re-evaluate density standards to better suit transit-supportive density and intensity to expand transit-supportive availability and incentivize providing density within short distance of bus rapid transit and Express Transit corridors.	Alachua County	Increased connectivity; increased access to transit	None.	Ongoing.
Re-evaluate adopted parking requirements with goals of reducing minimums and, where appropriate, eliminating off-street parking lots.	Alachua County	Less development of land for parking space	Potential pushback from community and other stakeholders	Not started

Goal 5.4 – Electric Vehicle Infrastructure

STRATEGY 5.4.1 – Increase the use of electric vehicles and supporting infrastructure.

The growth in popularity and use of electric vehicles presents an opportunity for the County to decrease GHGs from the transportation sector. Due to the relative novelty of electric vehicles, however, the County still needs to develop plans and policies to ensure that services and infrastructure are available. This can include a Fleet Electrification Plan, which should have an ultimate goal of 100% EVs, interim goals, and potential funding mechanisms (grants, public/private partnerships). A Vehicle Charging Infrastructure Plan would also be a next step towards regularizing EVs, with an ultimate goal for charging infrastructure (e.g., # of Level 2 and 3 chargers; level of service/area metrics, countywide coverage, and coverage by 'vulnerability focus areas'), interim goals, and potential funding mechanisms.

Table 5.5 Action Items for Increasing Electric Vehicles and Supporting Infrastructure (Strategy 5.4.1)				
Action Items	**Jurisdiction**	**Pros**	**Cons**	**Status**
Develop a Fleet Electrification Plan for Alachua County.	Alachua County	Progress towards electrifying Alachua County fleet; lower GHG emissions from transportation	Cost	Not started
Develop an EV charging infrastructure plan for Alachua County.	Alachua County	Progress towards advancing EV infrastructure in Alachua County; increase accessibility/viability of EVs	Cost	Not started
Implement ordinance requiring new and leased municipal vehicles to meet minimum efficiency standards.	Alachua County	Lower GHG emissions from transportation; encourages transition to EVs or hybrids	Cost; potential pushback from municipalities	Not started

Goal 5.5 – Expand Integrated Natural, Historic and Scenic Resources

STRATEGY 5.5.1 – Develop a muti-use, integrated network of routes throughout Alachua County.

From a land use and transportation perspective, integrating routes enhances multi-modal commuting by providing scenic routes that remain true to the County's natural and historic culture. One way to do this is by developing an integrated network of multi-use paths, connecting the natural, historic, and scenic parts of Alachua County. Work has already been started through the development of the Alachua County 2040 Mobility Plan and Mobility Fee.

Table 5.6 Action Items for Integrating Multi-Use Routes (Strategy 5.5.1)				
Action Items	**Jurisdiction**	**Pros**	**Cons**	**Status**

Within the Urban Cluster, integrate Safe Routes to Recreation and Conservation Area projects to support more sustainable transportation modes (walking, biking, transit).	Alachua County	Promotes multi-modal transportation	Cost	Ongoing.
Outside the Urban Cluster, integrate Safe Routes to Recreation and Conservation Area projects where existing or planned multi-use paths are within one mile of an AAA[5] facility (i.e., provide last mile AAA connectivity).	Alachua County	Promotes multi-model transportation; increases interconnectivity in rural areas	Cost	Ongoing.

Goal 5.6 – Bicycle and Pedestrian Transportation

STRATEGY 5.6.1 – Strategically plan bicycle and pedestrian transportation routes.

To encourage multi-modal forms of transportation such as bicycle and pedestrian transportation, there needs to be a well-planned network of routes accessible to the community. The County is currently developing a Countywide Bicycle-Pedestrian Plan to achieve this. The plan will:

- Update current pedestrian practices and policies,
- Close gaps on networks and paths, and
- Provide recommendations for pedestrian-conducive infrastructure.

The Countywide Bicycle-Pedestrian Plan is estimated to be adopted in 2026. For more information, please see the Alachua County Growth Management website: BikePedMasterPlan

Table 5.7 Action Items for Strategically Planning Bicycle-Pedestrian Routes (Strategy 5.6.1)

Action Items	Jurisdiction	Pros	Cons	Status
Develop, Implement, and Maintain policy changes and recommendations in the Countywide Bicycle-Pedestrian Master Plan.	Alachua County	Promotes multi-model transportation, safety and comfort	Cost	Ongoing

[5] All Ages and Abilities transportation facility, such as a sidewalk or shared use path. This principle refers to having a bicycle and pedestrian network that is accessible and comfortable for all users of any age and ability.

STRATEGY 5.6.2 *– Increase bicycle safety for general public.*

Safety is a huge factor in deciding whether to use a car or other forms of transportation. In 2022, there were a total of 127 bicycle crashes in Alachua County, with 124 people injured and 5 people killed.[6] Most crashes (47%) occurred on state and US routes, followed by city streets (36%). Most of these crashes occurred with passenger cars (51%). Increasing the safety of pedestrian-bicycle routes can increase the number of people who decide to use them. Not only should the routes be made safer, but also those who decide to use their bicycle should be well-informed about bicycle safety and signals.

Alachua County was awarded a $262,500 grant from the U.S. Department of Transportation (DOT) to implement the Safe Streets and Roads for All Action Plan in 2023. Since the project began, Alachua County staff have been collecting public feedback, stakeholder meetings, and public workshops. The Safe Streets for All Action Plan is still currently under development. For more information, please see the Alachua County Growth Management website: SS4AActionPlan.

Table 5.8 Action Items for Increasing Bicycle Safety for Citizens (Strategy 5.6.2)

Action Items	Jurisdiction	Pros	Cons	Status
Ensure safety is a main component of the Countywide Bicycle-Pedestrian Master Plan	Alachua County	Increase safety for cyclists and pedestrians; encourages non-car transportation	None.	Ongoing
Continue development, implementation, and receiving community feed for the Alachua County Safe Streets and Roads for All Action Plan.	Alachua County	Increase safety for cyclists and pedestrians	Cost	Ongoing

STRATEGY 5.6.3 *– Increase pedestrian-bicycle safety for students.*

Many students live within walking or biking distance from their school, making it an easy transportation option for them. Establishing specific routes for students can increase safety and allow public school staff to be able to know students' routes, allowing them to ensure they get to

[6] FDOT, "Alachua County 2022 Bicycle Crash Data."

school safely. Additionally, teaching citizens bicycle safety and signals from a young age can lower bicycle crashes in the future.

Table 5.9 Action Items for Increasing pedestrian-bicycle safety for Students (Strategy 5.6.3)

Action Items	Jurisdiction	Pros	Cons	Status
Create a Countywide Safe Routes to School Program.	Alachua County	Promotes multi-modal transportation; increases safety for students commuting	Cost.	Not started.
Coordinate with Alachua County Public Schools and/or the MTPO to hire and fund a Full-time Safe Routes to School Coordinator to plan, implement, and monitor a Countywide Safe Routes to School program.	Alachua County	Promotes multi-modal transportation; increases safety for students commuting	Cost.	Not started.

Goal 5.7 – Develop and Maintain Transit

STRATEGY 5.7.1 *- Assist the providers of mass transit in Alachua County in their planning efforts through coordination, informational support, and participation in planning efforts.*

By improving inter-agency collaboration and access to data, mass transit agencies can more effectively design and implement services that are reliable, convenient, and accessible. Moreover, coordinated planning allows transit systems to better serve the needs of the entire community, particularly low-income and transit-dependent populations who rely on public transportation for access to jobs, education, and healthcare.

By using data to understand travel patterns and service gaps, agencies can promote greater mobility. Participation in regional and local planning efforts also ensures that mass transit is aligned with broader sustainability goals, including compact development, reduced traffic congestion, and long-term climate resilience. This leads to greater public confidence in mass transit, encouraging more residents to choose buses or other shared modes over personal vehicles. This strategy supports a shift away from car-dependent infrastructure toward a more efficient and environmentally responsible transportation system in Alachua County.

Table 5.10 Action Items for Mass Transit (Strategy 5.7.1)				
Action Items	**Jurisdiction**	**Pros**	**Cons**	**Status**
Design and construct dedicated transit lane(s) in conjunction with any new roadway projects consistent with the Rapid Transit Corridors map as well as expanding on existing projects to increase range of network. Dedicated Transit Lane(s) shall connect transit supportive development with regional employment, educational and entertainment centers	Alachua County	Increase transit connection; encourages use of public transportation; increases accessibility and convenience of mass transit	Cost, potential pushback	Ongoing.
Transition from providing new capital infrastructure for a multi-modal transportation network to providing frequent transit service along rapid transit corridors.	Alachua County	Increase transit connection; encourages use of public transportation; increases accessibility and convenience of mass transit	None	Not started.
Identify and implement 'first and last mile' improvements via the Countywide Bicycle/Pedestrian Master Plan.	Alachua County	May help decrease the distance and time between traveler's origins and final stop; may help lower GHG emissions by lowering VMT	None	Ongoing
The County shall coordinate the provision of park and ride facilities with transit supportive developments located along Rapid Transit Corridors consistent with the Capital Improvements	Alachua County	Increase transit connection; encourages use of public transportation; increases accessibility and	None.	Not started.

Element and associated maps		convenience of mass transit		

Goal 5.8 – Rail Transportation

STRATEGY 5.8.1 – Investigate possibility of rail transportation systems in Alachua County.

Rail transportation has been championed as an efficient form of public transportation for decades, but due to lack of resources and technological constraints, passenger rail transportation does not exist in Alachua County. Extensive research must be done to determine whether a rail transportation system could work in Alachua County. To begin the process, feasibility studies should be conducted to determine whether it is technologically possible and cost efficient.

Table 5.11 Action Items for Rail Transportation (Strategy 5.8.1)

Action Items	Jurisdiction	Pros	Cons	Status
The County shall coordinate with the Metropolitan Transportation Planning Organization, FDOT, and other applicable entities to conduct a feasibility study for a regional light rail system.	Alachua County	Obtain a better picture on whether rail is possible in Alachua County	Cost	Not started.
Increase utilization of existing rail infrastructure and promote expansion of network for freight transit within the County	Alachua County	Decrease reliance on truck freight transportation.	Limited existing rail lines and acquisition expense for new right of way	Not started.
Assess feasibility and initiate passenger rail service within the County.	Alachua County	New form of fast, mass transit for residents	Cost, may not be feasible (depending on results of studies)	Not started.

Goal 5.9 – Increase Telecommuting and Remote Work Alternatives

STRATEGY 5.9.1 *- Promote online telecommunication and remote work for Alachua County residents.*

A way to reduce GHGs from transportation is by traveling less. By providing more opportunities for telecommuting and remote work, vehicle parking and VMT can decrease. Making remote work more available to staff lowers emissions from transportation.

Table 5.12 Action Items for Telecommunication and Remote Work (Strategy 5.9.1)

Action Items	Jurisdiction	Pros	Cons	Status
The County shall allow for appropriate staff to participate in remote work and telecommuting to decrease the necessity for daily commute.	Alachua County	Lowers VMT for County staff and GHG emissions from transportation	Loss of in-person communication, connection, and socializing	Ongoing.

Triple Bottom Line

People

Implementing sustainable land development practices increases interconnectivity and density of communities. TOD and mixed-use development bring citizens closer to local businesses, parks, and other services. This can foster more community engagement, citizen participation, and social connection.[7]

Safer, more accessible routes for cyclists and pedestrians can improve citizen health. Through more TOD or mixed-use development practices, citizens can normalize daily physical activity. Increasing activity levels via cycling or walking is associated with lower risk of cardiovascular diseases and diabetes. Some studies also found that substituting daily car rides with cycling and walking can improve mental health by lowering stress and increasing perceived quality of life.[8] Additionally, less cars on the road means less traffic-related pollution (e.g., nitrogen oxides, carbon monoxide, particulate matter, and more), which is known to increase risk of respiratory illnesses, lung cancer, and heart diseases.[9]

[7] Zamorano and Kulpa, "People-Oriented Cities: Mixed-Use Development Creates Social and Economic Benefits," *World Resources Institute*, 2014.
[8] Logan et al., "Benefits, risks, barriers, and facilitators to cycling: a narrative review," *Front Sports Act Living*, 2023.
[9] Miner et al., "Car harm: A global review of automobility's harm to people and the environment," *Journal of Transport Geography*, 2024.

Profit

Sustainable construction and land development practices can lead to cost savings in various ways. Transitioning to cycling or walking as a method of transportation can save citizens money on gas by using their car less. This is especially the case if routes allow access from a citizen's home to their job. In general, compact land use patterns result in cost savings because less money is spent on infrastructure to support the end user. Further, compact land uses have the potential to generate higher revenues for lower costs. This is illustrated when comparing Haile Plantation to Celebration Pointe in the table below. Each development has the same number of dwelling units but Celebration Pointe's compact design results in fewer road miles and total acres of land developed.

Development	Haile Plantation	Celebration Pointe
Acres	1,628	154 (w/out CMA) 246.99 (w/CMA)
Miles of Road	37	3
Linear ft. of road/Unit	72.73	7.04
Residential Units	2,686	2,500
Residential Density	1.65 DU / ACRE	16 DU / ACRE (Net) 10 DU/ACRE (w/CMA)
Non-Residential	280,000	1,500,000
Non-Residential Density Intensity	104 SF / DU	600 SF / DU
Hotels	0	2 hotels/265 units

Table 5.13: Haile Plantation and Celebration Pointe Density Data

The land use patterns above result in drastically different fiscal outcomes for the County as shown in the tables below.

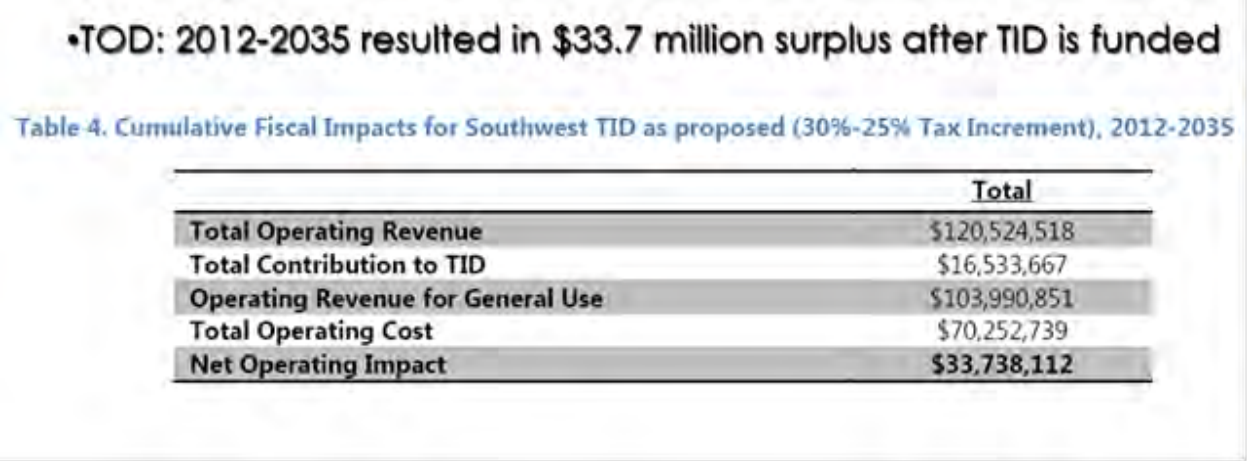

Table 5.14: Cumulative Fiscal Impacts for Southwest TID as proposed (30%-25% Tax Increment), 2012-2035[10]

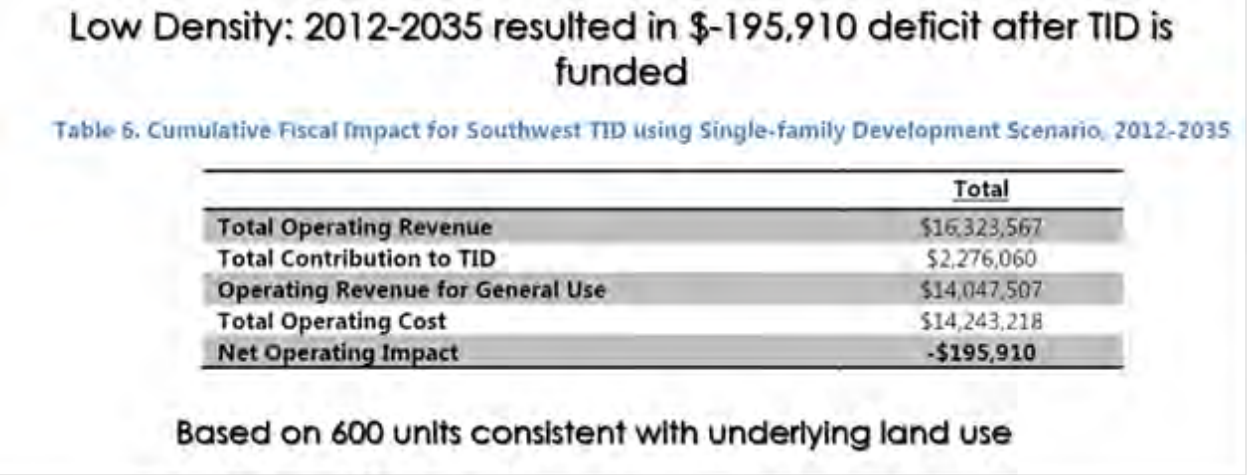

Table 5.15: Cumulative Fiscal Impacts for Southwest TID using Single-Family Development Scenario, 2012-2035[11]

Dense development appears less green at the site level but overall helps save productive rural and agricultural land that might otherwise be developed and creates productive places within the land the County has identified for urban development.

[10] Hay et al., *Policy Review of TND and TODs*, Presentation, 2024.
[11] *Ibid* footnote 10.

Planet

Sustainable land development practices prioritize minimizing the amount of land required to accommodate people and the built environment footprint while protecting natural ecosystems. This complements and supports land conservation efforts made by the County, ensuring that development works with nature rather than against it (see the Natural Resources Chapter for more information on the County's conservation efforts). Mixed-use development is particularly efficient for providing pedestrian and multi-mode transit options as alternatives to travel by private vehicles.

As stated previously, transportation produces the most GHG emissions compared to any other sector in Alachua County (39% in 2019). By providing alternatives to fossil-fuel powered vehicles such as passenger cars, the County can lower GHG emissions from transportation.

Community Engagement

Encourage That New Development Occur in a Manner That Expands or Protects Availability and Access to Land and Water for Hunting, Fishing, Hiking and Other Beneficial Uses

Alachua County has a wealth of environmental resources enjoyed by thousands of people. To protect and expand these resources for County residents and visitors, new land use patterns must occur. Continued expansion of low-density development is wasteful to our natural resources and costly to County residents. Efficient and affordable development must occur. One way to make this happen is through increased density and compact development patterns.

Use Public Transportation, Bike, or Walk

One of the most effective ways to lower one's carbon footprint and the amount of GHGs emitted from transportation is by changing one's method of transportation. A great option is to make use of Gainesville Regional Transit System's (RTS) fleet of buses. The GNV RideRTS app provides information on the location of bus stops and tracks buses in real time. Ridesharing or carpooling is another way to minimize the amount of passenger cars on the road.

Another option is to bike, walk, or even skate when traveling short distances. Electric bikes and scooters are less physically demanding and faster options. Many of Alachua County's multi-use trails and bike lanes connect to urban clusters for easier access to stores, restaurants and jobs. However, it is important to acknowledge that many places in Alachua County are not pedestrian or bike-friendly, giving people limited options to travel without a private vehicle. The County is currently working towards more interconnected multi-use roadways to facilitate easier access to modes of transportation other than private vehicles.

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6. Natural Resources and Conservation

Purpose

Protect, restore and properly manage natural areas, trees and landscapes, and conservation lands in Alachua County while enhancing their resilience and improving their capacity to support climate adaptation and carbon sequestration.

Introduction

Natural Resources and Climate Change

Climate change and natural resources are interconnected and interdependent. Climate change can negatively impact natural resources, while the depletion or degradation of natural resources can further intensify climate change's impacts. It impacts wildlife, plant and animal communities, and natural cycles by introducing shocks such as extreme heat and weather events that disrupt natural processes. As natural resources like carbon sinks deteriorate, there are less opportunities to mitigate climate change by sequestering GHGs from the atmosphere.

This interconnected relationship highlights the importance of conservation and proper management of natural resources in buffering and protecting ecosystems and local communities from the worst effects of a changing climate. Appropriately managed, forests, wetlands, and prairies are effective at lowering temperatures, increasing carbon sequestration, and improving water quality. Nature-based solutions can tackle both climate mitigation and adaptation. Because they do not require intensive infrastructure, nature-based solutions are an economically effective and technically feasible option for local governments such as Alachua County.

Natural Resources in Alachua County

North Central Florida is home to bountiful natural resources, including springs, forests, wetlands and prairies. Alachua County has a long history of valuing and protecting resources that are essential to ensuring a healthy ecosystem for future generations.

Currently, the main threats to our County's natural resources are habitat loss, unsustainable development practices, pollution and invasive species. Climate change, however, also poses a worsening threat to our ecosystems, as shown in the County's Vulnerability Assessment. The risk of damaging wildfires is projected to increase, particularly around the Wildland-Urban Interface and within natural areas such as forested wetlands, pine flatwoods, and pine plantations. As

temperatures increase and droughts become more extreme, water resources, including surface waters and the aquifer, are projected to decline in water quality and available quantity. Meanwhile, more extreme rainfall events may cause new and additional areas to flood. A changing climate is thus expected to negatively affect local biodiversity by inflicting extreme weather events organisms may not be able to recover from. Alachua County has a duty to protect its communities and natural resources from the impacts of climate change through strategically planned development and land preservation and conservation.

Natural Resources and Community Resilience

Natural resource strategies and solutions are critical elements of building community resiliency to the changing climate. As mentioned in previous sections, climate change impacts communities disproportionately depending on geographic location and available resources. One such way is through urban heat islands (UHI). A UHI is a phenomenon where cities are significantly warmer than rural areas. The difference in heat is a result of clearing natural areas and removing trees and plants that provide shade and cooling, as well as replacing natural soils and turf with artificial surfaces that absorb heat.[1] According to the Massachusetts Institute of Technology, UHIs can cause cities "to be 1-7°F warmer during the daytime"[2] (see the Heat and Health Chapter on UHIs' impacts on health and who is most affected, and the Land Development and Transportation Chapter for further strategies on climate-smart development patterns).

To achieve successful community support and longevity, land conservation must be done with respect for those who live in conservation focus areas and manage the land. Strong conservation practices should respect local voices and create broader partnerships that can ensure long-term success.

Another consideration is the fact that the County's natural resources are often not accessible to all community members. Those with limited mobility, for instance, are not able to easily access the resources provided by the County in our parks or preserves. It is imperative that these spaces are designed with these community members in mind whenever possible.

Alachua County Comprehensive Plan

The Conservation and Open Space Element of the Alachua County Comprehensive Plan emphasizes the urgent need to preserve our natural resources in protection of human health and natural resource integrity. This protection of wetlands, floodplains, uplands, and other natural resources within the County are key to supporting the climate resiliency of the County and are

[1] "Urban Heat Islands." *MIT Climate Portal*. 2021.

[2] Ibid footnote 1

important tools to address aspects of climate vulnerability identified in the County's Climate Vulnerability Analysis. See Appendix B for a full list of objectives and policies referenced by the CAP.

Past and Current Efforts

Alachua County Forever

Conservation of natural and working lands is the most effective nature-based solution available at a broad scale in the County's climate resiliency strategies. This critical strategy can help lower GHGs while improving community response to climate-driven hazards. Natural lands, particularly forests, wetlands, and grasslands, allow trees, plants, and soils to act as carbon reservoirs, reducing the release of GHGs and capturing GHGs already in the atmosphere. These lands also support community resilience to climate change, improving water and air quality, preserving biodiversity, and reducing inland flooding while protecting essential water supplies that communities depend upon.

Alachua County Forever (ACF), the County's land conservation program, has successfully protected over 36,000 acres of environmentally significant lands in the County, since the program's establishment in 2000. These lands are protected through fee-simple acquisition of lands from willing landowners, and through establishment of conservation easements which protect privately-owned lands from future development in perpetuity and protect the most significant environmental resources on-site in partnership with willing landowners. Land acquired fee-simple are managed as nature preserves, while conservation easements allow landowners to retain rights for use and management of their properties, with annual monitoring of ecological value protection conducted by County staff.

The ACF program mission is to acquire, improve, and manage environmentally significant lands that protect water resources, wildlife habitats, and natural areas suitable for resource–based recreation. This is implemented by County staff working with citizens, conservation partners, and willing landowners. To prioritize protection of the most ecologically significant lands, geographic "ACF project areas" have been identified within the County. Three priority corridors were named in 2023, integrating the County's land conservation with regional and state-level conservation efforts.

In 2023, the Board of County Commissioners identified the "30x30" initiative as the minimum guiding target for the ACF program. The "30x30", or America the Beautiful Initiative is a national goal to conserve at least 30 percent of U.S. lands, freshwater and U.S. ocean areas by 2030. Locally led conservation efforts are critical to accomplishment of this goal.

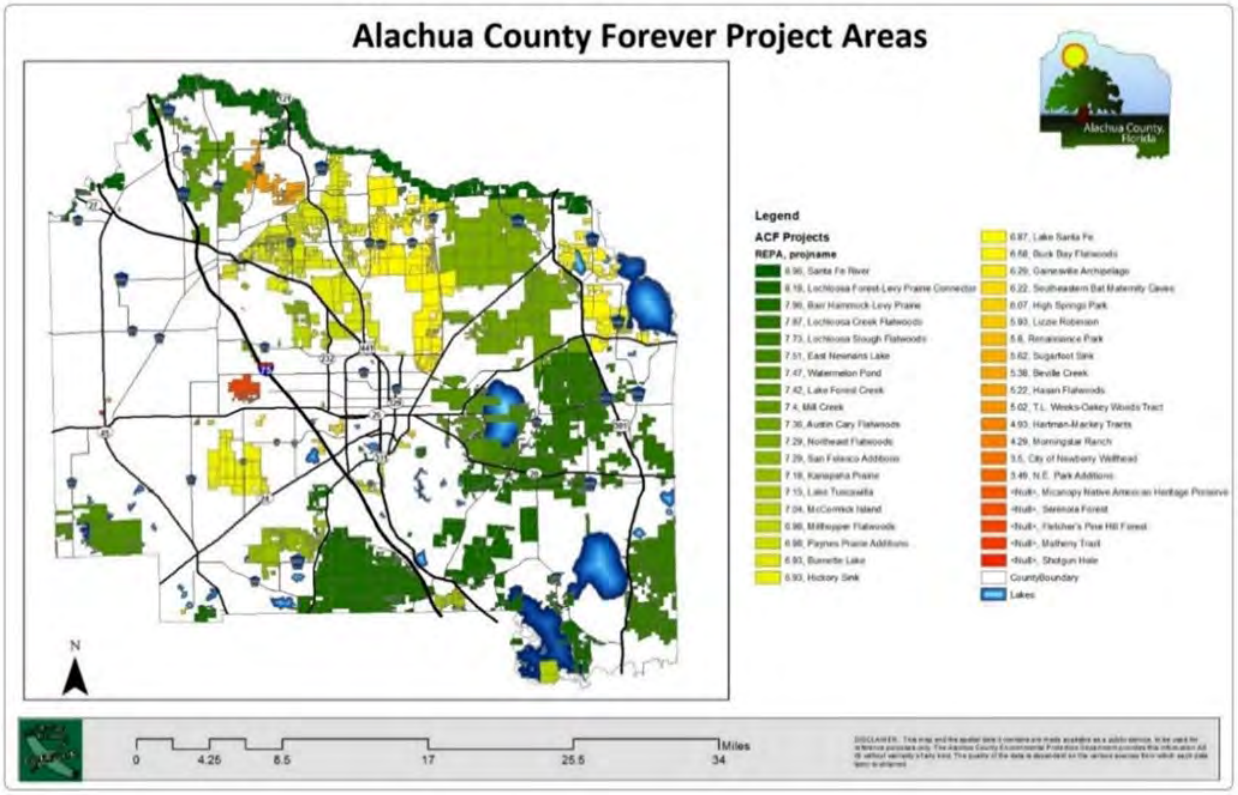

Figure 6.1. Alachua County Forever Project Area Map

Wild Spaces and Public Places

The ACF program is funded by the voter-approved Wild Spaces and Public Places surtax. Since 1998, the voters in Alachua County have passed referenda on four separate ballots (1998, 2008, 2016, and 2022) to support protection of environmentally significant lands and water resources, and to expand recreational opportunities in the County. In November 2022, the Wild Spaces Public Places referendum was re-authorized by Alachua County voters for a ten-year period. With this most recent referendum, from 2023 through 2032, a 0.5% sales tax will be directed towards acquiring and maintaining conservation lands, wildlife habitat, and green spaces such as parks, and improving park recreational infrastructure. Funds dispersed to the nine municipalities are primarily used for recreational park improvements and other built public infrastructure, while County funds prioritize protection of environmentally significant lands while also supporting recreational park improvements.

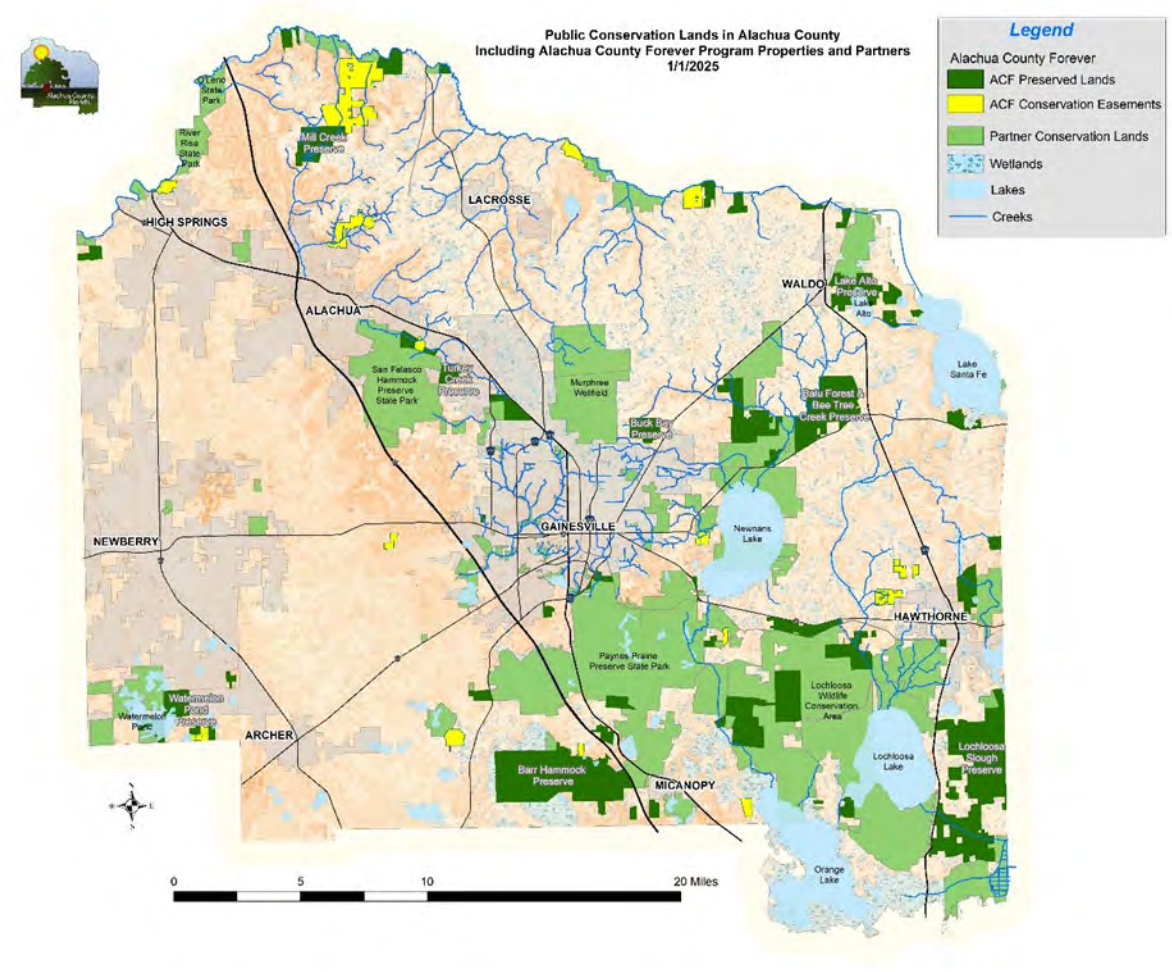

Figure 6.2 Alachua County Conservation Lands with Properties Acquired through the Alachua County Forever Program and Wild Spaces and Public Places Surtax Funding

Unified Land Development Code

Given the impact land development can have on habitat loss and resource use, Alachua County has implemented several Land Development Codes to protect its natural resources. Since 1993, for example, the County implemented strict protections for wetland and wetland buffers with minimal exceptions. In 2005, upland habitat protections were added, requiring conservation resources outside of wetlands to be protected, including significant habitat, listed species habitat, strategic ecosystems, and significant geologic features. For high quality ecosystems, or areas of significant habitat, up to 25% of uplands on a property proposed for development may be required to be set-aside as a conservation area. For strategic ecosystems, which represent large corridors of high-quality habitat and waterways, up to 50% may be set-aside. Setting aside exceptional upland habitat further protects our water resources as well as wildlife habitat and loss of plant diversity.

Alachua County has some of the most stringent buffer requirements and upland habitat protections in the state, putting residents in a better position to cope with climate change impacts like flooding

and extreme heat. Other parts of the code protect a variety of other green spaces, such as the Open Space Code, which provides protections for open spaces such as community gardens, community fields, greens, or pocket parks. These spaces are not only essential for conservation and wildlife habitat, but they also allow us to build a stronger community by having natural areas where people can gather, traverse, exercise, and play. To protect the natural habitat value of these green spaces, the Code requires removal and management of invasive exotic species on all new developments.

The Unified Land Development Code also implemented two Special Area Studies (SAS); one in the community of Cross Creek and the other in the Idylwild/Serenola community. The intent of the special area studies is to provide specific policies, standards, and guidelines that address significant cultural, historic, and environmental resources and characteristics of unique communities within Alachua County. SAS contain some of the most stringent protections for natural resources in the County. For example, in the Cross Creek SAS, building impact areas are limited to 0.5 - 1 acre for properties located within certain mapped resource protection zones. In the Idylwild/Serenola SAS, all developments must be designed so as to retain at least 40% of the initial canopy.

Tree Protection

Trees are undeniably valuable assets for both the environment and the community. They offer a wide array of benefits that increase over time, including shade, oxygen, and habitat for wildlife. As trees mature, their shade can cool urban temperatures by as much as 10 degrees compared to areas without trees and their capacity to sequester carbon further amplifies. Additionally, they protect people from harmful ultraviolet radiation while filtering air pollutants, reduce energy costs, and enhance property values which further amplifies their positive impact on the lived environment.

The purpose of the Tree Protection Code is to advance these aesthetic, economic, environmental, and social contributions through preserving existing canopy and the creation of tree resources where there is a deficit. In the interest to promote the public health, safety and general welfare; enhance the beauty of Alachua County, and to complement zoning, subdivision and land use ordinances, it is imperative to establish standards and improve measures to preserve trees.

The Tree Protection Code implements policies to preserve, protect, and enhance the quality and quantity of the County's tree canopy while also balancing development and improvement of property. In 2025, Tree Code update provided a variety of additional protections and incentives for tree retention:

- Strengthened protection of high quality 45" Diameter at Breast Height (DBH) trees by defining them as “landmark live oaks”
- Codified definitions to clarify tree protection zones versus dripline
- Codified the tree rating system for tree evaluations and associated mitigation

- Provided incentives for developers some allowable impacts around trees with the intention of integrating mature trees on developed sites as opposed to removing and replanting.
- Reorganized code enforcement procedures for tree removal violations

Tree Planting Program

Trees are essential to many ecosystems and landscapes. Trees clean and cool air through transpiration and filtration, insulate buildings, calm traffic, and provide homes for wildlife and sanctuaries from the heat of summer and many other values. This is why the County not only protects trees, but plants them as well. In 2018, the Board of County Commissioners established the County Tree Planting Program goal "to offset canopy loss and establish high value trees on County owned rights-of-way, developed County properties, and properties directly influencing the general public," and identified two project priorities:

- **FIRST PRIORITY** – Trees to be planted on road segments where traffic calming is most needed and multimodal transportation choices are most likely to be utilized such as approaches to schools, commercial centers, employment centers and service centers including libraries, parks, churches and community centers.
- **SECOND PRIORITY** – Trees to be planted in locations that facilitate shade and buffering for pedestrians, cyclists, buildings, parking lots, and recreational centers.

The County Arborist prepares an Annual Tree Planting Work Plan identifying and prioritizing new tree planting sites for the year in accordance with those priorities. Since then, 1,630 trees have been planted with a 91% survival rate over the past seven years. The County has also established a Tree Sponsorship program through which private "sponsor" landowners agree to allow the County to plant and establish high quality shade trees, appropriate for site conditions near public rights-of-ways, public spaces, and on properties influencing the public sphere. Ideal tree sponsorship locations include properties adjacent to sidewalks or paths, parking lots of community buildings like churches or businesses, and other areas that contribute to UHIs within the County. offer excellent opportunities for new trees.

In addition, annual wildflower seeding in County rights-of-way provides more spaces for pollinators, plant diversity, and reduces resources to mow or water needed that would be used for sod. Participating in tree planting events is a great way to volunteer toward helping improve tree canopy in Alachua County. In 2025 alone, volunteers dedicated over 700 hours last year to plant trees in the County. Protection of Karst Sensitive Areas

The Unified Land Development Code sets forth protection measures for significant geologic features and karst topography, such as retention of these features and their buffers in their natural condition. Climate influences natural ecosystems in a variety of complex ways, for example warming may force species to seek out cooler areas for survival. Fine-scale topographic complexity creates important microclimates that can facilitate species to grow outside their main distributional range and increase biodiversity locally. Additionally, karst features provide a variety

of microclimatic habitats that may facilitate the persistence of organisms with diverse environmental preferences. Research indicates karst features may provide potential safe havens for multiple plants and fungi under local and global climate oscillations.[3] Locally, most sinkholes promote a moist climate that is moderated from temperature extremes. Protecting the features that provide such microclimates could improve resilience for animal communities in the face of ecosystem migration resulting from climate influences.

Other stressors such as land development, combined with climate change, can lead to more drastic cumulative effects. The County's Comprehensive Plan requires strategies that, "Protect and conserve the quality and quantity of groundwater and springs resources to ensure long-term public health and safety, potable water supplies from surficial, intermediate, and Floridan aquifers, adequate flow to springs, and the ecological integrity of natural resources." In unincorporated areas, the Alachua County Development Review Process also has mechanisms to address the type of development surrounding geologic features.

On the other hand, while the Countywide Natural Resources Protection Code provides some protection of significant geologic features within the municipalities through avoidance and minimization of impacts, it does not currently consider the larger development patterns surrounding those features since it is not a land development code. Alachua County will continue to work with local municipalities to strengthen their comprehensive plans to match the County's protection strategies.

Landscaping Code

Current landscaping methods are water and resource intensive and do not contribute to local ecosystems. Resilient landscaping should thus "work with nature instead of against it," incorporating native plants that are biodiverse and pollinator friendly.[4] To promote resilient landscaping, the County Comprehensive Plan requires and encourages development and landscaping practices that conserve, appropriately use, and protect native vegetation and forests. Landscaping in new development must incorporate water conservation practices while use of invasive species is prohibited. The Comprehensive Plan encourages the use of groundcover alternatives to lawn grass, site design techniques that provide for passive cooling in landscape design and supports strategies that maximize biodiversity of plant species.

Recent updates to the Landscaping Code to further these objectives include changes in the following areas:

[3] Bátori et al., "Karst Dolines Provide Diverse Microhabitats for Different Functional Groups in Multiple Phyla," *Scientific Reports,* 2009.

[4] McPherson, *The New Yard Pattern Book for Florida's Sustainable Single Family Homes,* 2005, 15.

- **Resilient Landscapes** – increased emphasis on reduced irrigation and fertilizer, promotion of alternative groundcovers and reduced turfgrass; requirements for Low Impact Development to disrupt impervious surfaces; clarity on credit for use of existing vegetation.
- **Urban Forest** – biodiversity requirements for trees, shrubs, and groundcovers; minimum requirements for native species; reduced tree installation sizes for greater species biodiversity; encouragement of edible and keystone species; update of appropriate trees list to remove invasive species, limitation on use of palm species to control Lethal Bronzing Disease.
- **Urban Heat Island** – allow flexibility for tree locations near covered parking solar facilities; for paved area tree canopy coverage, simplify requirements for vehicular areas and add requirement for pedestrian areas.
- **Compact Development** – new standards for root zone volume, width, depth, pervious surface areas for trees in constrained areas; clarification of street trees requirements; standards for geometric, walled, fenced basins as amenities to developments.

Countywide Wetland Protection Code and the Countywide Natural Resources Protection Code

In 2018, Alachua County adopted countywide wetland protection standards outlined in Chapter 77, Article II of the Countywide Wetland Protection Code. Chapter 78, Countywide Natural Resources Protection Code, was later adopted in 2021, and outlines protection standards for significant habitat, listed species habitat, strategic ecosystems, and significant geologic features. Both codes implement strong protections for wetlands from clearing and other activities, only allowing alterations if authorized by the associated municipality and County Board of County Commissioners.

Technical Assistance, Community Engagement, and Code Enforcement

In support of the extensive environmental protections in the County's Comprehensive Plan and Unified Land Development Code, staff respond to citizen inquiries, code violations, and provide technical assistance. The County has had a Pre-Application Screening process in place since 2015 whereby all building permits are reviewed by the Environmental Protection Department for compliance. The Department also has a robust outreach program, including regular presentations to school children and civic groups, social marketing campaigns, informational pamphlets, mailings, and more. When code violations cannot be resolved by staff working with citizens or are irreversible and irreparable, the County can proceed with a quasi-judicial hearing with a code enforcement special magistrate and/or civil citation.

Program Highlight

Alachua County Forever: Building Community Resiliency Through Land Conservation

Figure 6.3: ACF program logos from 2000, 2008, 2016, and 2022

Alachua County voters passed a pioneering local land conservation program called Alachua County Forever in 2000. Alachua County citizens recognized the need to protect environmentally significant lands to benefit the health and well–being of residents as well as plant and wildlife communities. The program has now expanded to protect farm and ranch lands as well (please see the Agriculture and Food Systems Chapter for more information on conservation easements of agriculture lands).

The program has been a clear example of community collaboration yielding expanding benefits. Citizen volunteers and community organizations and non-profits are critical to the ACF program's creation and success. These include: the Nature Conservancy, Alachua Conservation Trust, the Sierra Club, Alachua Audubon, Florida Native Plant Society, Keep Alachua County Beautiful, school groups, scouting groups, the University of Florida and others.

These conserved lands are the keystone green infrastructure in the Alachua County. These natural and working lands help ensure climate resiliency for citizens by:

- Reducing wildfire risk and destructiveness through the practice of prescribed burning,
- Reducing flooding potential (and homeowners flood insurance rates) through wetland protection,
- Aiding mental health and well-being through protected greenspace and recreational opportunities in nature,
- Protecting drinking water recharge and water quality, increasing property values in areas near the protected lands,
- Helping protect local food systems through agricultural land easements, and more.

Today, the ACF program continues protecting local resiliency while also contributing to statewide conservation priorities within our County with partners like the State of Florida, the Suwannee and St Johns River Water Management Districts, the USDA Natural Resource Conservation Service. Originally passed as a bond, the Alachua County Forever program serves as the highly successful cornerstone of the Wild Spaces and Public Places surtax, now benefitting citizens throughout the County and its cities with conserved lands, park improvements, road improvements, fire stations, community spaces, and affordable housing. Citizens across the state continue to recognize and prioritize the value and benefit of land conservation, with local ballot measures similar to Alachua County Forever passing in 23 counties by 2025.

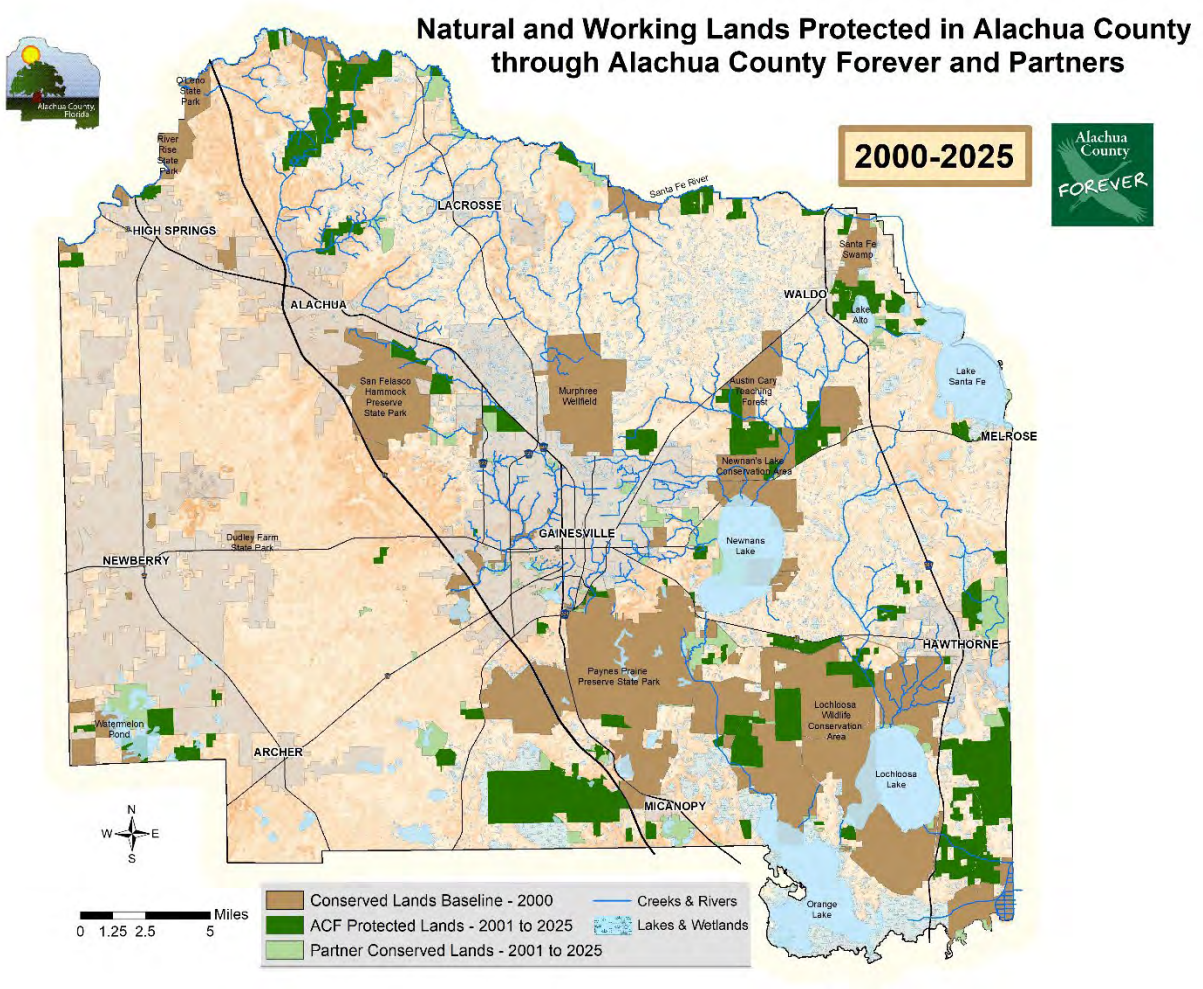

Figure 6.4: ACF and Partner Protected Lands throughout the County from 2000-2025

Future Strategies and Action Items

Goal 6.1 – Continuation and Expansion of Land Conservation Efforts through Alachua County Forever Program

STRATEGY 6.1.1 – Continuation of Protection of Environmentally Significant Lands through Alachua County Forever Program

Land conservation, habitat restoration, and land stewardship are nature-based climate actions which increase carbon storage or reduce GHGs in the atmosphere. Natural climate solutions include strategies from special low-impact agricultural practices and habitat restoration to tree planting, nutrient management, and conservation of both public and private lands. Combined at the national level, these and other natural climate solutions could absorb twenty-one percent of the

annual net GHG emissions.[5] Among these strategies, land conservation is one of the most cost-effective.

The voters of Alachua County have approved continued funding of land conservation efforts through the Alachua County Forever Program through 2032 and may likely support additional funding into the future. The Board of County Commissioners, in its 2023 Strategic Guide, identified "Invest in and Protect Our Environment" as a guiding principle, and named "Continue Wild Spaces and Public Places and include agricultural lands as well" as a program action in support of this principle. In February 2023, the Board approved the "30x30" goal for land conservation within the County as a target for the 10-year (2023-2032) management strategies of the Alachua County Forever Program.

Table 6.1: Action Items for Continuing Protections for Environmentally Significant Lands (Strategy 6.1.1)

Action Items	Jurisdiction	Pros	Cons	Status
Continue acquisition of conservation lands in support of "30x30" land conservation goal. Utilize planning and funding strategies in support of conservation of 30% of the County's lands and freshwater by 2030.	Alachua County	Increase the amount of conservation lands in Alachua County; reach 30x30 goals	Cost	Ongoing
Continue to evaluate and acquire environmentally significant lands in priority project areas and corridors in support of Alachua County Forever mission.	Alachua County	Increase the amount of conservation lands in Alachua County; reach 30x30 goals	Cost	Ongoing
Continue acquisition of conservation lands in support of "50x50" land conservation goal. Utilize planning and funding strategies in support of conservation of 50% of the County's lands and freshwater by 2050.	Alachua County	Increase the amount of conservation lands in Alachua County; reach 50x50 goals	Cost	Ongoing

[5] Fargione et al., "Natural climate solutions for the United States," *Science Advances*, 2018.

Review ACF property evaluation data and process, including and decision matrices, for opportunities to include climate resiliency values and climate change mitigation opportunities by December 2026.	Alachua County	Maximize climate resiliency when conserving lands ; increase climate mitigation strategies	None	Emerging
Continue public education, code enforcement	Local government, FDEP, WMD	Increase habitat value, fewer code violations	Cost	Ongoing
Conserve priority lands as fee simple or conservation easement acquisitions to protect water resources, wildlife habitat, and resource-based recreation where appropriate.	Alachua County, private landowners, FDEP, WMD, USDA	Reduce flooding, reduce risk of catastrophic wildfire, protect water quality and water recharge, mitigate greenhouse gas emissions, protect carbon storage reservoirs	Landowner awareness, real estate market conditions, expanding population.	Ongoing.

STRATEGY 6.1.2 – *Review land stewardship practices on Alachua County Preserves for opportunities to increase climate resiliency and implement selected compatible strategies. Prioritize vulnerabilities identified in the County's Vulnerability Analysis.*

The first step in public land conservation is to acquire land, or interests in land through a conservation easement or similar tool. However, after land is protected, stewardship of that land is the key to unlocking the nature-based solutions for climate resiliency. Climate resiliency benefits from both natural lands and working lands can be maximized though restoration of soils, forests, wetlands, and grasslands, and use of climate-smart agricultural practices, and climate smart forest-management practices.

Table 6.2: Action Items for Reviewing Land Stewardship Practices on Alachua County Preserves (Strategy 6.1.2)

Action Items	Jurisdiction	Pros	Cons	Status

Review the land stewardship practices on County-owned conservation lands for potential climate benefits as well as other priority ecosystem services.	Alachua County	Incorporating climate focus in land conservation practices; climate preparedness for the future	None	Not started
Complete a climate-focused review of Alachua County Forever Timber Business Plan, and Grazing Business Plan by 2027. Include assessments of carbon storage and absorption in analyses	Alachua County	Incorporate climate focus into ACF efforts and plans	None	Not started
Continue and expand prescribed burning on County-owned preserves to help reduce the possibility and intensity of destructive wildfires by reducing fuel build-up.	Alachua County	Climate resiliency.	None	Ongoing
Conserve priority lands as agricultural conservation easement acquisitions	Alachua County, private landowners, FDACS, USDA	Protect local food production, protect open space, reduce flooding risk, protect or mitigate water quality and water recharge.	Landowner awareness, real estate market conditions, expanding population, and challenges in farming longevity.	Emergent

Goal 6.2 – Tree Protection Code Update

STRATEGY 6.2.1 – Increase Tree Canopy Retention Percentage

Currently, development projects tree protection amounts are based on a flat minimum percentage based on the type of development and do not recognize sites that may have higher quality or lower quality tree resources. In addition, assessments of whether previous tree protection and canopy policies and plantings have been effective should be evaluated for this next tree protection code revision.

Table 6.3: Action Items for Updating the Tree Protection Code (Strategy 6.2.1)

Action Items	Jurisdiction	Pros	Cons	Status
Assess various strategies such as retaining trees based on current/historical land resources, existing vs overall canopy, and retention based on overall condition and quality of species	Unincorporated	Increase and diversify protections for trees within Alachua County	None	Ongoing
Evaluate the effectiveness of existing policies such as of 45" diameter landmark live oak, trees, canopy coverage in 20-years, and minimum canopy retention percentages.	Unincorporated	Increase and diversify protections for trees within Alachua County	None	Emergent
Assess policy incentives for low impact development	Unincorporated/County-wide	Transition towards low impact development	Market/Execution	Ongoing

STRATEGY 6.2.2 – Update Specimen Tree List

The current Specimen Tree List overestimates size of specimen trees compared to when specimen trees are observed on site. This creates inconsistencies and prevents the County from protecting trees that are of an appropriate size. The Specimen Tree List should be updated and modified to protect these trees.

Table 6.4: Action Items for Updating the Specimen Tree List (Strategy 6.2.2)

Action Items	Jurisdiction	Pros	Cons	Status
Remove minimum sizes for small trees and assess on a site-by-site basis	Unincorporated	Increase amount of trees protected	May require more staff time.	Not started
Clarify mitigation on smaller stature trees and provide a method for capturing uncommon species on a tree survey	Unincorporated	Increase the amount of trees protected	None.	Not started

STRATEGY 6.2.3 *– Potential Tree Permit Changes*

Tree removal permits are required for removing regulated trees. These policies will be evaluated to provide more flexibility with replacement trees.

Table 6.5: Action Items for Potential Tree Permit Changes (Strategy 6.2.3)

Action Items	Jurisdiction	Pros	Cons	Status
Allow non-native edible species for mitigation	Unincorporated Alachua County	Promotes food forests and more flexibility for single-family residential properties	Potential loss of mature canopy trees	Not started
Determine a process for denial and appeal tree permits for checks and balances	Unincorporated/ Interdepartmental	Prevents Unnecessary Tree Removal and allows owners to appeal decisions to a board	TBD	Not started
Tree advisory board and other municipality Tree City USA certification	County-wide; municipalities	Unified Tree City USA certification within Alachua County	Determining the resources needed to become a Tree City	Not started

Goal 6.3 – Community/Urban Forest Management Plan

STRATEGY 6.3.1 – Develop Community/Urban Forest Management Plan

Alachua County's currently provides protections to forests or trees through conservation land management, tree protection standards for trees removed on development projects and the permit process for single-family properties; landscaping standards on development projects and mitigating or replanting for trees removed within the County. Some of these protection methods are reactionary to specific situations within the County such as responding to inquiries for removal or evaluating tree concerns for safety. The Community/Urban Forest Management plan will provide proactive, comprehensive goals and strategies to further balance the needs of the environment and people.

Developing a Community Forest Management Plan, or a more tightly geographically focused Urban Forest Management Plan, will require three major components: social systems, governance systems, and the ecological systems. The social component incorporates the framework of community values – what people who live and use these spaces would like to see. The governance provides the guidelines and responsibilities for Alachua County's goals such as how they will be applied and monitored, and the timeframe for implementation methods for trees Countywide. Community/urban forest management will inventory current tree canopy cover, species, health, and distribution. It will also identify public safety hazards to residents and structures which will be a useful tool for extreme weather preparation. The community input and support to establish the public commitment and organizational framework will unify efforts to protect, manage, and care for our trees in the long term.

Initial discussions regarding the scope of the plan suggest the following areas be reviewed for consideration in the plan development, community outreach, and tree inventory areas within the County:

- County Urban Cluster or Urban Service Area
- County Road rights-of-way
- County Parks
- Smaller municipalities within the County as interested

Examples of successful urban forest plans include specific recommendations on policies, procedures and practices, and provide information required by policy makers, planners, utilities, environmental managers, businesses and citizen volunteers to optimize the benefits of the urban forest while minimizing management costs.

The investment in this plan can come at a fraction of the cost of other environmental management programs, such as stormwater system maintenance. A five-city study by the EPA in 2015 found that cities received benefits ranging from $1.50-$3 for every dollar invested in trees. Unlike

human-made systems, such as roads and bridges which deteriorate with age, trees are the only urban infrastructure that increase service and value over time.[6]

By properly managing the County's tree population and tree infrastructure through proactive planning of quantity and quality of trees, structural pruning maintenance, pest management, and removal of high-risk trees, the County can increase property values, tourism appeal, and the physical, and mental health of residents while reducing storm water runoff, energy consumption, and air and water pollution.

Overall, a community/urban forest management plan will define the vision, begin the tree inventory and tree assessments, create a strategic plan and timeframe based on the assessments, define the entities responsible for implementation, and monitor efforts towards achieving these goals.

A component of the community/urban forest management plan will require knowing what the composition and condition of trees in Alachua County prior to developing short term and long-term strategies. It is currently estimated through aerial imagery that there is approximately 53% of tree canopy coverage in the County's urban service area. A formal tree inventory should include an assessment of current tree canopy percentage and forest cover; tree species, health, and how they're distributed. This will help make informed decisions on future goals of maintaining canopy coverage, areas to plant high-quality species or improve biodiversity, management of invasive species or removal of trees at risk of causing damage or harm to property or people.

Table 6.6: Action Items for Developing a Community/Urban Forest Management Plan (Strategy 6.3.1)

Action Items	Jurisdiction	Pros	Cons	Status
Determine baseline canopy	Alachua County Urban Cluster	Frame of reference	None	Current
Establish Canopy Goals and ways to manage	Unincorporated	Step toward	None	Not started
Community Engagement for Management Priorities	Unincorporated	Community focused priorities	Conflicting needs	Not started

[6] McPherson, E. et al., "Municipal Forest Benefits and Costs in Five US Cities." *Journal of Forestry*, 2005

Tree Inventory/Ecological Analysis	County-owned property	Allows for more proactive management of size, species, and potential risks within the County	Costs	Not started
Obtain and implement Community/Urban Forest Management Plan	Alachua County	Reduce UHI effect, increase storm resiliency, increase habitat	Currently no dedicated funding sources	New/ Not started

Goal 6.4 – Landscaping Goals

STRATEGY 6.4.1 *– Create resilient landscapes through sustainable landscaping practices*

In recent years, the land development process has dramatically changed in ways that exacerbate habitat loss and the heat island effect. The current land development process currently results in vast clearcutting and scraping away of existing resources to create a "blank slate." This method consumes a vast amount of resources, such as new landscaping, irrigation, and fertilizer.

Alachua County currently does not have any requirements for lot level landscaping. As part of the Climate Action Plan, the County will explore adding lot level landscaping requirements, particularly focused on replanting of trees and native vegetation. Additionally, requiring soil amendments for new landscaping will also be considered in order to promote healthy soils and landscaping practices that minimize the use of supplemental resources.

One planting strategy that has gained a lot of attention for its climate benefits is micro forests, or the Miyawaki method. This is an afforestation practice that involves planting a variety of native trees in as little as a tenth of an acre. The result is an accelerated growth of a diverse forest that requires little maintenance once established. While this practice is just beginning to gain traction in the United States, it has proven successful in other countries such as Japan, where the idea originated. Alachua County will consider this strategy to address the increasing need in urbanized areas for cooling and habitat that micro forests have the potential to provide. This could be achieved through first planting a micro forest on County property as a demonstration, then finding ways to incentivize it in the broader development landscape.

As addressed in the County's current Comprehensive Plan and Landscaping Code, Firewise landscaping is an important strategy for minimizing impacts to developed areas from wildfires. The Climate Vulnerability Analysis points out that chances of extreme drought, and associated wildfires, are expected to increase with climate change. To address this concern, the County will

assess staff and budgetary resources allocated to implementing the wildfire mitigation objectives of the Comprehensive Plan.

Table 6.7 for Sustainable Landscaping Practices (Strategy 6.4.1)				
Action Items	**Jurisdiction**	**Pros**	**Cons**	**Status**
Require soil amendments in new construction	Local government	Great water savings if property owner changes watering behaviors	Property owner and builder resistance, potentially staff intensive	Not started
Require trees on new residential lots	Local government	Reduce urban heat island (UHI) effect, modest energy savings	Property owner and builder resistance, potentially staff intensive	Not started
Subsidize native plant nurseries	FDACS	Increase availability and stock	Currently no dedicated funding sources	Not started
Promote movements that assist landowners with native landscaping	Local government, UF IFAS Extension	Increase habitat, marginal water savings and water quality improvements	Difficult to measure	Ongoing
Require green certification of new construction	Local government or utilities	Modest water, energy savings	Political and builder resistance, potentially staff intensive	Not started
Retain higher density inside Urban Cluster, while also retaining greenspace	Alachua County	Reduce UHI effect, incentivize pedestrian transportation	Political and builder resistance	Ongoing

Impose limits on impervious surfaces	Alachua County	Reduce UHI effect, reduce stormwater runoff, protect soil and habitat	Developer and builder resistance	Not started
Update Tree Protection Code to increase tree canopy retention	Alachua County	Reduce water use, protect soils and habitats	Builder/ developer resistance	Not started
Require / incentivize permeable pavement and other Low Impact Development techniques	Local government	Improve water quality and reduce flooding	Builder/ developer resistance, cost, maintenance	Not started

Goal 6.5 – Climate Action Mapping

STRATEGY 6.5.1 – Develop more climate- and resilience-related maps.

Maps are a helpful visual tool to promote broad understanding of current conditions and policy implications for natural resources. Through the use of Geographic Information Systems (GIS), complex analysis of geographic data can be performed and visually displayed in an easy-to-understand format. The Climate Vulnerability Analysis contains several useful maps, including areas of extreme flooding, heat, and wildfire risk in the County. The following maps could also be included as part of the Climate Action Plan:

- County Tree Inventory
- Updated Greenways Master Plan (Bicycle and Pedestrian Master Plan)
- Climate Action Infrastructure Projects (e.g. tree plantings, flood mitigation, cooling stations, etc.)

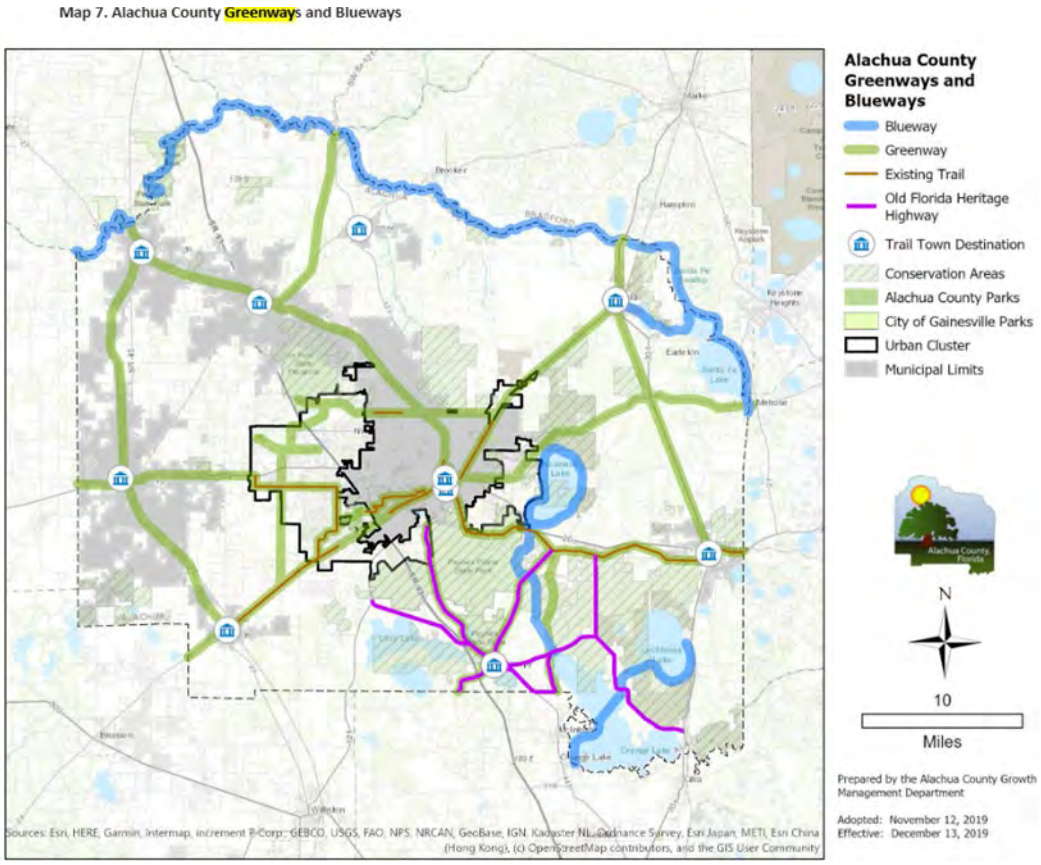

Figure 6.5: Alachua County Greenways and Blueways

Table 6.8 for Climate Mapping (Strategy 6.5.1)				
Action Items	**Jurisdiction**	**Pros**	**Cons**	**Status**
Develop GIS maps for climate, resilient, and sustainable projects and plans (e.g., County Tree Inventory, updated Greenways Master Plan, infrastructure projects, etc.)	Local government	Better understanding of climate impacts and climate projects; strategic planning	Potentially staff intensive	Emergent

Triple Bottom Line

People

Preservation of natural resources has immense benefits for the residents of Alachua County. By conserving lands such as parks, citizens have access to trails, springs, and other natural areas. These can be used to improve physical health, mental health, and for recreation. They provide spaces for people to connect and socialize, improving citizens' sense of community and belonging. Volunteering for conservation lands can also provide citizens with a sense of fulfilment. Furthermore, the health and stability of local ecosystems directly impacts the health of people in various ways.

Profit

The Florida Fish and Wildlife Conservation Commission (FWC) estimates the economic impact from recreational hunting, fishing, and wildlife-viewing in Florida is $10.1 billion every year[7]. These activities create tens of thousands of jobs and generate millions in state and local tax revenue. Outdoor recreation, hunting, and fishing have a tremendous economic impact within Alachua County. Among these are the County's iconic state parks that draw tourism dollars from across the nation. For example, Friends of Paynes Prairie Inc. estimate that Paynes Prairie State Park generates over $10 million in direct economic benefit annually and supports 164.5 jobs.[8]

Protecting the County's urban forest is also economically beneficial. Trees save billions nationally by reducing energy costs, removing air pollution, and storing carbon while increasing property values and commercial benefits.[9] They also reduce runoff and improve water quality, especially during storm events, which saves money in stormwater treatment and runoff management.

Planet

Conserving local ecosystems protects carbon sinks and provides habitats for the fauna and flora that preserve the natural balance in Alachua County. Integrating more natural spaces into urban or developed areas provides more carbon sinks as well as decreases the incidence of UHIs. Additionally, by transitioning away from intensive turf grass and planting native turf and plants, pollinators can recover and increase in population.

Community Engagement

[7] Florida Wish and Wildlife Conservation Commission, "Economic Impact of Outdoor Recreation."

[8] Friends of Paynes Prairie, "Friends of Paynes Prairie, Inc."

[9] Nowak et al., "Sustaining America's Urban Trees and Forests," *USDA*, 2010.

Volunteering Opportunities

One of the best ways to get involved with Alachua County's efforts to protect our natural resources is by directly volunteering with the variety of opportunities provided for residents. Volunteer opportunities are available for our Water Resources Program, Arboriculture program and Alachua County Forever Program. Please see the Alachua County Environmental Protection Department Volunteer Page for more information.

Implement Native Yards

Collectively, urban landscapes, particularly those surrounding single-family homes, place a strain on natural and water resources without contributing much to the surrounding ecosystems. It is essential that to shift the paradigm away from resource-intensive traditional yards and towards a more natural approach to landscaping that promotes native plant species and provides habitat for wildlife. There are several resources to assist property owners locally, including the Florida-Friendly Landscaping Program (FDEP and UF/IFAS) and Springs Friendly Yards (Florida Springs Institute) programs. Nationally, the Homegrown National Park movement is a grassroots call-to-action to regenerate biodiversity and ecosystem function by planting native plants and creating new ecological networks within urban landscapes. Similarly, the Wild Ones Program offers free native landscape designs for each unique ecoregion. These programs promote yards that require little to no supplemental inputs such as fertilizers and irrigation once established, while also providing forage and habitat for native species including pollinators.

Involvement in Local Governmental Efforts

There are several ways to get involved with Alachua County's efforts to preserve local ecosystems and trees:

- Contacting elected representatives to support climate resilient policies.
- Joining a County Advisory Committee such as the Environmental Protection Advisory Committee, Citizen Climate Advisory Committee, or Land Conservation Board.
- Reporting clearing of natural areas, excessive water use, and other activities that harm the environment by calling the Alachua County Environmental Protection Department.

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7. Waste Management and Resource Recovery

Purpose

Ensure high quality waste management services for Alachua County residents and minimize the amount of waste directed towards landfills and the environment.

Introduction

Solid Waste and Climate Change

A significant way humans impact the environment and climate change is through overconsumption and unsustainable waste management practices. Municipal solid waste is a large source of GHGs, primarily due to the contributions from landfills and waste collection systems. Emissions from landfills are the result of decomposing organic materials that release carbon dioxide (CO2) and methane (CH4). According to the Environmental Protection Agency (EPA), "municipal solid waste (MSW) landfills are the third-largest source of human-related methane emissions in the United States….".[1] Another consideration are the emissions generated as part of solid waste collection and transportation. Efforts aimed at reducing the amount of solid waste generation can have a significant impact on addressing climate change.

Solid Waste in Alachua County

In 1998, Alachua County closed the Alachua County Southwest landfill, located at 19401 SW Archer Rd, Archer, FL. Upon closure, the County determined it was in the best interest of the community to outsource landfill disposal. The County currently contracts to dispose of solid waste at the New River Regional Landfill in Raiford, Florida. The current agreement expires in 2027.

Prior to disposal, collected solid waste is transported to the Leveda Brown Environmental Park, located at 5115 NE 63rd Avenue, Gainesville (Figure 7.1). Materials are screened for prohibited waste and hazardous materials before being compacted and transported to the New River Landfill, located 35 miles from the Environmental Park. The County transports an average of 775 tons of solid waste per day, which translates to 33 trips per day.

[1] EPA, "Frequent Questions About Landfill Gas."

Figure 7.1: Leveda Brown Environmental Park

Residential Collection

Waste collection for residents within the County varies based upon location. The County provides weekly waste and recycling collection within the designated mandatory curbside collection area. Garbage cart sizing is currently a Pay-As-You-Throw (PAYT) rate structure with annual costs ranging from $203.89/yr. (20-gallon) to $330.00/yr. (96-gallon) (Figure 7.2). Recycling is collected utilizing a dual stream system in orange and blue 18-gallon bins to separate recyclables (Figure 7.3). Educational programs and materials are provided through the County's Solid Waste and Resource Recovery Department. County residents outside the mandatory curbside collection area may subscribe to curbside pickup through private services with any of the franchises waste haulers in the County or utilize the Rural Collection Centers (RCCs) or the Leveda Brown Environmental Park.

Figure 7.2. Pay-As-You-Throw (PAYT) rate structure

Figure 7.3: Dual Stream Recycling System

The five RCCs positioned throughout the County offer recycling (plastic, metals, glass, mixed paper, cardboard), household hazardous waste disposal, yard waste recycling, bulk material disposal, and garbage waste disposal (Figure 7.4). The Leveda Brown Environmental Park accepts recycling (plastic, metals, glass, mixed paper, cardboard), scrap metal, tires, yard waste, household hazardous waste, and garbage disposal. It also provides further educational outreach to the community.

RURAL COLLECTION CENTERS

Locations

Disposal
Garbage
Recycling
Yard Waste
Scrap Metal
Hazardous Waste

Reuse Area
Lightly used items
Paint

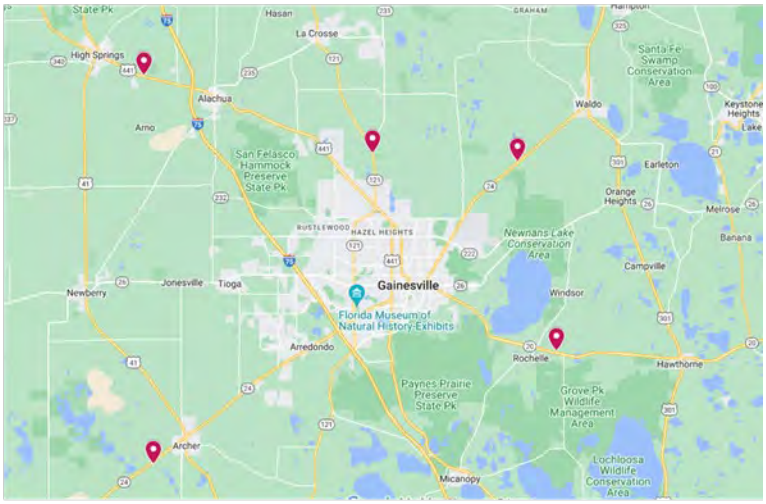

Figure 7.4: Rural Collection Centers

Commercial Collection

Commercial solid waste collection is provided by the County as part of an exclusive franchise agreement. Recycling collection services are provided by an open franchise, or free market, system. Businesses in the County are required to recycle the following materials: steel cans, aluminum cans, glass containers, plastic containers, magazines, newspapers, office paper, and corrugated cardboard.

Hazardous Waste Collection

The Hazardous Waste Collection Program provides a county-wide system for the proper disposal, reuse, and recycling of hazardous materials; automotive fluids, household chemicals, unwanted pharmaceuticals, waste vegetable oil, latex paint and electronic waste materials generated by households and small businesses. Materials are collected primarily at the Hazardous Waste Collection Center, located at the Leveda Brown Environmental Park. Additional drop off sites are located within each of the five Rural Collection Centers. Through a grant from the Florida Department of Environmental Protection (FDEP), Hazardous Waste Management also conducts hazardous waste collection events in Baker, Bradford, Columbia, Dixie, Gilchrist, Lafayette, Nassau, Putnam and Union counties.

Composting Services

A current concern in the waste sector is the lack of access to composting. In Alachua County, there are drop-off locations for composting provided by Beaten Path Compost, the UF Student Compost Cooperative, UF Field and Fork Gardens, and the Gainesville Giving Garden. There are limited options for those who do not live in the Gainesville area, do not have access to a car, are of limited mobility, or do not have the ability to compost at home. Because composting is one of the primary ways individuals can reduce their waste, effort should be put into providing more composting services for Alachua County residents.

Alachua County Comprehensive Plan

The Solid Waste Element of the County's Comprehensive Plans contains the policies designed to provide for the clean, efficient, economical, and environmentally sound management of solid waste resources in the County. Several policies and objectives within the Plan that directly address solid waste and resource recovery practices are listed in Appendix B.

Past and Current Efforts

Zero Waste in Alachua County

In 2021, Alachua County and the City of Gainesville approved a Joint Zero Waste Strategy Report and Implementation Plan. The Report includes key findings from the analysis of potential zero waste strategies accompanied by their associated review from the community during stakeholder engagement, as well as the final implementation plan recommended for adoption.

The movement towards Zero Waste in Alachua County has been active for several years and continues to gain momentum from the public, private, and non-profit sectors. The City of Gainesville has set a goal to divert 90% of its waste by 2040 and established a Zero Waste Subcommittee to assist in driving initiatives. In addition, Zero Waste is a forefront topic for the County and City's Joint Water and Climate Committee. Both the County and City have begun implementation of Zero Waste policies to reduce single-use items and promote waste reduction strategies within their daily operations.

In Alachua County and the City of Gainesville Zero Waste is defined as: "*The conservation of all resources by means of responsible production, consumption, reuse and recovery of products, packaging, and materials by minimizing discharges to land, water, or air that threaten the environment or human health.*"

Additionally, the definition is supported by five guiding principles for evaluating Zero Waste strategies to increase material recovery rates and foster reuse throughout the community. They are as follows:

- Keep Resources Local
- Foster Job Growth
- Emphasize and Support Upstream Solutions
- Mitigate Climate Change
- Maximize Resource Access and Environmental Services

A key principle within Zero Waste is the establishment of a Circular Economy (Figure 7.5). Circular Economy is a whole-system approach based upon repositioning disposal and reuse opportunities. Through this process, less raw materials are consumed for production, more manufactured materials remain in use, and commodities are recycled to continue to maximize the value of material. This concept allows resources to have a continuous life cycle through multiple uses and purposes, rather than limiting their life span to simple production that results in waste.

Figure 7.5: Circular Economy[2]

The Joint Zero Waste Strategy Report and Implementation Plan includes a list of recommended zero waste strategies. The strategies are divided into three categories: General Recommendations, Organic Materials Recovery, and Recyclables and Construction and Demolition Materials Recovery. Additionally, the recommendations are listed in three different phases for implementation. Tables 7.1 through 7.4 present a description of the Phase I strategies and a brief status update.

Program Highlight

Alachua County Zero Waste Grant

In general, local governments and their staff have well defined roles and responsibilities. Establishing a new program or conducting pilot programs can often become mired in red tape as staff attempt to establish the policies, procedures, funding mechanisms, staffing, etc. which are necessary to implement them. To combat this, local governments have the opportunity to partner with community organizations, private businesses, and non-profits which have much more flexibility with their internal systems. One example of such a partnership is the Alachua County Zero Waste Grant.

The Alachua County Zero Waste Grant was first established in 2022 with the stated goal of stoking innovation, spurring development, and encouraging the enhancement of waste reduction programs for the benefit of the residents of Alachua County.

[2] U.S. Public Interest Research

The initial round of Zero Waste Grants resulted in three recipients:

1. **The Repurpose Project** – Enhancement of reusable material collection and delivery abilities,
2. **The Repurpose Project** – Assessment of the quality, quantity, and value of reusable materials being disposed of at the County's Transfer Station, and
3. **Beaten Path Compost** – Increase compostable materials collection capacity.

The Repurpose Project is a local reuse center focused on reducing the amount of material sent to the landfill. They operate a number of retail facilities to receive and sell used furniture, construction materials, household items, and more. For the grant to enhance their reusable material collection and delivery abilities, The Repurpose Project used the funds to purchase an additional box truck, doubling their fleet. Having this additional truck assisted the community by removing the transportation barrier for donating or purchasing reusable items. Through the year-long reporting period of the grant, this additional box truck enabled them to collect 252,857 lbs. of items from the public to be diverted from the landfill through their facilities. In addition, the box truck delivered 154,023 lbs. of items back to the community for customers who may not have otherwise been able to transport the item to their home.

The Repurpose Project's second grant was not about enhancing an existing program but rather collecting data on the solid waste system to analyze a community need. To assess the quality, quantity, and value of reusable materials being disposed of at the County's Transfer Station, staff from the Repurpose Project would intercept vehicles as they approached the tipping floor of the Transfer Station to see if there were items which could be diverted to a higher use than being sent to a landfill. Participation by the approaching vehicles was purely optional and all of the items selected would have been disposed of at a landfill. During the collection and reporting period, a total of 1,574 items totaling 56,812 lbs. were collected for reuse. Of the items collected, 959 of them were taken to The Repurpose Project's retail facility named Reuse Planet. These items were tracked during a 90-day period to see if they were sold. During that time, 89% of the items were sold and given a second life outside of being landfilled. The items which were not tracked through the point of sale were taken to separate facilities which did not have the ability to track them items through the point of sale.

The recipient of the third grant, Beaten Path Compost, is a small-scale composting operation based in Gainesville, FL. They collect material from both residential and commercial properties with a large portion of their collections being residential units in the City of Gainesville. Through this grant, Beaten Path Compost was able to expand their collection capacity by adding a second flat-bed vehicle to their fleet. Although it occurred beyond the reporting period, the additional capacity allowed them to expand their program through the City of Gainesville by nearly 1/3, adding an additional 200 households to the curbside compostable material collection plan.

During the summer of 2025, Alachua County issued a request for proposals for a second round of Zero Waste Grants. The grant review committee members are recommending two projects to the Board of County Commissioners for approval. The first project is through O-Town Compost and involves the collection of compostable materials at the County's Rural Collection Centers. The second project is with Lost and Found GNV to help grow their bulk item collection program from multi-family residential complexes.

Through the completed grant projects and the recommended future ones, Alachua County and their community partners have demonstrated that such collaborations can help local governments address current issues in a timely manner within their existing systems.

Strategies and Action Items

Goal 7.1 – Increase intergovernmental collaboration and Lead by Example.

STRATEGY 7.1.1 - Establish a Solid Waste Reduction Goal and Formalize by Adopting a Resolution on Zero Waste

A key step towards Zero Waste in Alachua County is ensuring that local governments are willing and able to participate in Zero Waste initiatives. Intergovernmental collaboration will be necessary to tackle such a large-scale goal. A significant obstacle is the inconsistent recycling management practices in the County and the municipalities.

Table 7.1 Action Items for Increasing Intergovernmental Collaboration for Waste Reduction (Strategy 7.1.1)

Action Items	Jurisdiction	Pros	Cons	Status
Establish a Solid Waste Reduction Goal and Formalize by Adopting a Resolution on Zero Waste.	County	Establishes a formalized commitment and foundation for Zero Waste initiatives in the community.	Funding requirements to fulfill goal. Inconsistent waste management practices across jurisdictions. Public support for initiative. Requires intergovernmental coordination.	Not started

Implement a Zero Waste Procurement Policy.	County	Supports the circular economy in the area and allows governments to lead by example.	Funding requirements to fulfill goal. Public support for initiative. Requires intergovernmental coordination.	In progress

Goal 7.2 – Establish Public-Private Relationships between Alachua County and Private Entities to Facilitate Zero Waste Goals

STRATEGY 7.2.1 *– Increase the amount of accessible opportunities for the private sector to reduce waste.*

The private sector plays a large role in the amount of waste Alachua County and its residents accumulate, indicating a need to foster more public-private relationships with them. The private sector is an essential partner to meet Zero Waste goals. Table 7.2 provides action items dedicated to encouraging public-private relationships that increase progress towards Zero Waste. The County continues to seek suitable tenants for the EcoLoop industrial park.

Table 7.2 Action Items for Increasing Private Sector Opportunities to reduce waste (Strategy 7.2.1)

Action Items	Jurisdiction	Pros	Cons	Status
Establish Public and Private Partnerships to Facilitate Innovative Research and Develop New Technologies for Managing Solid Waste in Alachua County and City of Gainesville.	County	Encourages innovation, utilizes existing infrastructure, and incorporates Zero Waste planning into the EcoLoop Park Business Plan.	Will require political buy-in, support, and potential funding.	Ongoing. County staff continues to seek potential projects for the EcoLoop Industrial Park.
Develop Partnerships with the Private Sector to Implement a Large-Scale Reuse Program.	County	Large waste reduction impacts based upon case	Requires private sector interest, capital, and	Ongoing. See Program Highlight section.

		study programs. Fosters circular economy. Generates job growth. May be more financially advantageous than disposal fees.	warehouse or infrastructure for the collection of salvaged materials and storefront for sales. Requires political support. May require altering of current collection contracts to ensure appropriate Designated Facility for receipt of materials or allow for the infrastructure for salvaging of materials to be co-located at the facility.	

Revise Future Contracts and Franchise Agreements with Collections and Processing Vendors to Include Requirements and Incentives Addressing Zero Waste.	County	Can lead to higher diversion rates and the ability to meet established goals. Allows the County and City greater control of their procurements and may be linked to educational and outreach programming to increase public awareness.	County exclusive franchise includes provision to allow for organics collection once feasible in area. Curbside yard waste processing agreement going out next year with goal of using a composter.	Completed.

Goal 7.3 – Phase Out Organics from Waste

STRATEGY 7.3.1 *– Increase resident and commercial opportunities and accessibility for composting.*

The County Waste Management Team aims to expand composting opportunities for its residents. It is an effective way to lower GHG emissions from food waste, utilize the waste for other purposes, and reach the County's zero waste goals.

An organics processing facility is necessary to facilitate the diversion of organics from the waste stream, making the process much faster and smoother. However, both the residential and commercial sectors still must be incentivized to participate in composting.

Table 7.3 – Action Items for Increasing Resident Opportunities for Composting (Strategy 7.3.1)

Action Items	Jurisdiction	Pros	Cons	Status

Develop a Plan to Phase Organics from Garbage Collection.	County	Will ensure adequate feedstock for any future organics processing facility. Will allow for a comprehensive assessment of requirements to ensure a viable and successful organics processing facility.	May require revisions to collection contracts. Plan will need political and public support and buy-in to be viable. May require changes to customer collection programs including new containers or new setout procedures.	Ongoing. See Program Highlight section.
Expand Food Recovery Networks to Include Food Pantries.	County, Private Sector	Fosters partnerships among different sectors of the community. Increases awareness of hunger and poverty initiatives within the County and City. Redirects excess food to those within the County and City in need. Reduces	May require new resources for transporting materials. May require incentives or social marketing campaigns to increase participation of food service vendors.	Not started

		organic materials in need of reprocessing or disposal.		
Add Incentives to Current Residential Backyard Composting Programs and Expand.	County	Builds upon an existing program and infrastructure. Reduces the collection and processing burden on the communities by having materials processed at the source.	Program participation may already be maxed. Incorporating incentives may not have an adequate return on investment.	County provides frees wire composting bins kits
Establish the Processing Facility Infrastructure Necessary for Diverting Organic Materials from the Waste Stream.	County, Private Sector	Current processing of organic materials is limited to yard waste. Establishing an organics processing facility will allow for the diversion of over 20% of materials from the County and City's solid waste stream and foster partnerships.	Will require planning, space, and adequate funding. Financial sustainability of the processing facility will require adequate materials collected to process (feedstock). Feedstock will be needed to ensure	Gaston Tree Debris Recycling; mulch and compost County Line Landfill: compost Leveda Brown Environmental Park: mulch Lifesoils: compost (under construction)

			adequate operations and to leverage any potential private sector interest.	
Develop Infrastructure for the Collection of Organic Materials.	County, Private Sector	Allows for greater diversion of organic materials. Can foster partnerships with the private sector and interlocally. Allows for consistent messaging and branding to encourage greater participation and stability.	Infrastructure may require staffing or operational changes to resource recovery centers, carts, or other collection bins, as well as a collection fleet. May additionally require modifications to solid waste ordinances. Significant public education and outreach to inform customers of programmatic changes and to improve diversion potentials	Beaten Path residential collection O-Town Composting commercial collection.

Goal 7.4 – Recycling

STRATEGY 7.4.1 – Expand recycling programs and opportunities within the County.

Recycling is one of the main methods by which the County can achieve its Zero Waste goals. Efforts should be put into increasing the recycling capacity of Alachua County and educating citizens and the private sector on best practices. Table 7.4 demonstrates action items dedicated to enhancing the recycling capacity of Alachua County and increasing citizen awareness. The lack of modern public and private infrastructure is a significant obstacle to increasing recycling in the County.

Table 7.4 Action Items for Expanding Recycling Programs and Opportunities (Strategy 7.4.1)

Action Items	Jurisdiction	Pros	Cons	Status
Expand Existing Mandatory Commercial Recycling Ordinance.	County	Audits will present clear data on compliance for commercial and multi-family recycling.	Maximum contamination levels may be controversial. Policy changes will require political buy-in and support. Inspection and enforcement will be required to implement effectively.	Not started

Establish Uniform Multi-Family Recycling.	County	Will strengthen the recycling program and increase diversion rates by providing uniformity and simplifying educational programming.	Will require ordinance revisions and political support. Multi-family materials typically have high contamination levels, requiring significant outreach and education efforts, as well as potential carts or equipment for units to recycle effectively.	Limited implementation. Pilot study conducted in 2024
Conduct an Analysis of Recycling and Disposal Fees for the County to Identify Methods for Discouraging the Landfill of Material.	County	Provides the County and City with a clear picture of fees associated with municipal solid waste disposal to evaluate potential areas for deterring landfill material. Can be utilized as a financial foundation for numerous	Will require staffing and/or funding to perform.	Not started

		Zero Waste strategies.		
Expand the Reach of the Business Recycling Toolkit to all Municipalities within the County.	County	Toolkit already developed. Easy strategy to implement.	Will require staff time. May have minimal impacts to diversion levels. May not be suitable for all municipalities depending upon their own ordinances, policies, and programs	Limited implementation
Support Organizations Working on the Implementation of Take-Back Programs.	County	Requires businesses to take-back difficult to manage items such as batteries and lightbulbs and reduces the County and City's need for processing or providing proper disposal.	Will require political buy-in and support. Compositional analysis will require staff time, partnerships, and/or funding to determine appropriate industries to target.	Limited implementation (pharmaceuticals Take-Back programs)
Revise Building Code Standards or Green Building Ordinances to Address Zero Waste Initiatives for C&D Material Diversion.	County, Local Governments	Supports infrastructure investments by ensuring necessary feedstock.	Requires political buy-in and support. May be challenged by the building community. May impact the costs	Not started

			of construction and new development	

Triple Bottom Line

People

Becoming a Zero Waste community has many benefits to our community. Decreasing the amount of food waste, such as by donating excess food to food pantries, increases food security for those most in need. According to the EPA, over one-third of food in the U.S. goes uneaten, which is enough to feed more than 150 million people each year.[3] This is enough to feed the estimated 35 million Americans and over 40,000 Alachua County residents who are food insecure.[4][5] It also reduces the negative impact of landfills on health, property value, and aesthetics.[6]

Profit

Opting to become Zero Waste and adopt a Circular Economy can impact Alachua County in several ways. These sustainable models create jobs and can save money for both businesses and the County. The EPA found that recycling and reuse, two of the tenants of a Zero Waste Community, created 681,000 jobs and $5.5 billion in tax revenue in just one year.[7] Additionally, businesses with a circular economic model outperformed "linear" businesses that create waste after use of their products, according to the World Economic Forum. They had lower costs, reduced production times, better resilience against price and supply chain fluctuations, and increased consumer spending.[8]

Municipalities also save money on waste management in the long-term.[9] Less money is spent on collecting litter (which is significant given that the U.S. spends about $11.5 billion annually on litter cleanup) according to a 2009 study.[10] Residents also pay less money for solid waste collection when they recycle and compost as a result of the County's Pay-As-You-Throw program.

[3] EPA, *From Farm to Kitchen: The Environmental Impacts of US Food Waste,* Office of Research and Development, 2021.
[4]FLHealthCharts, "Food Insecurity Rate," 2023.
[5]Florida Legislature Office of Economic and Demographic Research, "Alachua County."
[6] EPA, "Recycling Basics and Benefits."
[7] EPA, "Recycling Economic Information (REI) Report," *Sustainable Materials Management.*
[8] Jensen, "8 ways the circular economy will transform how business is done," *World Economic Forum*, 2023.
[9] Global Alliance for Incinerator Alternatives, *Zero Waste to Zero Emissions*, 2022.
[10] Mid Atlantic Solid Waste Consultants, *2009 National Visible Litter Survey and Litter Cost Study*, 2009.

Planet

The Zero Waste approach significantly reduces emissions, with one report estimating it to reduce 1.4 billion metric tons of greenhouse gas emissions.[11] It also improves the aesthetic and health of waterways in Alachua County, including creeks and lakes.[12]

Reducing food waste reduces deforestation, biodiversity loss, water pollution and scarcity by feeding a growing population without needing to grow more food. It also prevents wasted resources such as energy, land, and fertilizers that come from growing food only for it to go uneaten.[13]

Proper disposal of household hazardous waste helps stop nonpoint source pollution.[14] Additionally, most of the hazardous waste the County receives is recycled, further benefiting environmental health.[15]

Community Engagement

To provide the community with thorough, transparent information regarding where their waste goes, County staff created the website entitled Alachua County Recycles. This site provides information on the County's solid waste programs and accurate data on the number (in tonnage) of recyclables collected and the processing facilities they went to.

Similar to Alachua County Recycles, the City of Gainesville's Zero Waste Wizard provides information on recyclable goods, specifically what can and cannot be recycled and specific bins that recyclables go in. Residents can look up hundreds of different items and the site will explain how and where to dispose of those items properly.

Table 7.5 presents a list of Zero Waste resources in Alachua County. The original list is included in the Joint Zero Waste Strategy Report and Implementation Plan.

Name	Items Accepted
Alachua Habitat for Humanity ReStore	Clothing, Household Goods, Furniture, Appliances
Batteries Plus Bulbs	Batteries Plus Bulbs
Battery Land	Rechargeable Batteries
Battery Source	Rechargeable Batteries
Best Buy	Electronics, Batteries, Wires, Cords, Cables,

[11] *Ibid* footnote 8.
[12] EPA, "Learn About Aquatic Trash," *Trash-Free Waters.*
[13] *Ibid* footnote 2.
[14] University of Florida Facilities Services, "Hazardous Waste."
[15] Alachua County, "About the Hazardous Waste Collection Center (HWCC)."

	Plastic Bags
Bj's Thrift Shop	Clothing, Household Goods, Electronics
Cartridge World	Printer Ink Cartridges and Toners
CMC Recycling of Gainesville	Aluminum Cans and Scrap, Auto Parts, Bikes, Brass, Cookware, Copper, Ferrous Metals, Garden Tools, Hardware, Lawnmowers, Metal Clothes Hangers, Metal Tags, Musical Instruments – Metal, Nonferrous Metals, Pipes, Radiators, Scrap Metal, Stainless Steel, Tools, Zinc
Entenmanns Gainesville Thrift	Clothing, Household Goods
eco ATM	Smartphones, Tablets, Cell Phones
Flashbacks Recycled Fashions	Clothing
Gainesville Junk Removal	Furniture, Appliances, Misc. Scrap Metal
Goodwill	Clothing, Household Goods
Haven – Attic Resale	Clothing, Household Goods
Home Depot	Light Bulbs, Rechargeable Batteries
Humane Society of North Central Florida Thrift Store	Clothing, Household Goods
JCPenney	Plastic Bags #2 and #4
Kohls	Plastic Bags #2 and #4
Lowes	Plastic Bags #2 and #4, Cell Phones, CFLs, Lead-acid Batteries, Lithium-ion Batteries, Nickel-cadmium Batteries, Nickel-metal Hydride Batteries, Nickel-zinc Batteries, Plastic Plant Materials (No Single-use Batteries)
Melody's Memories	Clothing
Office Depot	Ink and Toner Cartridges
Office Max	Ink and Toner Cartridges
Outreach Thrift	Clothing, Household Goods
Plato's Closet	Clothing
Publix Super Markets	Plastic Bags #2 and #4, Plastic Egg Cartons, Paper Bags, Plastic Film #2 and #4
Recycling Services of America	Office Paper, Cardboard, Bottles, Cans
Salvation Army	Clothing, Household Goods
Sam's Club	Plastic Bags #2 and #4, Car Batteries, Marine Batteries
Sandy's Savvy Chic Resale	Clothing

Boutique	
Sound Ideas	Small Electronics
Sprint Store	Cell Phones
St. Patrick's Thrift Shop	Clothing, Household Goods, Furniture
St. Vincent De Paul Thrift Shop	Clothing, Household Goods, Furniture
Target	Plastic Bags #2 and #4, Cell Phones, Inkjet Cartridges, MP3 Players
T-Cellular	Cell Phones
The ARC of Alachua County	Clothing, Household Goods
The Heart of Gainesville Thrift Store	Clothing, Household Goods, Furniture
The Repurpose Project	Clothing, Household Goods, Furniture, Appliances
Tools for Schools	Office / Classroom Supplies
Trademark Metals Recycling	Ferrous and Non-ferrous Metals, White Goods, and Appliances
Uniquities Consignment Shop	Furniture, Home Goods, Clothing
Walmart	Plastic Bags #2 and #4, Car Batteries, Marine Batteries
Watson C&D	Aluminum Scrap, Asphalt, Brass, Brick, Carpet, Carpet Padding, Ceiling Tiles, Ceramics
Whole Foods	Batteries, Corks, Plastic Bags, Brita Filters, Yogurt Cups and #5 Plastics
WeeCycle of Gainesville	Clothing, Furniture, Household Goods

Note: List is subject to change and may not be all inclusive.

Table 7.5: Zero Waste Resources

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8. Water and Aquifer Protection

Purpose

Protect Alachua County's aquifer, springs, and surface water resources by implementing integrated water quality and conservation strategies and making infrastructure improvements to mitigate the adverse effects of climate change.

Introduction

Water and Climate Change

Climate change is significantly impacting water supply by influencing and disrupting the water cycle. Rising global temperatures are leading to increased evaporation, resulting in more water vapor in the air and subsequent increased intensity and frequency of rain events. Sea level rise puts aquifers – the main source of Florida's drinking water – at risk through saltwater intrusion. Climate migration and increased duration of extreme heat events also increase demands on our aquifer for both urban and agricultural uses.

Considering climate change's breadth and extent of impacts to various water systems and sectors of the economy that depend upon limited water resources, the County is diversifying management strategies to build community-wide economic and ecological resiliency. This chapter outlines water supply resilience strategies for local governments, utilities, and state agencies including reducing urban and residential landscape irrigation, enforcing irrigation restrictions, implementing tiered water rates, enhancing aquifer recharge, and promoting water quality improvement projects and monitoring.

As climate change impacts water supply availability and distribution, continuous tracking of water withdrawals and usage patterns will be vital for adapting to new conditions. Given Florida's significant reliance on groundwater resources, monitoring rainfall and groundwater levels and pumping is crucial.

Changes associated with climate change also pose a threat to the water quality of our surface waters and groundwater. For example, fertilizer use on agricultural and urban lands can also degrade water quality. Strategies to protect our water quality and utility infrastructure are also presented in this chapter.

Water in Alachua County

In Alachua County, like most of northern peninsular Florida, the primary source of water is the Floridan Aquifer. The Floridan Aquifer is also the source for most springs on the Santa Fe River. To protect the springs, surface waters, and the drinking water in Alachua County, there must be a reduction in pollution that degrades water quality as well as a decrease in groundwater pumping.

According to the 2023 North Florida Regional Water Supply Plan (NFRWSP), the population of North Florida is projected to increase by 49% by 2045. This results in a 32% increase in water demand, or 135 million gallons a day (MGD). Even without this projected growth, the adopted Minimum Flows and Levels (MFLs) for the Lower Santa Fe and Ichetucknee Rivers are not being met due to current groundwater pumping. MFLs set minimum water levels necessary to protect water resources and maintain ecosystem services such as habitat and recreation. The NFRWSP outlines billions of dollars in proposed projects to meet projected water demand along with water conservation efforts. As our changing climate affects demand and water availability, measurable and meaningful water conservation policies, which are more cost-effective than projects, would reduce demand and the need for expensive water supply projects.

Residential and commercial water use (referred to as Public Supply) is the largest water use in Alachua County, followed by agricultural use. Agriculture is the focus of a different chapter and is beyond the jurisdiction of local government. Public Supply water use is largely driven by landscape irrigation (Figure 8.1). The UF IFAS Program for Resource Efficient Communities analyzed single family residential water use in Gainesville and found that water use greatly increased when permanent irrigation systems became prevalent in the nineties (Figure 8.2). According to 1000 Friends of Florida's Water 2070 Report, "The single most effective strategy to reduce water demand in Florida is to significantly reduce the amount of water used for landscape irrigation."[1]

[1] 1000 Friends of Florida, *Water 2070 Summary Report*, 2016.

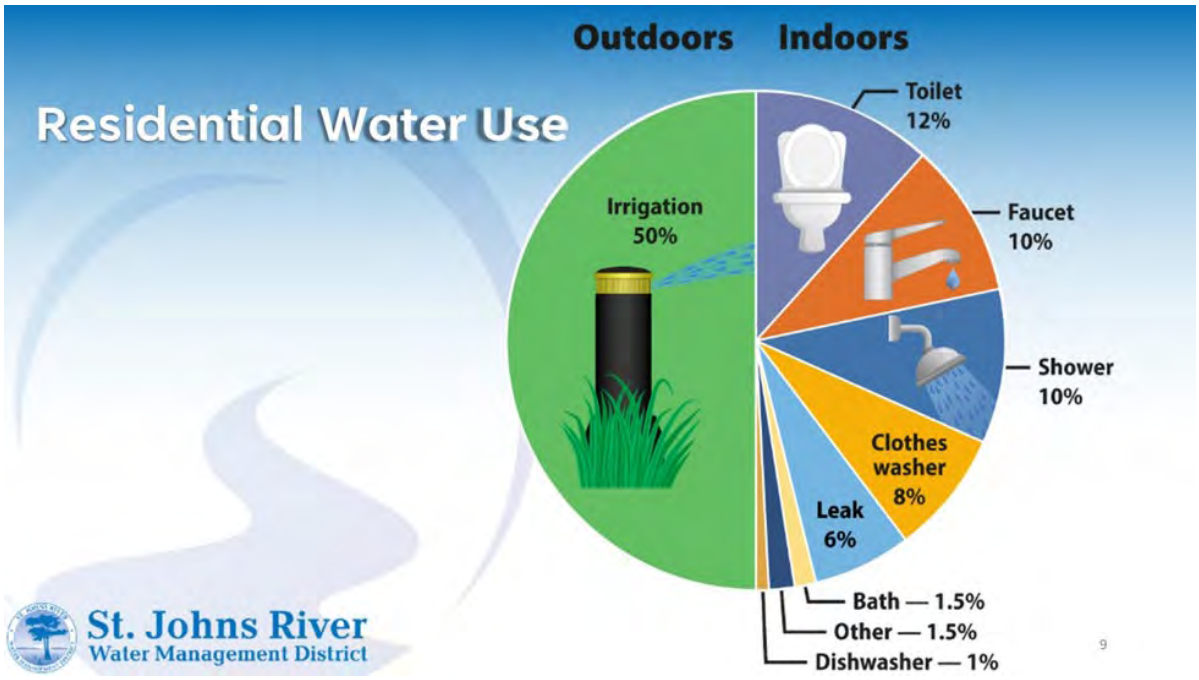

Figure 8.1: Typical Residential Water Use[2]

[2] St Johns River Water Management District, "Residential Water Use."

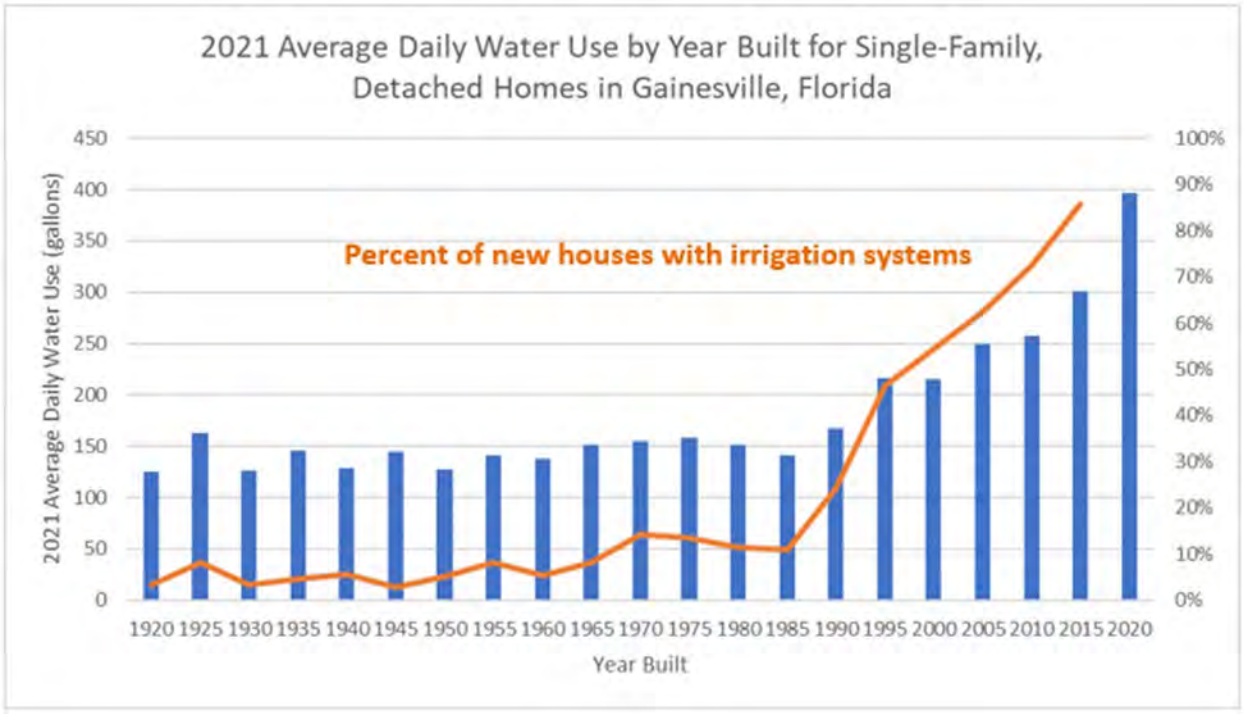

Figure 8.2: 2021 Average Daily Water Use by Year Built for Single-Family Detached Homes in Gainesville, Florida[3]

The County's Vulnerability Assessment reveals projections for changes in precipitation due to climate change. A small increase in average total annual precipitation is expected, accompanied by more heavy and extreme rainfall events and longer dry periods between storms. This can cause more variation in groundwater levels, long-term surface water levels and flow reductions, increased risk of flooding, and increased fertilizer use and irrigation/water demand. Increased runoff can lead to more pollutants entering our lakes, streams and rivers, negatively impacting water quality.

Fertilizers containing nitrogen and/or phosphorus can degrade the quality of our waters, especially during heavy rains that push nutrients past the rootzone of plants and into groundwater. Fertilizer can also contribute to algae blooms (such as cyanobacteria) when it washes off our landscapes into ponds, lakes, creeks, and other surface waters. Because cyanobacteria thrive in warm, slow-moving water, Florida and Alachua County are susceptible to their impacts.

Water Use, Efficiency, and Affordability

When looking at residential water use trends, most high-water users live in more affluent areas as most older homes do not have permanent irrigation. In this regard, strategies to reduce water use

[3] UF/IFAS Program for Resource Efficient Communities.

(such as tiered water rates) typically do not harm those residing in older residences. However, some strategies, such as rebates and monetary incentives to encourage high-water users to reduce their use, are typically distributed to wealthier individuals, as these users are most likely to live in high-water use areas.

As part of the Alachua County Energy Efficiency Program (ACEEP), Alachua County can provide households making 50% area median income or lower with water-saving technology including:

- Updated efficient clothes washers
- Updated efficient water heaters
- Efficient WaterSense toilets
- Water-efficient faucet aerators and showerheads, as part of the Community Weatherization Coalition (CWC) tune-up program.

Alachua County Comprehensive Plan

The Alachua County Comprehensive Plan addresses water supply and conservation through policies that relate to development patterns, residential density, expansion of and connection to potable water systems, aquifer protection and recharge, water conservation, water quality standards, and irrigation practices. See Appendix B for more information on the Comprehensive Plan.

Past and Current Efforts

Alachua County EPD staff have learned that voluntary programs alone are not effective at creating needed changes, so have implemented a combination of regulatory, educational, and incentive programs to create lasting behavior change.

Water Quality Code

The Alachua County Water Quality Code was adopted by the Board of County Commissioners in August of 2002. The code applies countywide and is enforced by the Alachua County Environmental Protection Department. The code originally included the following components:

- Only stormwater (with a few exceptions) can be discharged to surface waters, stormwater collection systems, and groundwater
- Best Management Practices must be used on construction sites to reduce erosion and sedimentation
- Cleanup or monitoring of pollutant discharges may be required

- Civil Citations (fines) may be issued for violating the code

The Code was later expanded to address fertilizer pollution. Current provisions state that:

- Fertilizers containing nitrogen must have a minimum of 50% of the nitrogen in a slow-release format and may not be applied:
    - during the seasonal ban of July through February
    - when soils are saturated or before a heavy rain
    - for the first 30 days after seeding or sodding (except when hydro-seeding for erosion control)
- Fertilizers containing phosphorus are prohibited unless a deficiency is verified by a soil or tissue test.
- The above standards do not apply to fruit trees and/or vegetable gardens.
- Fertilizers spilled on impervious surfaces must be removed immediately, and may not be blown or washed into storm water systems or water bodies.
- Fertilizers shall not be applied within a minimum of 10 feet from any waterbody unless a deflector shield is used (then a minimum of 3 feet is required).
- Grass clippings must be removed from impervious surfaces immediately.
- Fertilizer must be stored in areas protected from rainfall and stormwater runoff.

The Water Quality Code was further amended in 2009 to address landscape irrigation. While the County would like to implement even more protective irrigation restrictions, pre-emptions by the water management districts limit restrictions to those adopted by the state and illustrated in Table 8.1.

Irrigate only on specific day(s), and not between 10 am and 4 pm		
Location	Summer (2nd Sun. In March – 1st Sun. In Nov)	Winter (1st Sun. In Nov – 2nd Sun. In Mar)
Odd house #	Wednesday and/or Saturday	Saturday
Even house #	Thursday and/or Sunday	Sunday
Non-residential/Commercial	Tuesday and/or Friday	Tuesday

Table 8.1: Irrigation Rules for Alachua County

In 2015 the County adopted Landscape Irrigation Design Standards that were further strengthened in 2023. The goal of this article is to reduce water use by reducing the footprint of permanent

irrigation and promoting temporary irrigation for establishment of new landscapes. Current provisions of this element:

- Limit irrigation to 50% of the permeable area of lots and commercial sites
- Limit irrigation to 0.25 acres for residential lots
- Require soil moisture sensors or smart controllers
- Require approval and fees prior to installation
- Require inspections to ensure code compliance
- Require registration and annual maintenance documentation for commercial systems

Incentive and Outreach Programs

Alachua County commits significant resources (staff and budget) to public education programming. A program largely funded through the Gainesville Clean Water Partnership (Florida Department of Transportation, City of Gainesville Public Works, and Alachua County Public Works) brings educational programs to schools, camps, and public events. The Partnership also funds an illicit discharge detection and elimination program designed to identify and eliminate sources of water pollution.

The County has various campaigns designed to change behaviors that increase water use and degrade water quality. Campaigns include various components depending on budget and need and include a combination of paid social media runs, billboards, newsletter articles, paid print media ads, radio, videos, bus wraps, car wraps, exhibits at events, and more. Examples of some of our current campaigns include:

- Keeping Grass Off the Streets (decreasing pollution from grass clippings)
- Scoop it, Bag it, Trash it (decreasing pollution from pet waste)
- Only Rain Down the Drain (keeping pollution out of stormwater systems)
- FOGS Cause Clogs (keeping cooking grease out of wastewater systems)
- Fertilizer Free (reducing fertilizer pollution)
- Weeds Feed Bees (promoting more natural landscapes with multi-species)
- Watch the Weather Wait to Water (reducing irrigation in rainy season)
- Irrigation Systems Need Maintenance (reducing wasteful landscape irrigation)
- Winter Irrigation (reducing landscape irrigation while landscapes are dormant)

The County also has grant funded incentive programs to assist with more costly behavior changes. With financial assistance from the St. Johns River Water Management District (SJRWMD), in 2017-2019 the County offered builders $700 rebates for each new home that received Florida Water Star Certification. This program was only utilized by one builder. The irrigation standards in the Florida Water Star program were later largely codified into the Water Quality Code as described above.

The Turf Save Water Add Plants (SWAP) program was originally funded by the SJRWMD and then by the Suwannee River Water Management District (SRWMD) to provide 50% rebates to property owners that replaced water-intensive landscapes with Florida-Friendly Landscaping (FFL), reduced irrigation, and replaced high-volume irrigation with low-volume. This program was successful in helping promote the FFL program and normalizing shifts in landscaping away from traditional, turf-dominated yards. Water savings were realized when the program targeted high-water users.

With the conclusion of and lessons learned from the Turf SWAP program, the County recently launched an Irrigation Tune-Up program with financial support from the SRWMD. Through the Irrigation Level-Up program, staff provides free irrigation tune-ups to residents coupled with 50% rebates for eligible property owners to address issues identified by staff. The program also offers larger rebates for commercial property owners to upgrade their system and reduce the irrigated footprint. This program also offers 50% rebates for soil amendments in new constructions, as improving soil health reduces the need for irrigation, fertilizers, and pesticides.

Water Quality Monitoring Program

Protecting water quality requires a robust monitoring program. ACEPD has been monitoring water quality throughout Alachua County since the 1970s, providing a crucial baseline for environmental conditions. Currently, ACEPD monitors 20 surface water sites quarterly and 21 groundwater wells semi-annually. Large lakes such as Lake Santa Fe and Newnans Lake are sampled semi-annually by the Water Management Districts. Two of Alachua County's notable springs, Poe and Hornsby, are also sampled by the Water Management District, while ACEPD conducts quarterly monitoring of Boulware and Glen Springs, two 3rd magnitude springs within the City of Gainesville. Sampling efforts are constrained by budget and staff time. Grants are utilized to conduct special studies to further our understanding of pollution trends and sources.

The City of Gainesville maintains a rain gage network, and precipitation is also tracked by the water management districts and United States Geological Services. As climate change causes variations in precipitation patterns, supporting and analyzing these monitoring efforts is vital to understanding the impacts of extreme weather events.

Partners

Alachua County collaborates with various partners to achieve our water protection goals. As mentioned above, the Gainesville Clean Water Partnership is comprised of FDOT, the City of Gainesville, and Alachua County. The Partnership works to reduce stormwater pollution in the greater urban Gainesville area. More information can be found at their website: https://www.gainesvillecreeks.org/.

GRU, the largest utility in Alachua County, has been an essential partner in delivering water protection messages to its customers. GRU's water conservation program includes customer notifications through high water use letters, outreach efforts such as social media posts, and participation in community events. GRU also utilizes a water use data and visualization tool (H2OSAV) that helps partners identify water use trends and assess program effectiveness.

GRU has water quality protection programs and was a partner in creating the "FOGS Cause Clogs" outreach program designed to keep fats, oil, and grease out of our plumbing systems to reduce sanitary sewer overflows. GRU also created the "Unflushables" program, which turns commonly flushed items into characters to educate customers about what not to flush and why.

GRU operates a significant amount of infrastructure which includes water and wastewater treatment facilities, pumping systems, and over 2,000 miles of piping to provide potable water and wastewater service to its customers. GRU continues to invest in maintaining and replacing infrastructure to maintain and improve reliability and resiliency. GRU currently invests approximately $50 to $70 million per year in replacing aging water and wastewater infrastructure. The increase in extreme weather events with climate change makes this on-going investment even more critical.

Most of the water GRU pumps from the Floridan Aquifer and sends to its customers comes back to GRU as wastewater. In order to minimize our community's water footprint, it is important that this water be treated or "reclaimed" and beneficially reused. Reclaimed water is used for aquifer recharge, environmental restoration, and landscape irrigation. Sweetwater Wetlands Park receives flow from Sweetwater Branch which includes treated wastewater and stormwater. The wetland park further reduces nutrients in that water prior to discharging to Paynes Prairie. The park also removes sediment and trash and provides wildlife habitats and recreation. Use of reclaimed water for aquifer recharge is critical in reducing the impacts of groundwater pumping in the region. Reclaimed water is recharged to the Floridan aquifer via recharge wells and groundwater recharge wetlands. GRU is constructing the Southwest Nature Park which will include a groundwater recharge wetland with nature trails and public use facilities. The project will achieve aquifer recharge with high quality, low nutrient water and provide wildlife habitat and public recreation.

UF Institute of Food and Agricultural Sciences (IFAS) Extension is an additional resource for providing educational materials and training to the public and to our landscaping industry. ACEPD frequently partners with UF IFAS/Extension.

Program Highlight

Alachua County has one of the strongest programs for reducing the water waste from landscape irrigation. The Landscape Irrigation Design Code was initially adopted as part of the Water Quality Code in 2015 and for the first time regulated this previously unregulated industry and influenced how lots are landscaped. The Code has since been updated twice and the program has grown into a leading program across the state. Roughly three staff members review applications, inspect systems, implement compliance and enforcement actions, and conduct trainings. The program has increased the use of temporary irrigation for the establishment of new landscaping and a guidance document for such has been created by staff with input from the industry. The impacts of this program will be evaluated in 2026.

Future Strategies and Action Items

Goal 8.1 – Reduce Water Use

STRATEGY 8.1.1 *– Reduce Landscape Irrigation*

The State has adopted Minimum Flows and Levels (MFLs) for the Lower Santa Fe and Ichetucknee Rivers and Springs, and Lake Brooklyn and Geneva. MFLs establish the limit beyond which further withdrawals would be significantly harmful to the water resources or the ecology of the area as provided in Section 373.042(1), F.S. These MFLs have associated prevention and recovery strategies that outline how and when the MFLs will be achieved. The state is developing revised MFLs for the Lower Santa Fe and Ichetucknee Rivers which are expected to be ratified by the legislature in 2026. The projects and regulatory strategies should be tracked to help monitor success, with the long-term goal of meeting the MFLs within the prescribed timeframe. The following strategies and action items address ways to reach this goal and to reduce water use.

Landscape irrigation is currently one of the largest water uses in Alachua County and accounts for over 50% of residential water use. While Alachua County has made significant strides in shifting landscaping practices, the following action items would further reduce water use if pursued and/or continued.

Table 8.2: Action Items for Reducing Landscape Irrigation (Strategy 8.1.1)

Action Items	Jurisdiction	Pros	Cons	Status
Limit use of irrigated turfgrass	Local government	Great water savings	Builder and homeowner resistance, potentially staff intensive	Current (limit irrigation to 50% of area)

Prohibit new permanent irrigation	WMD	Great water savings	Political resistance	Not Started (preempted)
Rebates to improve irrigation efficiency	Funding from WMD/FDEP, implemented by local government or utilities	Decent water savings	Staff intensive, voluntary participation	Current
Remove exemptions for micro-irrigation	WMD	Marginal water savings	Requires a rule change or addition as element of MFL	Not Started (preempted)
Prohibit new landscape installations during water shortages	WMD/Local Government?	Marginal water savings	Requires a rule change or addition as element of MFL	Not Started
Extend the daytime prohibition on irrigation from 9 am to 6 pm	WMD	Marginal water savings	Requires a rule change or addition as element of MFL	Not Started (preempted)
Update Florida Friendly Landscaping program to discourage irrigation and fertilizer	FDEP, UF, IFAS extension	Marginal water savings and water quality improvements	Voluntary participation	Emergent
Rebates to builders/developers to install alternative groundcovers and no irrigation on landscapes	Funding from WMD/FDEP, implemented by local government or utilities	Great water savings	Builder resistance, voluntary participation	Not Started
Require soil amendments in new construction	Local government	Great water savings if change watering behaviors	Builder resistance, staff intensive	Not Started (anticipated for 2026)
Require Florida Water Star Gold in new construction	Local government or utilities	Modest water savings	Builder resistance, lack of certifiers	Not Started

STRATEGY 8.1.2 *– Reduce Water Use from Landscape Irrigation Wells*

Tiered water pricing has been an effective tool implemented by utilities to decrease discretionary water use, as prices increase with increased use. Unfortunately, a simple way for high water users to avoid this pricing tool is to install an irrigation well. Irrigation wells contribute to over pumping of the aquifer and lead to uncertainties in water use projections and monitoring. Because well metering has not been historically required, it is presently impossible to accurately report the

current baseline for groundwater pumping from the region. Alachua County continues to advocate for changes to the well permitting rules to prohibit new landscape irrigation wells and to require metering for any new wells. To document progress, a map of all suspected irrigation wells in Alachua County should be created.

Table 8.3: Action Items for Reducing Water Use from Landscape Irrigation Wells (Strategy 8.1.2)

Action Items	Jurisdiction	Pros	Cons	Status
Prohibit new irrigation wells when public supply is available	WMD or utilities (for new developments)	Improves effectiveness of aggressive tiered rates to discourage high users	Political resistance, greater demand on utilities	Not Started (preempted)
Limit new irrigation wells for common areas	WMD	Improved water use data, price signal decreases water use	Political and builder resistance	Not Started (preempted)
Require metering and reporting of water use data and leak detection	WMD	Improved water use data and transparency	Political resistance, staffing	Not Started (preempted)
Enforce prohibition of well water use in reclaimed water areas	WMD	Marginal water savings and aquifer protection from contamination	Staffing	Current (not enforced)
Rebates to plug existing wells	Funding from WMD/FDEP, implemented by local government or utilities	Marginal water savings and aquifer protection from contamination	Staff intensive, voluntary program	Not Started

STRATEGY 8.1.3 *– Improve Consumptive Use Permitting.*

Per capita water use is a common metric for measuring a community's collective water use. However, per capita water use is influenced by development patterns and residential types (for example, multi-family residential water use is typically much lower compared to single family residential) and ignores other uses included in public supply. To accommodate future growth and maintain healthy flows for rivers, springs and lakes, the per capita water use will need to decrease

with the goal of maintaining or decreasing current municipal Consumptive Use Permit (CUP) allocations as population increases. Table 8.4 summarizes current CUPs issued for each municipality within Alachua County. As a measure of success in decreasing water use, changes in CUPs should be tracked with a goal of not increasing allocations as the population increases.

Municipality/PW Suppliers	Consumptive Use Permit-CUP (mgd)	Issue Date	Expiration Date
City of Gainesville (GRU)	30	9/10/2014	9/10/2034
City of Alachua	1.7843	8/13/2024	8/14/2029
City of High Springs	1.1178	7/11/2023	7/11/2028
City of Newberry	0.89	3/22/2023	3/22/2028
GRU South Energy Center (backup)	0.341	3/25/2008	3/25/2028
City of Hawthorne	0.298	1/4/2006	12/12/2025
City of Archer	0.2567	4/28/2023	4/28/2043
City of Waldo	0.1723	7/21/2022	7/21/2042
Town of Micanopy	0.103	1/13/2021	1/13/2041

Table 8.4. Consumptive Use Permits issued to Municipalities/Public Water Supply Providers in Alachua County.

Table 8.5: Action Items for Improving Consumptive Use Permitting (Strategy 8.1.3)				
Action Items	**Jurisdiction**	**Pros**	**Cons**	**Status**
Redefine the public interest and reasonable beneficial use for CUPs and scrutinize all permits	WMD	Great water savings	Political resistance	Not Started (preempted)
Require and enforce measurable and aggressive water conservation plans	WMD	Great water savings and Improved water use data	Political and utility resistance	Not Started (preempted)
Require offsets for existing and new permits immediately	WMD	Great water savings or increased recharge	Political resistance and costs	Emerging (MFL may require)

Goal 8.2 – Increase Water Quality and Quantity

STRATEGY 8.2.1 – Improve Utility Water Supply and Wastewater Infrastructure Protection

Maintaining drinking water and wastewater infrastructure is important and will become increasingly challenging as we experience the impacts of climate change. Increases in storm intensities will increase the likelihood of wastewater releases. Gainesville Regional Utilities (GRU) is the largest utility in Alachua County and provides water and wastewater to much of the unincorporated area of Alachua County. Alachua County does not operate a utility, so it has a minor role in protecting infrastructure through the action items below.

Table 8.6: Action Items for Improving Utility Water Supply and Wastewater Infrastructure (Strategy 8.2.1)				
Action Items	**Jurisdiction**	**Pros**	**Cons**	**Status**
Continue or expand tiered water rates	Utilities	Effective in promoting conservation	If tiers become too aggressive customers install irrigation wells in the absence of prohibition	Not Started
Ongoing replacement and upgrade of aging water infrastructure	Utilities	Reduces leaks, improves safety and reliability, ensures long-term sustainability	Utility rate pressure/cost	Current
Direct Potable Reuse	Utilities	Reduces groundwater pumping	Costs and public perception	Not Started
Automate Metering Infrastructure (AMI)	Utilities	Informs water conservation efforts	Costs and staff intensive	Emerging
Continue Water Quality Improvement Projects & Programs	Utilities, Local Government	Maintain & Improve Water Quality	Costs and staff intensive	Current
Ongoing investment in replacement and upgrade of aging wastewater infrastructure	Utilities	Minimize Sanitary Sewer Overflows (protects water quality) and ensure long-term system viability	Utility rate pressure/cost	Current
Septic to sewer conversions	Utilities, Local Government, State Funding	Reduce nutrient pollution from septic tanks	Funding limitations; sewer not available, homeowner unwillingness	Not Started

STRATEGY 8.2.2 – *Improve Water Quality Monitoring*

Currently, ACEPD monitors 21 groundwater wells semi-annually. A recent groundwater report conducted by AquiferWatch on behalf of Alachua County recommended expanding the groundwater monitoring network to 45 groundwater monitoring wells. This expansion would more than double the size of the current network and would provide a more comprehensive baseline groundwater quality monitoring network.

Water quality data are shared with the State and surface water data is used to determine impaired water bodies in need of water quality improvements through the Total Maximum Daily Loads (TMDL) program. The State then works with stakeholders to adopt a Basin Management Action Plan (BMAP) to outline how and when water quality improvements will be achieved. Alachua County is within the Silver, Santa Fe, and Orange Creek BMAPs and is responsible for a portion of the nutrient load reductions in each basin. Progress is reported annually, and Alachua County must outline how the allocations will be met by January 2026.

Table 8.7: Action Items for Water Quality Monitoring (Strategy 8.2.2)

Action Items	Jurisdiction	Pros	Cons	Status
Expand monitoring and analysis of water quality stations for surface water and groundwater	Local Government FDEP, WMD	Understanding of water quality status and trends	Costs	Emergent
Create hurricane response sampling team	Local Government, Utilities	Immediate assessment of storm impacts	Costs, safety	Not Started
Identify projects and policies to meet Alachua County's BMAP allocations	Local Government	Will improve water quality	Costs, staff intensive, limited options	Emergent

STRATEGY 8.2.3 *– Increase Aquifer Recharge*

While decreasing water use is important for protecting the aquifer, projects that increase recharge of the aquifer are also beneficial. These projects typically utilize highly treated wastewater as source of recharge water. Since Alachua County does not operate a wastewater treatment facility, those projects are led by utilities like Gainesville Regional Utilities. Recharge with treated stormwater is another recharge option to be explored.

Table 8.8: Action Items for Increasing Aquifer Recharge (Strategy 8.2.3)				
Action Items	**Jurisdiction**	**Pros**	**Cons**	**Status**
Implement projects to Increase aquifer re-charge using reclaimed water or stormwater	Utilities	Return of high quality low nutrient water to aquifer reduces impact of pumping	Costs, Must have suitable sites	Emergent
Increase reclaimed water pricing to promote water conservation	Utilities	Reduced reclaimed water use, Improved water quality, more water available for recharge	Need policies in place to prevent irrigation wells	Not Started

Goal 8.3 – Increase Water Efficiency in New Developments

STRATEGY 8.3.1 – Establish New Development Requirements

As documented in the North Regional Water Supply Plan, this region will continue to grow. Climate change and increasingly challenging conditions in coastal areas may exasperate growth. It is crucial to minimize the impact of new growth. Land development regulations are typically limited to the jurisdiction in which the property is located.

Table 8.9: Action Items for Establishing New Development Requirements (Strategy 8.3.1)				
Action Items	**Jurisdiction**	**Pros**	**Cons**	**Status**
Minimize site clearing	Local government	Reduce water use, protect soils and habitat	Builder/developer resistance	Current (needs improvement)
Require Low Impact Development techniques	Local government	Improved water quality and increased recharge	Builder/developer resistance, costs, maintenance	Current (needs improvement)
Require new septic systems be Enhanced Nitrogen Reducing (ENR) systems	Local government	Improved water quality	Costs, maintenance requirements, political resistance	Emergent
Improved lift station requirements	Local government and/or utilities	Reduces sewer overflows	Costs	Not started
Require soil amendments in new construction	Local government	Great water savings if change watering behaviors	Builder resistance, staff intensive	Not Started (anticipated for 2026)
Require Florida Water Star Gold in new construction	Local government or utilities	Modest water savings	Builder resistance, lack of certifiers	Not Started
Continue water/sewer connection requirements in Urban Cluster	Alachua County	Serves greater population with high quality water & greater efficiency	Limited to unincorporated Alachua county	Current
Retain/lower density in rural area outside Urban Cluster	Alachua County	encourage density in municipalities		Current

Triple Bottom Line

People

Through the strategies above, Alachua County can improve water quality and prevent water contamination, which can increase the health of citizens by avoiding certain waterborne diseases (e.g., *E. coli*). Additionally, by minimizing nutrient loading and excessive water use, Alachua County can protect its springs. Springs protections allow citizens to keep enjoying them for recreation and socialization. Implementing these strategies now protects springs and aquifers for generations, especially considering the expected population and water demand increase in the next 50 years.

Profit

Irrigating a yard can cost around $5 to $25 each time.[4] By decreasing water use, property owners and businesses reduce water bills, saving money. If successful in reducing community wide water use, Alachua County can meet the demand created by future growth with existing resources rather than implementing expensive water supply projects. Additionally, if the County minimizes nutrient loading, there is an avoided cost of cleaning up these waters.

Protecting Alachua County springs can also bring in revenue via tourism. Between 2016-2017, around 3 million people visited Florida state park springs, generating between $60-130 million.[5] In 2019, around 3.9 people visited these springs, generating over $350 million, showing an increase in interest and tourism.[6] The many springs in Alachua County serve as an important employment and revenue source.

Planet

The importance of springs and aquifers to local fauna and flora cannot be understated. Keeping water levels stable and maintaining high water quality is necessary for local ecosystems, and humans, to thrive. Without healthy water, ecosystems can collapse, disrupting the natural balance.

Community Engagement

[4] Borisova et al., "Estimating Benefits of Residential Outdoor Water Conservation: A Step-by-Step Guide," *UF/IFAS.*
[5] Buck, "UF/IFAS Study Illustrates Value Floridians, Others Place on Springs," 2018.
[6] UF/IFAS, "How Springs Invigorate Florida's Economy."

Volunteering Opportunities

Every member of the community plays an important role in protecting water, especially amid a changing climate. Each person can take action to reduce their water use and personal pollution, but collectively, they can make great strides in protecting their water resources on a larger scale. For more ways to get involved, volunteer with us at www.Volunteer.AlachuaCounty.us

Minimizing Landscape Irrigation

One of the most direct ways to alleviate pressure on our groundwater supply is by reducing the amount of landscape irrigation on your property and limiting its use. To eliminate the need for irrigation, replace turfgrass lawn with drought-tolerant native plants. Hardy native plants can typically thrive on rainfall alone, reducing the need for landscape irrigation. Furthermore, native plants provide habitats for pollinators and other wildlife. Learn more about native plants and landscaping for water conservation on the Florida Friendly Landscaping website and the Florida Springs Institute Website.

The greatest long-term water conservation impact is achieved by capping or removing irrigation on established landscapes. Irrigation restrictions (days of the week) mandated by the Water Management Districts are the maximum amount of irrigation allowed on a property and allow watering that often exceeds plants' needs. The County therefore recommends turning irrigation systems off and operating them manually only as needed. Slowly adjusting run times and turning off zones that no longer need irrigation is also an option.

Property owners with a permanent irrigation system and an average monthly water use exceeding 10,000 gal/month can request a free irrigation tune-up from the County's Water Conservation Team. Eligible customers can also take advantage of rebate funds, when available, to help cover some of the costs incurred to remove irrigation or upgrade to more efficient components.

Reducing Personal Pollution

Fertilizer reduces water quality when it is carried into surface water by stormwater runoff or into our groundwater through leaching. When nitrogen from fertilizer is washed into surface water, it harms local wildlife and contributes to algae outbreaks, which harm wildlife and make our water unsuitable for swimming, boating, and fishing.

Since 2018, the share of Alachua County residents who say they do not use fertilizer increased from 55% to 68%. To join these residents in their efforts to minimize fertilizer use, sign this pledge to eliminate the personal use of fertilizer and receive a Fertilizer Free bumper sticker. The pledge can be found at MyYardOurWater.org

In most home landscapes, many species of beneficial plants and native wildflowers are intermixed with turf. However, these plants are often framed as “weeds” by landscaping companies. Homeowners may thus be persuaded to have them treated with herbicides. Residents can prevent water pollution by skipping herbicides and fertilizers and embracing wildflowers and weeds. In addition to adding interest and beauty to our landscapes, wildflowers and native “weeds” thrive without irrigation. They also serve as a critical food source for birds, bees, and other pollinators. To help residents discover the hidden beauty of “weeds” in their yards, Alachua County launched a new initiative on iNaturalist (an app), a global database where anyone can document their observations of the natural world using their phones.

Alachua County has a “Pooper Scooper” ordinance (Alachua County Code 72-13) that requires pet owners to clean up pet waste. When not picked up and left on the grass or in the street, pet waste washes into storm drains and pollutes our surface waters. Pet waste also contains nutrients that contribute to algae outbreaks. Furthermore, pet waste carries diseases such as *E. coli* that make water unsafe and disproportionately impact children and immuno-compromised individuals.

In Alachua County, many storm drains lead to our waterways with no filter. This means that pollution on land travels into these storm drains when it rains and eventually flows into creeks, lakes, and other natural areas. Residents can help the Environmental Protection Department ensure that there is “only rain down the drain” by reporting illegal discharges to the Clean Creeks Hotline: (352) 264-6800. Illegal discharges include:

- Cleaners and solvents
- Wash water from cars, mops, and carpet cleaning
- Landscaping debris and chemicals
- Oil and grease
- Paints
- Swimming pool discharge
- Construction dirt and debris
- Litter
- Wastewater (sewage)

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Alachua County, Florida

Climate Vulnerability Assessment

FINAL REPORT | **JULY 2024**

About

Alachua County

Alachua County, in north-central Florida, is characterized by its landlocked geography. It is renowned as the location of the University of Florida, a prominent public research institution. With a population exceeding 250,000 residents, most of whom reside in and around Gainesville, Alachua County is a vibrant community. The County boasts abundant natural resources and parks, including the notable Paynes Prairie and freshwater springs.

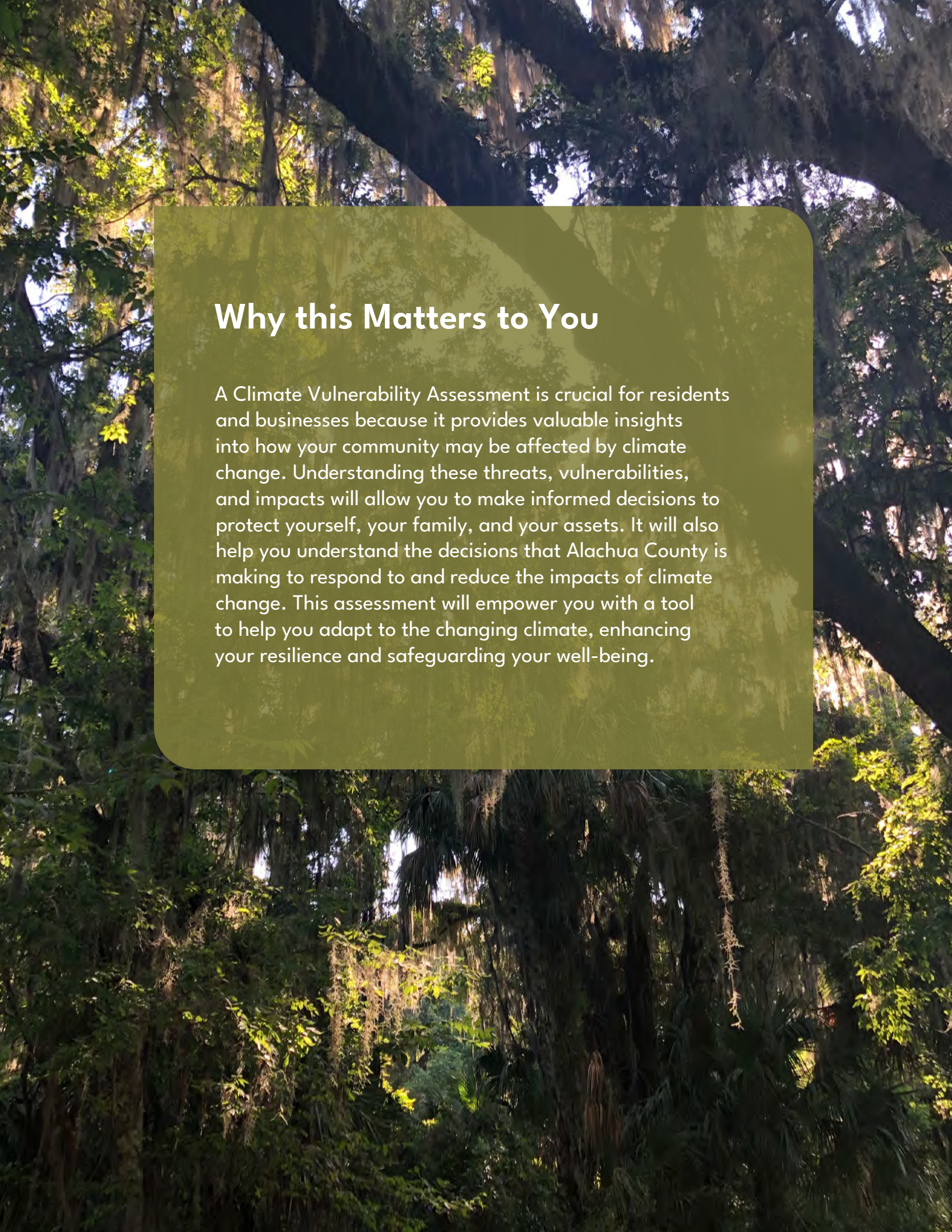
Considering ongoing climate changes, Alachua County recognizes the importance of adapting and evolving. to address these challenges effectively, the County has undertaken a comprehensive Climate Vulnerability Assessment. This Assessment aims to identify key areas of vulnerability and determine optimal strategies for fostering resilience within the community. By proactively assessing risks and planning, Alachua County endeavors to create a more resilient and sustainable environment for its residents.

Climate Vulnerability

Alachua County faces vulnerability from various hazards that pose threats to its communities, businesses, and environment. These hazards can be natural, societal, or technological and can cause significant adverse impacts on human health, the environment, and the economy. Recognizing the importance of assessing vulnerability to climate change and natural hazards, it's crucial to understand that climate risks and associated losses aren't solely determined by the hazard itself. Societal and economic factors influencing preparedness and responses to such events are equally critical. To quantify these hazards and impacts, the County conducted a Climate Vulnerability Assessment.

Climate Vulnerability Assessment

A Climate Vulnerability Assessment in a municipality or county is a comprehensive analysis aimed at identifying and understanding the susceptibility of the municipality or county and its inhabitants to various risks and threats related to climate change. The assessment typically involves evaluating the municipal or county infrastructure, natural resources, socio-economic factors, and population demographics to determine potential vulnerabilities to hazards. The Climate Vulnerability Assessment provides foundational information to support decisions about preparing for and adapting to climate change. This Final Report details the results from the Climate Vulnerability Assessment performed for Alachua County.



Why this Matters to You

A Climate Vulnerability Assessment is crucial for residents and businesses because it provides valuable insights into how your community may be affected by climate change. Understanding these threats, vulnerabilities, and impacts will allow you to make informed decisions to protect yourself, your family, and your assets. It will also help you understand the decisions that Alachua County is making to respond to and reduce the impacts of climate change. This assessment will empower you with a tool to help you adapt to the changing climate, enhancing your resilience and safeguarding your well-being.

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Understanding the Analysis

This section summarizes the technical report titled, "Spatial Vulnerability Assessment Report."

Threats include a range of potential risks and hazards that could negatively impact the identified categories of critical assets within Alachua County. These threats may include natural disasters such as hurricanes, floods, or wildfires, which could endanger critical infrastructure, natural resources, and residential or commercial areas. For this assessment **three primary threats** were identified: (1) **extreme heat**, (2) **heavy rainfall**, and (3) **sea level rise**.

Other threats, which are not climate-induced and not directly examined in this analysis, include human-induced risks such as pollution, deforestation, and urbanization, which could affect the County's built environments and natural areas. Threats could also extend to socio-economic factors such as economic downturns and population growth, which may pose challenges to the resilience and stability of the community's assets. By systematically categorizing these threats and evaluating their potential impacts on different elements of the community's assets, the County can develop targeted strategies for mitigating risks and enhancing resilience.

Each threat was reviewed in the context of the community's assets. The community's critical assets were divided into categories to evaluate potential vulnerabilities and risks. By adopting this structured approach, the diverse components of the County's built environment and natural areas could be evaluated.

Community assets evaluated include critical infrastructure and services as well as natural, cultural, and historical resources, homes, and businesses. These assets represent most of the County's built environment and natural areas. Table 1 shows the seven asset categories that were established.

For this analysis, the team evaluated the vulnerability of physical assets using property or parcel-based data within Alachua County. This approach enables a comprehensive evaluation of the County's built environment, including places where people live, work, and socialize.

KEY TERMS

Extreme Heat – Excessive and prolonged high temperatures, often surpassing normal seasonal averages, posing risks to health, infrastructure, and ecosystems.

Heavy Rainfall – Intense precipitation events characterized by significant amounts of rainfall over a short period, potentially leading to impacts such as flooding and infrastructure damage. Heavier periods of rain are expected with a changing climate.

Sea Level Rise - The gradual rise in the average global sea levels, primarily attributed to the melting of polar ice caps and expansion of our oceans resulting from an increase in global temperatures.

Table 1.
Asset Categories and Types of Community Assets within Each Category.

ASSET CATEGORY	TYPES OF COMMUNITY ASSETS
Critical Infrastructure	Airport, Bus Terminal*, Communication Facility, Disaster and Debris Management Site, Drinking Water Facility*, Electric Facility*, Rail Facility, Solid Waste Facility*, Utility Property, Wastewater Facility*
Critical Community and Emergency Facilities	Community Center*, Correctional Facility*, Disaster Recovery Site*, Emergency Medical Services*, Fire Station*, Emergency Operation Center*, Healthcare Facility*, Higher Education, Hospital*, Law Enforcement, Municipal Property*, School*, Shelter*, State Government Property
Natural, Cultural, and Historic Resources	Cemetery*, Conservation Land, Historical and Cultural Assets, Parks*
Residential	Assisted Housing*, Assisted Living (Gainesville)*, Condominium, Miscellaneous Residential, Mobile Home Park*, Multifamily Property*, Nursing Home*, Residential Health Facility*, Single Family Property, Retirement Home*
Commercial	Daycare*, Gas Station*, Grocery Store*, Hotel, Industrial Property, Mining, Parking, Recreation, Rest Home, Timber, SNAP Store Retailer*, Stores, Miscellaneous Commercial Property, Commercial Retention Pond
Undeveloped Land	Vacant County Land, Vacant Commercial/Industrial Land, Vacant Institutional Land, Other Vacant Government Land
Services - Other	Food Bank*, Library*, Nonprofit, Relief Agency*, Religious, SNAP Store Retailer*

*Indicates a Critical Asset as defined by the Florida Department of Environmental Protection Flood Vulnerability Assessment Requirements.

The Assessment also includes locations of critical infrastructure and facilities where government and non-government entities provide services. Property-based information was also used to include natural areas in the Climate Vulnerability Assessment.

The Climate Vulnerability Assessment will identify specific **assets** at risk from specific **threats.** Vulnerability is quantification of how exposed an asset is to a particular threat and how easily it can be adapted or changed to reduce the exposure.

Threats can be defined as a range of potential risks and hazards that could negatively impact the identified categories of critical assets.

Assets can be defined as the identified categories of critical infrastructure, natural resources, residential or commercial areas, built environments, and natural areas, such as shown in Table 1.

What are the Important Components?

Vulnerability assessments evaluate three main components that, when combined, provide a quantifiable vulnerability:

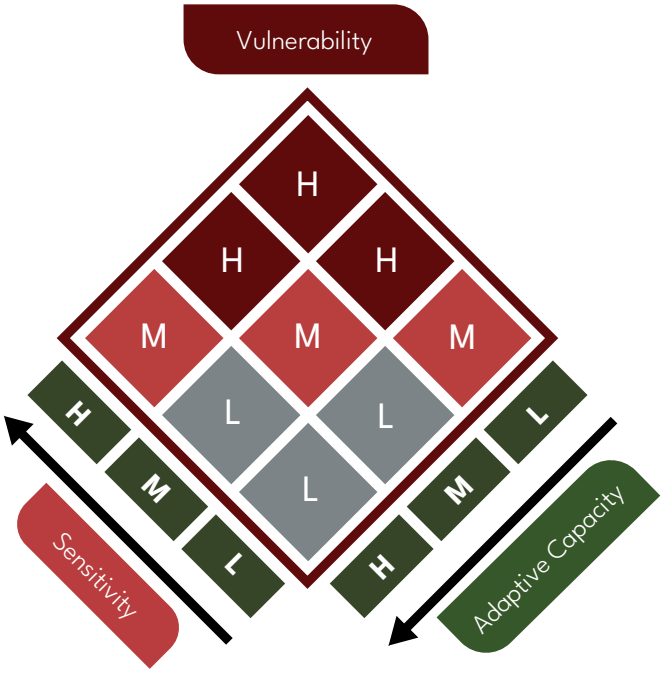
EXPOSURE - Exposure refers to the presence of people, assets, and ecosystems in areas where hazards can cause adverse effects.[1]

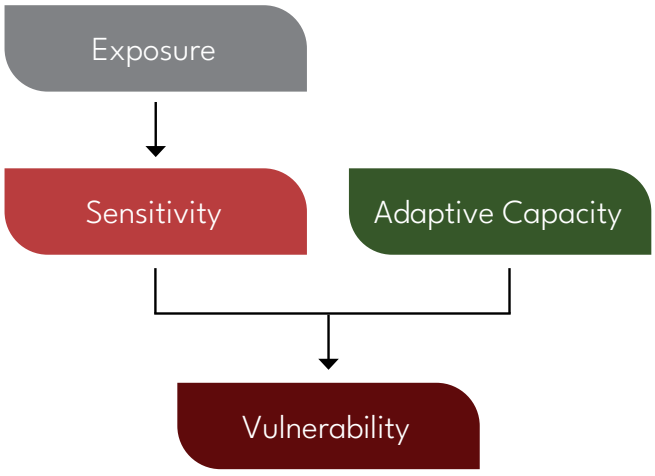
SENSITIVITY - Sensitivity measures the extent to which an exposed asset is impacted.

ADAPTIVE CAPACITY - Adaptive capacity represents an asset's ability to manage or endure the potential impact of the threat with minimal disruption or loss.

VULNERABILITY - The vulnerability of a community is determined by combining sensitivity and adaptive capacity levels, as illustrated in the figure below.

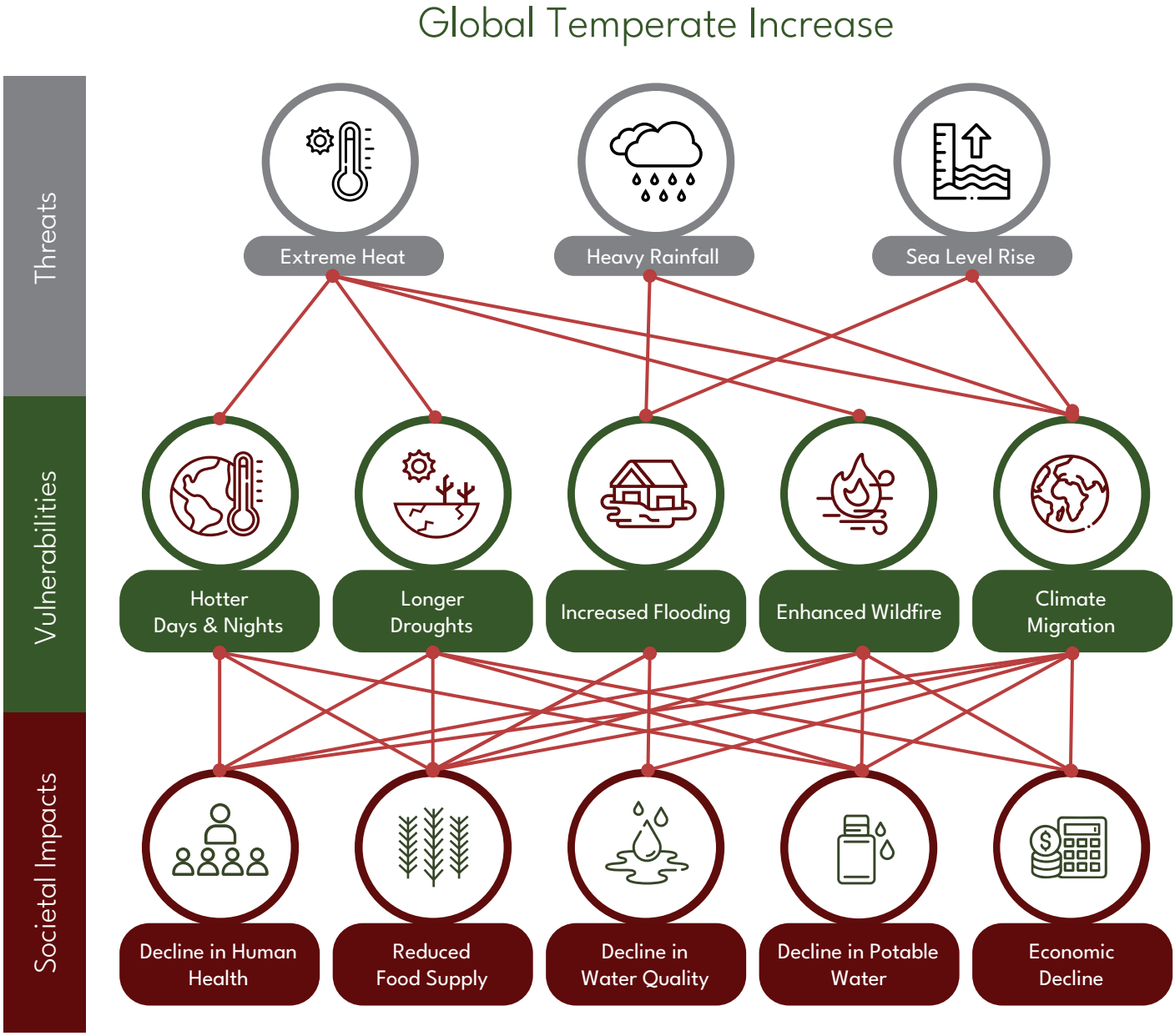
Assets with low sensitivity and high adaptive capacity are considered the least vulnerable, whereas those with high sensitivity and low adaptive capacity are deemed the most vulnerable. The levels of adaptive capacity are shown as **high (H)**, **medium (M)**, and **low (L)**.





Interconnected Climate Impacts

Through the Climate Vulnerability Assessment, we can understand how vulnerable an asset, or the community is to a particular threat. The graphic below demonstrates the interconnected nature of climate threats and how those threats increase our vulnerability and impact you and society, in general. For example, heavier rainfall will increase flooding and impact the food supply.



The remainder of this report explores **climate vulnerabilities and societal impacts** in more detail. Each of these sections are **based on detailed technical reports.**

Hotter Days & Nights

This section summarizes the technical report titled, "Critical Infrastructure and Land Use Climate Vulnerability Analysis - Task 3.1 - Climate Data Review."

High temperatures will increase the need for air conditioning leading to **higher utility bills, heat-related illness,** and potential **failing window air conditioning units.**

Many national and international meteorological organizations have published estimates that July 2023 was likely the world's hottest month, and 2023 is the hottest year on record since the start of recorded observations in the late 19th century. Models from the World Weather Attribution (a non-profit organization that studies the probability of weather events) and other research entities indicate that climate change is most likely responsible for the record-setting heat, and additional record-breaking temperatures are likely soon given current climatological trends.

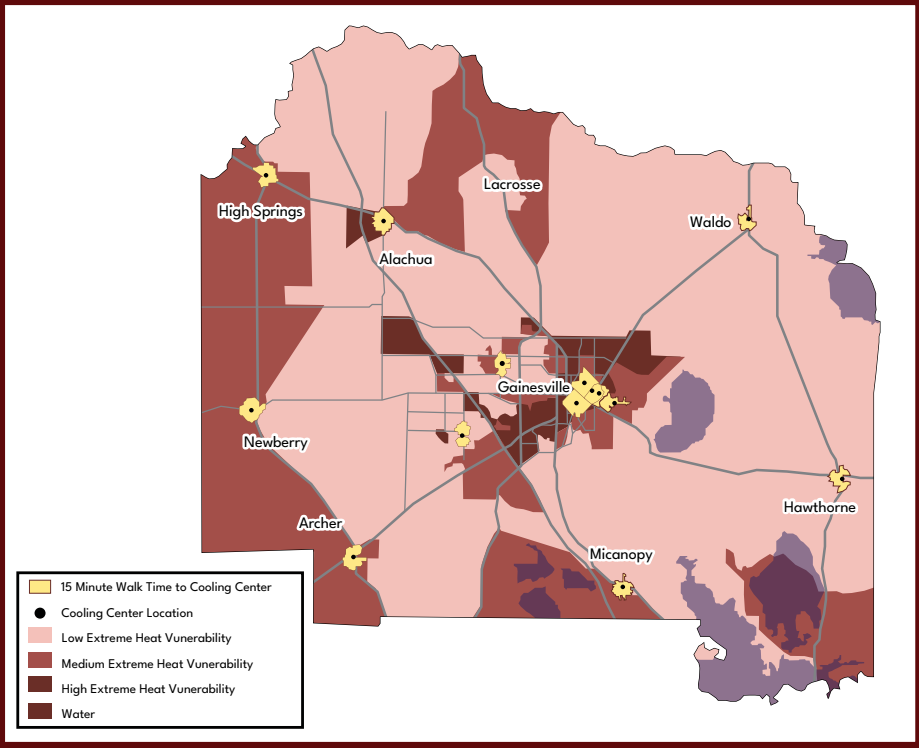
Extreme heat incidents occur when outside temperatures exceed those typically experienced within a region and may strain or surpass climate control capabilities that are commonly available (i.e., increased need for effective air conditioning). These incidents may occur across the entire County over a few hours, days, and possibly weeks. These incidents may lead to heat-related health impacts and increased utility bills, most notably in lower-income households with weaker climate control capacities. These incidents may also impact power transmission systems, potentially resulting in brownouts and power outages. Brownouts can be defined as temporary reductions in electrical power distribution due to strain on the power transmission systems during extreme heat incidents. When outside temperatures exceed the average temperature for the area, there is an increased demand for air conditioning, which can overload the power transmission systems, leading to brownouts. Brownouts typically result in reduced voltage levels in the electrical grid, causing lights to dim and electrical appliances to operate less efficiently.

The proportions of developed land cover, tree cover, and median household income were analyzed to assess vulnerability to extreme heat, including factors related to urban heat island effects. The proportion of developed land cover is an environmental indicator of exposure to higher temperatures, with urban areas often experiencing more intense heat due to the urban heat island effect. Tree canopy coverage contribute significantly to mitigating the heat island effect through shade provision and evaporative cooling, underscoring the importance of extensive tree canopy coverage as a gauge of environmental resilience. Additionally, the median household income is a social/financial indicator of adaptive capacity, or ability to adapt, to extreme heat. Individuals with a lower income level will have less access to extreme heat-protective measures, including adequate cooling, medical care, reliable transportation, etc. This socioeconomic disparity can exacerbate the impacts of extreme heat events, particularly in urban areas.

The Assessment approach combines exposure and adaptive capacity indicators to classify relative vulnerability for each census block group. Additionally, data on high-risk groups are overlaid for visualization, allowing separate assessments and tailored heat-management strategies based on specific group needs. The extreme heat assessment focused on public health at the neighborhood level by combining environmental indicators of urban heat island effect with social indicators.

High heat vulnerability areas occur in the urban core of the City of Gainesville, the west part of Alachua County, and along sections of Interstate 75 between the Cities of Alachua and Gainesville. In Alachua County, the impact of extreme heat in neighborhoods with insufficient cooling as night and day temperatures and humidity increase with climate change can vary depending on the severity of the hazard and the vulnerability and inequitable socioeconomic conditions of the neighborhood. Although most households have air conditioners, interior cooling in some homes may need to be improved due to improperly sized and antiquated units. For example, window air conditioner units may no longer be sufficient. Insulation also plays a significant role in interior cooling, and inadequate insulation can lead to increased energy consumption and difficulty maintaining comfortable indoor temperatures, especially during extreme heat events.

Groups who are considered vulnerable to extreme heat, referred to as "at-risk" populations, have increased exposure/sensitivity or reduced adaptive capacity to extreme heat. Several populations are known to be more susceptible to extreme heat impacts than others. Student-athletes are susceptible to dehydration and heat-related illness from exposure during outdoor practice in an unshaded environment. 64 public schools and two higher education institutions, the University of Florida and Santa Fe College, are within Alachua County. These educational institutions provide physical education and athletic opportunities where students will be exposed to extreme heat conditions



Identified locations of Extreme Heat Vulnerability coincident with locations of Public Schools.

and susceptible to health impacts from the exposure. Infants and young children are also vulnerable to extreme heat and cannot recognize the signs and symptoms of heat exhaustion. They also lack knowledge on how to treat and prevent it. The figure above shows the locations of public schools within Alachua County; 16 of which are in block groups with high heat vulnerability. There are multiple schools in or surrounding the City of Alachua, which also have a high heat vulnerability block group.

As the climate of Alachua County changes, the area will see an increase in the number of very warm nights, longer consecutive periods of very warm nights, and a reduction in the number of freeze events. As shown in Table 2, this will impact many aspects of daily life, including agriculture and cooling needs.

Table 2.
Average Annual Number of Extreme Heat and Freeze Events over Assessment Periods.

	Number of Very Warm Nights (min. temp. >80°F) (Days)	Longest Period of Consecutive Very Warm Nights (Days)	Number of Freeze Events (min. temp. <32°F) (Days)	Longest Period of Consecutive Freeze Events (Days)
Baseline	0	0	7	3
2030	1	1	6	2
2040	1	1	4	2
2070	17	7	2	2
2100	73	28	0	0

Heat Index

The Heat Index measures how warm the air feels, accounting for humidity. Extended exposure to high Heat Index conditions, especially during physically demanding activities, can result in severe heat-related illnesses such as heatstroke and heat exhaustion. The Heat Index serves as a crucial indicator of outdoor safety for workers, with the National Oceanic and Atmospheric Administration (NOAA) issuing alerts when the Heat Index is forecasted to exceed 105˚F to 110˚F for two consecutive days.[2] NOAA outlines potential symptoms corresponding to four categories of heat index: Very Warm, Hot, Very Hot, and Extremely Hot. The assessment projected changes in the Heat Index from baseline to future assessment periods. This assessment involved calculating the average annual number of days when the daily minimum and maximum heat indices fall within each NOAA category for each assessment period, as detailed in Table 3 using the Lu and Romps (2022) method.[3] Table 3 shows the projected changes in the average annual number of days crossing each threshold for both the minimum and maximum daily Heat Index.

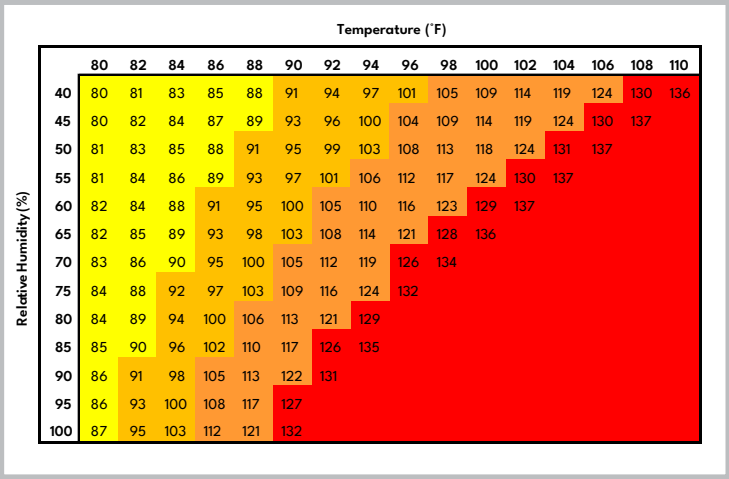
The Heat Index measures how warm the air feels, considering humidity levels. It includes both minimum and maximum values. The minimum Heat Index refers to the lowest Heat Index value recorded during a specific period, usually a day. Conversely, the maximum Heat Index represents the highest Heat Index value recorded during the same period. These indices help gauge the range of heat exposure experienced over time, providing valuable information for assessing potential health risks and safety measures.

Table 3.
Average Number of Days per Year that the **Maximum** Heat Index would trigger an NOAA Alert.

	Very Warm 80-89°	Hot 90-104°	Very Hot 105-129°	Extremely Hot ≥130°
Baseline	26	64	95	36
2030	23	51	94	53
2040	27	55	81	70
2070	24	54	75	107
2100	20	43	68	138

NOAA Heat Index

Likelihood of Heat Disorders with Prolonged Exposure and/or Strenuous Activity.



Temperature-Humidity Index (THI)

Another measure of heat is the Temperature-Humidity Index (THI). The THI is a measure that combines the effects of air temperature and humidity. The THI is widely used for weather safety and was developed to monitor and reduce heat stress-related losses of livestock. Animal species have different sensitivities to temperature and moisture levels in the air. For example, cattle can typically handle high temperatures. However, as humidity increases, the ability of cattle to handle the heat load decreases, and they exhibit signs of thermal stress. Lactating cows have even less tolerance. The effects of this stress can result in significant economic losses to the dairy industry due to cows' decreased milk production, fertility, feed intake, growth, and longevity. As climate changes the number of days with temperatures above the threshold that will create heat stress on the cow population in Alachua County will increase by 20-30% over the remainder of the century (Table 4).

Recent research has shown that there's a lot of variation in the thresholds for when cows get stressed from heat. While a Temperature-Humidity Index (THI) of 68 is often used as a sign of heat stress for cows producing milk, it's important to understand that this number isn't one-size-fits-all. It was specifically identified for certain types of dairy cows in dry climates, and it hasn't been confirmed for cows that aren't producing milk (dry cows). Dry cows can handle heat better than lactating cows because they're not producing milk and don't generate as much body heat.

Table 4.
Average Annual Temperature-Humidity Index (THI) counts on Daily **Minimum and Maximum** Temperatures.

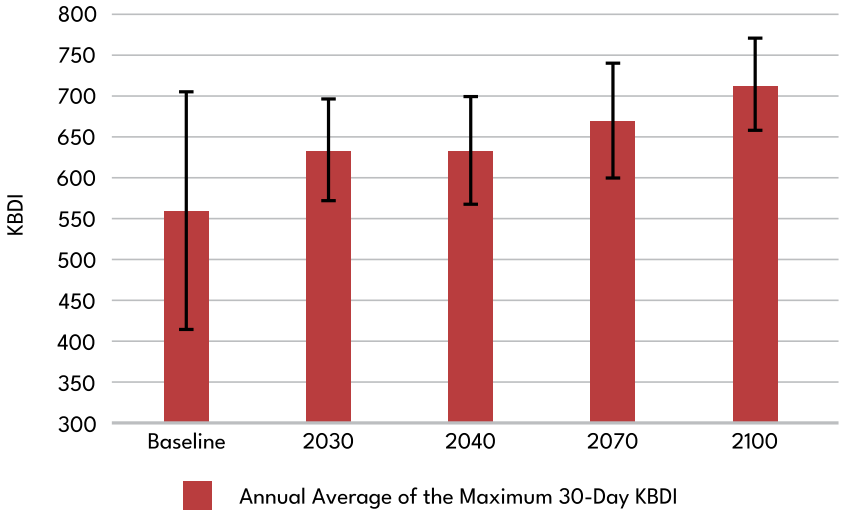
	THI > 68 (Milk Producing)	THI > 77 (Dry Cows)
Baseline	122	228
2030	127	225
2040	135	238
2070	160	260
2100	189	271

Longer Droughts

This section summarizes the technical report titled, "Critical Infrastructure and Land Use Climate Vulnerability Analysis - Task 3: Wildfire."

Insufficient water availability can cause plants to wither, resulting in crop failure and lower yields. Increased temperatures reduce yields of valuable crops such as blueberries. Reduced crop yield affects producers financially, resulting in lower wages and job losses (and potentially housing and meal loss) for farm workers. Urban water use can also increase during droughts, as property owners irrigate stressed landscapes.

A higher Keetch-Byram Drought Index (KDBI) suggests a greater risk of prolonged drought because the soil lacks moisture, worstening the impact of dry conditions over time.



Pastures and grazing lands also dry up during droughts, reducing feed availability for livestock. Flooded pastures can have the same impact. This forces farmers to seek alternative feed sources, which can be costly. Moreover, heat stress can negatively affect animal and farm worker health and reduce livestock productivity.

Several indices have been used in Florida to quantify drought. One common method involves tracking the number of consecutive dry days each year to assess changes in drought patterns due to climate change. The Keetch-Byram Drought Index (KBDI) is also frequently employed to classify drought severity in the southeast United States. The figure below shows the annual average of the maximum 30-day KBDI for reference.[4]

The KBDI considers factors like recent rainfall, temperature, and soil moisture levels. When the KBDI is high, it indicates that the soil is very dry, making it more prone to drought conditions and increasing the likelihood of longer-lasting droughts.

Overall, drought happens when there is not enough water for a long period of time, and it starts causing problems for communities, people, and the environment. A drought may occur across the entire County over weeks, months, and even years.

Some potential impacts seen during a drought include:

- Reduced Agricultural Production
- Decrease of Local Plants and Animals
- Increase in Sinkholes
- Increase in Wildfires
- Water Use Restrictions and Emergencies

Increased Flooding

This section summarizes the technical report titled, "Critical Infrastructure and Land Use Climate Vulnerability Analysis - Task 3.1 - Climate Data Review."

Flooding

Alachua County consists of different hydrologic systems with varying flood characteristics. Hydrology looks at water comes from, where it goes, and how it behaves. These systems include fast-flowing streams and creeks that are sensitive to intense rainfall, large prairie systems such as Paynes Prairie that are affected by long-term seasonal changes in rainfall and aquifer levels, closed basins that are sensitive to multi-day rainfall volumes, and large riverine systems like the Santa Fe River that are sensitive to regional rainfall. Large regions of the County experience localized flooding in smaller closed basins during extended or high-volume storms. Certain areas of the County, particularly along the shores of Newnans, Orange, and Lochloosa Lakes; portions of Gainesville along Hogtown Creek; and the Santa Fe River floodplain are vulnerable to flooding from rising water. The County has created a high-resolution flood risk model to improve our understanding of flood risk that provides data on the estimated depth of flooding during different storm events. The model was used to evaluate present and future flood risk, considering projected changes in extreme precipitation events. The model results have highlighted regions of the County that are likely to experience significant changes in flood risk due to changing rainfall characteristics.

Rainfall-Induced Flooding

A high-resolution Countywide inundation model was developed. The model predicts inundation for extreme rainfall events. It has a variable grid resolution and relies on the latest Countywide digital elevation model. In addition to current conditions, flood risk is evaluated for two future time horizons – 2040 and 2070 – using regional rainfall change factors. The model is described in detail the Countywide Inundation Modeling Technical Memorandum submitted as part of this project. In a warming climate, the frequency, severity, and amount of extreme rainfall will continue to increase in the southeast United States.[5]

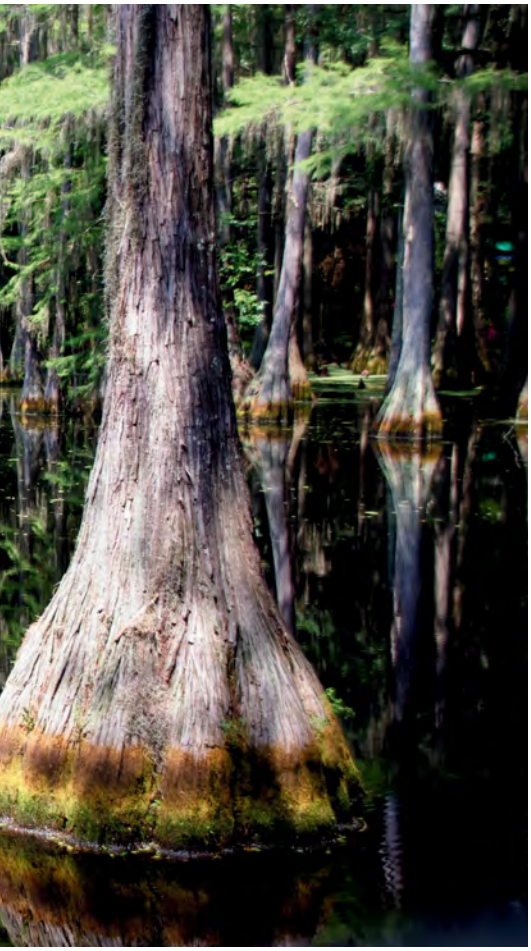
Flood vulnerability was evaluated for the County's assets, services, and infrastructure for three horizons:

1. Current 100-year rainfall-induced flooding;
2. 2040 100-year rainfall-induced flooding; and
3. 2070 100-year rainfall-induced flooding for the 1-day and 10-days storms.

A separate Vulnerability Analysis completed for the Florida Department of Environmental Protection Resilient Florida Program evaluated the vulnerability of critical assets to 100-year and 500-year rainfall-induced flooding under current, 2040, and 2070 conditions pursuant to Section 380.093, Florida Statutes. A compliant assessment will open up over $100 million in annual infrastructure funding from the State of Florida.

Flooding Assessment Rules

Similar to vulnerability to high heat, vulnerability to flooding combines sensitivity and the adaptive capacity of exposed assets. Rulesets, which are explained in Table 5, were used to classify each exposed community asset as having the "high," "medium," or "low" characteristics of sensitivity, adaptive capacity, and vulnerability.

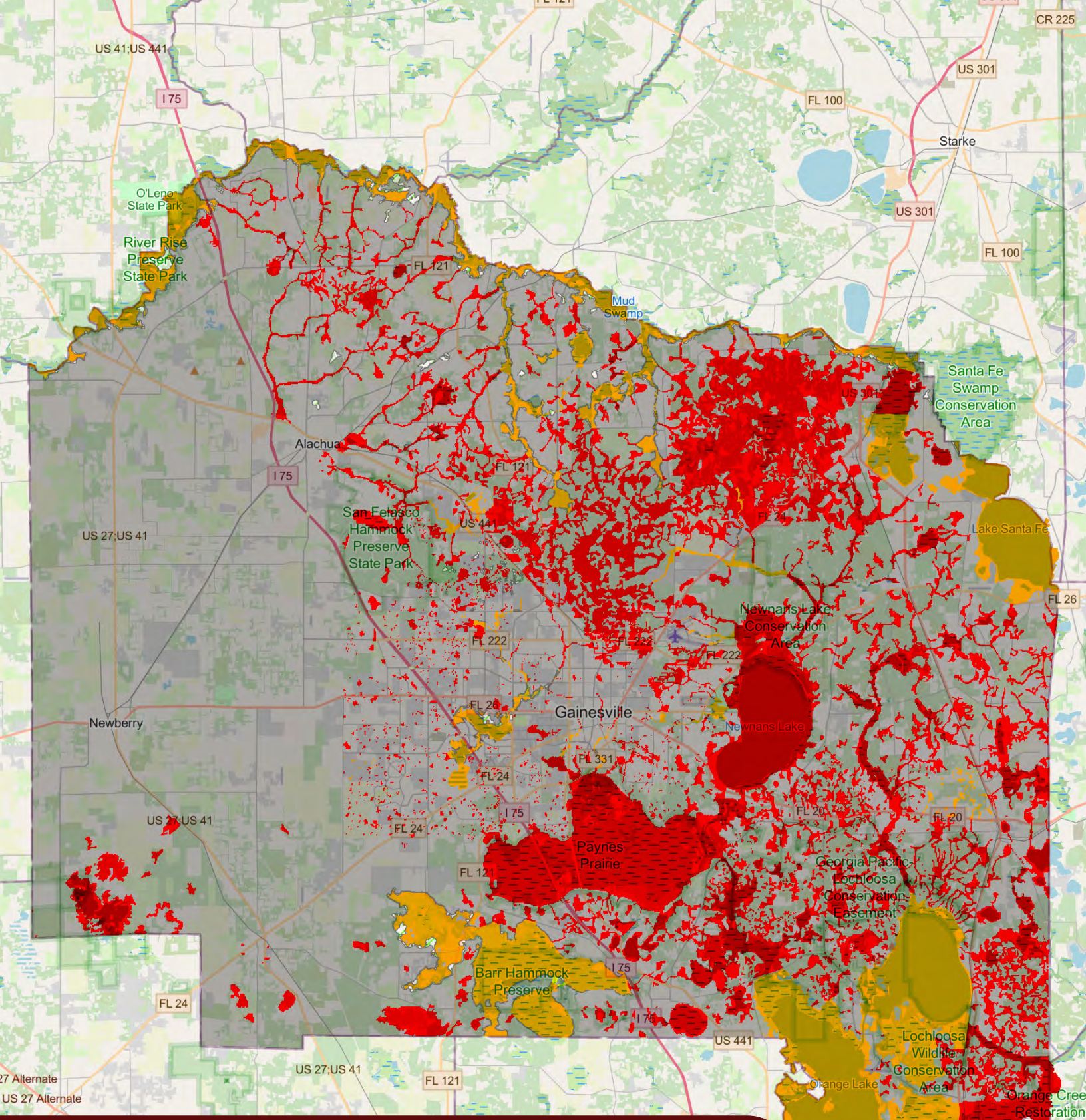


EXPOSURE – For this assessment, exposure means that an asset/property parcel is within an area that the model predicts will flood. Assets that are not exposed are not vulnerable or at risk of flooding.

VULNERABILITY – The structure's location and criticality are considered together for assessing sensitivity levels. Criticality looks at what would be impacted if the structure is exposed. This information is based on building footprints and type of asset use or nature of service provided. Properties with buildings within identified areas that flood have higher sensitivity compared to those with only land potentially affected. The second criterion of criticality is also applied in a binary manner where some asset types within an asset category are evaluated as having higher sensitivity based on the magnitude of impact or criticality of impact. For example, multi-family housing structures that accommodate more people are considered more critical than single-family properties. Similarly, a grocery store is considered more crucial than a retail or commercial property since it can provide a hub for access to food and other services like banking or pharmacy. Assets categorized as having a "high" level of sensitivity are those that meet both the criteria, i.e., their building footprint is within the flood extent, and the property use is considered critical. In this Assessment, high, medium, and low levels of adaptive capacity are determined by comparing the Finished Floor Elevation (FFE) of a building with the maximum Water Surface Elevation (WSE) within the building's footprint. If a building's FFE is below the maximum Water Surface Elevation, it is considered to have low adaptive capacity. Medium adaptive capacity is assigned to parcels with a building FFE within one foot above the maximum WSE. High adaptive capacity is designated to parcels where the difference between the FFE and maximum WSE is more than one foot.

Table 5.
Summary of Rulesets used for Flooding Vulnerability Assessment.

THREAT	EXPOSURE	SENSITIVITY	ADAPTIVE CAPACITY
2020 100-year Rainfall-induced Flooding	Parcels exposed to the flood extent	**High:** Structure in inundation extent and criticality of impact is high. **Medium:** Structure in inundation extent. **Low:** No structure in inundation extent (only land is exposed).	**High:** FFE >= 1 foot above maximum WSE OR structure outside flood extent. **Med:** The difference between FFE and maximum WSE is between 0 and 1 feet. **Low:** FFE below maximum WSE on the parcel
2040 100-year Rainfall-induced Flooding			
2070 100-year Rainfall-induced Flooding			



Floodplains in Alachua County (2023)

- **ZONE A** - 1% annual chance flood hazard with no base flood elevations
- **ZONE AE** - 1% annual chance flood hazard with base flood elevations
- **ZONE AO** - 1% annual chance flood hazard with average depths determined

When we talk about **vulnerability**, we are looking at **how likely a building is to be affected by flooding** and **how well it can cope** with it. We decided this by considering two things: **where** the building is and **how important** it is.

If a building is right **in the flooded area** and **serves an important purpose**, like a hospital or housing many people, it is considered **highly sensitive**.

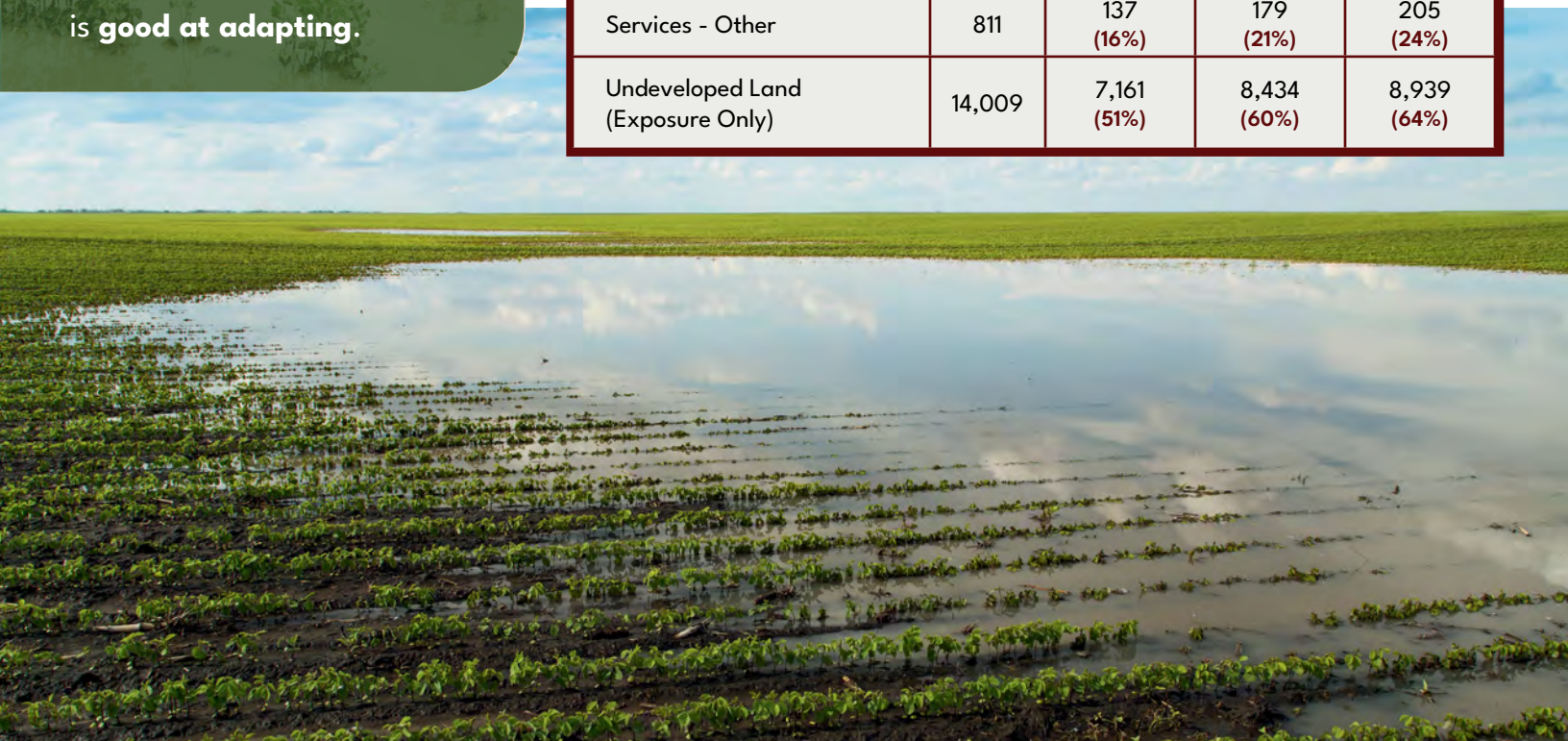
We also look at how high the building's floor is compared to the highest expected flood level. If the floor is below that level, the building **doesn't adapt well** to floods. If it is within one foot above that level, it **adapts moderately well**, and if it is more than one foot above, it is **good at adapting**.

Flooding Assessment Results

Table 6 shows the amount of flood vulnerability predicted for community assets in Alachua County organized by asset categories. The table provides the total number of assets and the number and percentage of those assets with a medium or high vulnerability under the three flooding scenarios assessed. Of the nearly 90,000 property parcels or assets analyzed across the County (all categories except for Undeveloped Land), a little less than 5% are estimated to experience more than 1 foot of flooding above their Finished Floor Elevation (FFE) during a 100-year flooding event in current conditions. These properties have the lowest adaptive capacity. An additional 11% of properties are estimated to experience less than one foot of flooding during a current 100-year rainfall-induced flooding event.

Table 6.
Summary of Vulnerability Assessment Results by Asset Category.

ASSETS CATEGORY	TOTAL ASSETS	100-Year Rainfall -Induced Flooding		
		2020	2040	2070
Critical Infrastructure	735	116 (16%)	134 (18%)	141 (19%)
Critical Community and Emergency Facilities	1,955	383 (20%)	467 (24%)	515 (26%)
Natural, Cultural, and Historical Resources	7,361	543 (7%)	804 (11%)	910 (12%)
Residential	73,765	5,700 (8%)	9,080 (12%)	10,921 (15%)
Commercial	5,059	658 (8%)	881 (10%)	904 (11%)
Services - Other	811	137 (16%)	179 (21%)	205 (24%)
Undeveloped Land (Exposure Only)	14,009	7,161 (51%)	8,434 (60%)	8,939 (64%)



Enhanced Wildfire

This section summarizes the technical report titled, "Critical Infrastructure and Land Use Climate Vulnerability Analysis - Task 3: Wildfire."

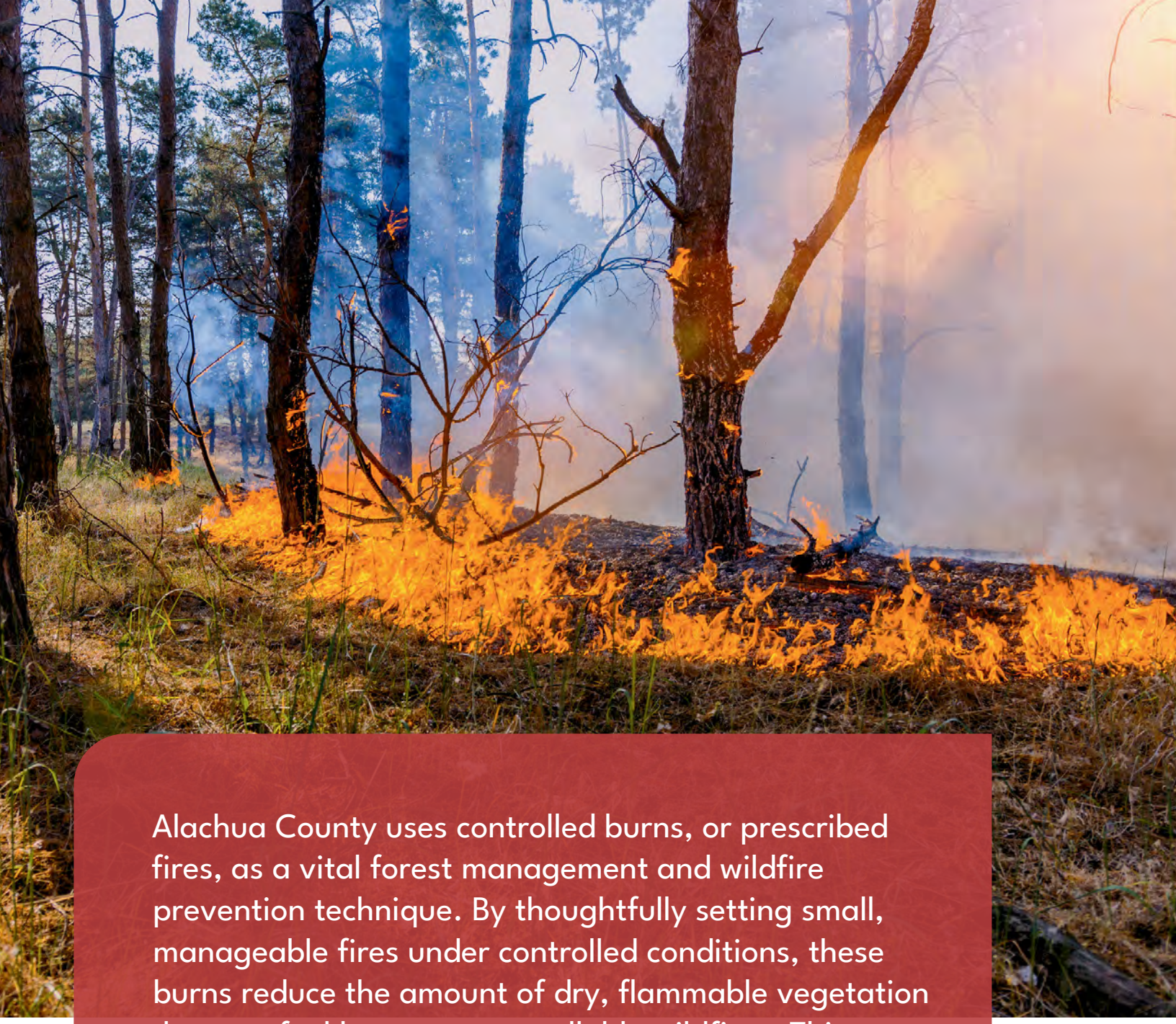
Wildland fires occur on lands that do not meet management objectives and therefore require a suppression response to avoid damage to natural areas or property and threats to life safety. The most at-risk portions of Alachua County are the wildland-urban interface, where community development meets wildland and rural areas where wildland fuels are present. Significant fuels are in each jurisdiction beyond the wildland-urban interface, encompassing a significant area of the County and impacting all jurisdictions. A few exceptions exist, such as developed retail or healthcare areas along Archer Road in Gainesville. Wildfires may rapidly spread over large land areas and may last for days or weeks. However, wildfires in Alachua County are typically well controlled. In addition to the potential for structural damage, wildland fires can cause significant losses and destruction for timber interests in Alachua County. The homes along the wildland-urban interface and agricultural interests are the most vulnerable. Individuals may receive acute or chronic injuries, and critical facilities may be damaged. All jurisdictions in Alachua County are vulnerable to wildfires and would experience similar impacts.[5]

Wildfires are essential for maintaining native biodiversity and ecosystem processes while having the potential for substantial environmental damage, significant impacts on silviculture, loss of property, loss of crucial infrastructure, disruptions to traffic, and smoke pollution. Alachua County includes various ecosystems with different fire-risk characteristics. Mitchel et al. (2014) provides and overview of fire interactions in the southeast United States and how climate change will likely influence those interactions.[6] Their assessment of fire risks for some forest and landscape types within the County is summarized as follows:

FORESTED WETLANDS: Fire risk is linked to hydroperiods and drought. With short hydroperiods, wetlands burn more frequently. With extended hydroperiods, wetlands experience more severe fires during droughts. Deep histosols (peaty soils) can sometimes burn, creating significant environmental changes through peat material loss and ash accumulation. For example, the fire in the Santa Fe Swamp in 2007 resulted in substantial water-quality impacts to Lake Santa Fe.

PINE FLATWOODS: Longleaf, slash pine, or a mixture of the two dominate these systems, and fires are naturally frequent (every three to five years). However, these systems can develop elevated fuel loads when fires are infrequent.

PLANTED PINE: Management practices significantly impact these systems. Monocultures of loblolly pine, slash pine, or longleaf pine become susceptible to fire. Long periods of fire suppression combined with drought can enhance this susceptibility.



Alachua County uses controlled burns, or prescribed fires, as a vital forest management and wildfire prevention technique. By thoughtfully setting small, manageable fires under controlled conditions, these burns reduce the amount of dry, flammable vegetation that can fuel larger, uncontrollable wildfires. This proactive approach not only helps maintain the health of ecosystems by promoting native species and reducing pests, but it also significantly lowers the risk of devastating wildfires. Controlled burns save money by decreasing the costs associated with firefighting, property damage, and disaster recovery.

Climate Migration

This section summarizes the technical report titled, "BEBR 2100 Population Projections for Alachua County Project Including Projections of Climate Migrants."

Population Projections

Florida's official population projections are available from the Bureau of Economic and Business Research at state and county levels. The projections only extend to 2050, lack spatial distribution data within counties (rendering accurate projections for cities, utilities, or smaller areas unattainable), and do not consider climate migration. Consequently, Alachua County recognized the necessity of developing a new forecast extending to 2100 with a finer spatial resolution and including climate migrants. This initiative was imperative to address the requirements of its Critical Infrastructure and Land Use Climate Vulnerability Analysis and facilitate informed future planning decisions.

An estimate of controlled and uncontrolled population forecasts was created through 2100 and shown in Table 7. Controlled estimates include the implementation of policies that may inhibit growth, while uncontrolled do not. The population would likely fall between the two estimates. Table 7 also provides an estimate of the number of climate migrants expected to move to Alachua County. The County will be a net recipient of climate migrants.

Alachua County could see an 8% increase in population by the end of the century just because of **climate migrants,** or people who move because of the impacts of climate change such as sea level rise.*

**These projections do not consider adaptation measures taken by other communities, which may reduce the number of climate migrants leaving those communities.*

Table 7.
Bureau of Economic and Business Research Popuation Projections for Alachua County Project.

Population Forecast	2040	2070	2100
Original Forecast Not Controlled to State Forecast	335,614	297,942	461,573
Revised Forecast Controlled to State Forecast	328,767	366,628	404,535
Projected Forecast (Average of Controlled and Uncontrolled)	332,191	382,285	433,054

Although the impacts of drought and flooding may force families involved in the farming economy to migrate from rural parts of the County in search of better opportunities in different sectors, a more likely scenario is that this migration will be caused by in-migration from surrounding counties, driving up demand for farmland conversion to housing, which could cause a reduction in available agricultural land without proper urban planning. This can increase farm-worker unemployment and pressure on urban infrastructure and services. This influx of new residents into Alachua County, coupled with the challenges posed by climate change, underscores the urgent need for proactive planning and adaptation measures to ensure the resilience and sustainability of the County's communities and infrastructure. By fostering collaboration among stakeholders, implementing sustainable development practices, and investing in resilient infrastructure, Alachua County can effectively address the impacts of climate change, mitigate risks, and enhance the quality of life for current and future residents.

Without action, Alachua County faces **significant** impacts from climate change.

The next sections explore those impacts and recommend actions to reduce them.

Resident Health & Finances

This section summarizes the technical report titled, "Critical Infrastructure and Land Use Climate Vulnerability Analysis - Task 3.1 - Climate Data Review."

Societal Impact

In Alachua County, the average daily maximum temperature will increase by approximately 6˚F by the end of the century, a substantial increase in average temperatures. Even more concerning is the combination of temperature and humidity. The project data show a 10-time increase in extremely hot days (based on a projected daily maximum Heat Index and National Weather Service classification of extremely dangerous conditions). The longer periods of hot days make working on farms or outdoor construction much more challenging.

As part of the overall Climate Vulnerability Assessment, Alachua County survived its residents to understand how they feel climate change will affect them and what they would like to see the County do to address those impacts. Note that the survey reached over 600 residents and provides general insight into the community's feelings, but it is not a large enough sample to fully represent the entire community. Survey respondents are already worried about extreme heat. 58% agreed that extreme heat would impact them, and 61% noted they were concerned about the health impacts of extreme heat.

In the assessment of areas vulnerable to extreme heat, household median income at the census block group level is one of the two key indicators of adaptive capacity, or ability to withstand and thrive through extreme heat. The second indicator is the percentage of tree canopy cover, which directly relates to an area's ability to stay cool, and percentage of developed land. Together, these indicators provide an understanding of where in our community extreme heat may impact community members hardest.

In areas vulnerable to extreme heat, we consider **household median income at the census block group level*** as one of the two indicators of adaptive capacity. The second indicator is the **percentage of tree canopy cover**. Additionally, we use the percentage of developed land as an indicator of exposure.

**Census Blocks are statistical divisions of census tracts, are generally defined to contain between 600 and 3,000 people, and are used to present data and control block numbering.[7]*

Impact Overview

In Alachua County, the impact of extreme heat in neighborhoods with insufficient cooling as night and day temperatures and humidity increase with climate change can vary depending on the severity of the hazard and the vulnerability and inequitable socio-economic conditions of the neighborhood. Although most households have air conditioners, interior cooling in some homes may need to be improved due to improperly sized and antiquated units. Inequitable health and financial effects include:

1. INCREASED HEALTH RISKS

Lack of proper cooling during hot weather can lead to various health issues. Extreme temperatures and humidity can cause heat-related illnesses in summer, such as heat exhaustion or heatstroke, especially for those who work outdoors. They can exacerbate certain medical conditions like respiratory problems and cardiovascular issues, particularly for those with pre-existing conditions, the elderly, children, and pregnant women.

2. INCREASED HEALTHCARE COSTS

Inadequate temperature regulation can increase healthcare costs as residents may require medical attention due to heat-related health problems. In addition to straining family finances, including lost wages, this can strain healthcare systems and public health resources. Those without access to health insurance face graver healthcare cost threats, which may dissuade some from seeking care.

3. INCREASED UTILITY BILLS AND FINANCIAL BURDEN

Residents may struggle to pay high utility bills as their demand for electricity increases to maintain a comfortable and safe indoor environment during extreme heat. This can result in financial hardship for individuals and families, particularly those on low incomes who already pay a disproportionate amount for electricity. Because cooling a residence during a 24-hour day is crucial – for instance, at night at home for daytime outdoor workers – home electricity shut-offs and families that limit cooling to avoid high bills can contribute to additional extreme heat mortality and morbidity. Mobile homes are less energy efficient than permanent structures and incur a higher cost per square foot for energy.

4. DECREASED ECONOMIC PRODUCTIVITY

Extreme temperatures can affect the ability of residents to work efficiently. In excessively hot conditions, productivity can decline, leading to potential economic losses for individuals and businesses. This is particularly true in the agricultural and construction sectors. In addition, employers may be required to change working hours to keep the workforce safe, which may cause difficulties for childcare. For instance, if the workday starts at dawn, goes to mid-morning, breaks, and then starts again in the evening childcare will become increasingly challenging.

Extreme temperatures can exacerbate certain medical conditions like respiratory problems and cardiovascular issues, particularly for those with pre-existing conditions, the elderly, children, and pregnant women.

Impact Overview continued...

6. INCREASED EDUCATIONAL DISRUPTIONS

Lack of adequate cooling in schools can disrupt the learning environment, and student-athletes have higher exposure. Extreme temperatures can affect students' concentration and overall academic performance.

7. DECREASED PROPERTY VALUES

Neighborhoods with a reputation for increased heat due to the urban heat island effect may experience reduced property values. Potential buyers and renters may be hesitant to invest in homes or apartments in such areas, impacting the overall economic stability of the community. Further, urban heat islands may impact economic assets in the County, including the University of Florida's football stadium in Gainesville, which we assume is an urban heat island based on the relative percentage of asphalt and dark roofs. Extreme heat during football games may reduce attendance and overall economic activity around the games.

8. INCREASED STRAIN ON SOCIAL SERVICES

As residents face mental and physical health and financial challenges due to extreme heat, an increased demand for social services and assistance programs may follow, further stretching public resources.

9. INCREASED AIR QUALITY IMPACTS

Respiratory distress from poor air quality increases as air temperature increases. Wildland Urban Interface (WUI) is expected to increase by 100% by 2100 and continue to increase beyond this century partly due to homes encroaching on natural and working lands. Wildfires create poor air quality for large regions; therefore, this issue also relates to WUI fires creating poor air quality in Alachua County. People with pre-existing conditions, including asthma, which disproportionately affects lower-income people due to more inadequate quality healthcare and living situations, are at greater risk of this distress.

Recommended Actions

To mitigate extreme heat impacts, governments, community organizations, and individuals must work together to address the issue. This may involve implementing green infrastructure and reflectivity policies. In addition to risk mitigation, decreasing heat morbidity and mortality requires adaptations like providing financial assistance to vulnerable residents to pay their electricity bills and promoting awareness of the health risks associated with extreme temperatures. It likely starts with an interagency or interdepartmental work group like the one created for this project, along with an Equity Advisory Council that engages the community and focuses on equitable engagement and actions.

PHYSICAL INFRASTRUCTURE

ENCOURAGE COOL ROOFS, PAVEMENTS, AND SHADING

Develop policies that encourage cool roofs, pavement, and additional shading. Light-colored roofs and pavements reflect more sunlight than dark surfaces, reducing the amount of heat absorbed and radiated by buildings, roads, parking lots, and other surfaces.

HEAT ISLAND REDUCTION TO MITIGATE HEAT RISKS

Implement heat island reduction programs incorporate strategies such as planting trees, cool roofs, cool pavements, and green spaces. Furthermore, Low Impact Development Standards should be enhanced to further support cooler surfaces and green infrastructure, which are already provided in the County's Low Impact Development manual.

INCENTIVIZE BUILDING-INTEGRATED OR SELF-STANDING SHADE STRUCTURES

These structures can deflect solar radiation and provide a moment of reprieve from the sun.

ADVANCE GREEN INFRASTRUCTURE

Historically used for stormwater management. Implement policies, programs, and guidance that require and encourage green infrastructure as part of development and County infrastructure. Historically used for stormwater management, green infrastructure also cools the surrounding area by releasing moisture into the atmosphere, deflecting radiation, and shading.

ENSURE COUNTY-OWNED ASSETS HAVE AIR CONDITIONING

The County should ensure that all appropriate assets, including affordable housing, have adequately sized and efficient air conditioning. However, how this will impact utility bills should also be considered.

ENCOURAGE ENERGY EFFICIENT BUILDINGS

The County should prioritize adherence to green building standards such as Leadership in Energy and Environmental Design (LEED) or similar building standards, especially for affordable housing units. LEED is a widely recognized certification program that emphasizes environmentally sustainable and energy-efficient building practices. Energy efficient buildings often have lower long-term cooling costs and can better regulate indoor air temperatures.

Recommended Actions continued...

POLICY

BUILDING STANDARDS TO MITIGATE HEAT RISKS

Incorporate energy-efficient design features and materials that reduce heat gain and make mechanical cooling more efficient.

INCREASE NATURAL COOLING

Update policies to enhance community cooling through outdoor shading and natural landscapes.

EXPAND COOLING CENTERS

Prioritize new structures and retrofit old structures to serve as cooling centers during the hottest times of the year.

LOW IMPACT DEVELOPMENT

Update development standards to incentivize and encourage more green space, tree cover, and cooler surfaces. Low Impact Development has multiple benefits, such as reducing runoff volume and improving water quality.

ACCESS TO COOLED SPACES

Ensure that farm workers have access to air-conditioned spaces to cool off during the daytime and that overnight accommodations have air conditioning.

ENHANCE WATER CONSERVATION PROGRAMS

Enhancing and expanding access to water conversation programs will aid in reducing water demands, while also assisting residents in reducing water bills.

PLANNING

DEVELOP HEAT PREPAREDNESS AND EMERGENCY PLANS TO ADAPT TO EXTREME HEAT

This would be an operational plan during extreme heat conditions. Measures may include opening cooling centers to provide water, rest, cooling, and shade to vulnerable residents and workers and possibly changing work hours.

INCREASE AWARENESS OF THE RISK OF HEAT

Provide education on the dangers of heat, both internally with County staff and with those who work with the County, can help everyone better prepare for the impacts of extreme heat.

FINANCE

PROVIDE FINANCIAL ASSISTANCE TO VULNERABLE WHO HAVE INSUFFICIENT COOLING

Consider financial assistance for energy-efficient modifications (expand and enhance existing programs) and for disadvantaged community members facing utility shut-offs.

COMMUNICATION

PUBLIC EDUCATION CAMPAIGNS TO ADAPT TO EXTREME HEAT

Implement a public education campaign that heat is different now, encouraging residents and workers to stay safe. This would include best practices to avoid heat exhaustion, heat stroke, and even death. Also educate residents on how to identify heat-related illness symptoms.

PRIORITIZE REACHING THOSE WE DO NOT OFTEN HEAR FROM

Make it clear that certain groups are more vulnerable, including the elderly, the young, and pregnant women, and find methods to communicate with those groups directly.

Worsening Community Flooding

This section summarizes the technical report titled, "Task 3.2 – Focus Areas."

Alachua County will experience a slight increase in long-term average annual rainfall through the end of the century. The County is also expected to have heavier rain events, meaning that the expected precipitation will occur in shorter periods. The area will experience more intense/extreme events (higher daily totals) due to additional energy in storms and a warmer atmosphere that can "hold more moisture" caused by climate change. A newly developed high-resolution flood model for Alachua County revealed that changing rainfall characteristics pose a greater risk of flooding. This projected increase in flood risk is particularly high in areas with internally drained basins, such as lakes and ponds.

Impact Overview

As precipitation intensity increases with climate change and impervious surfaces increase with climate migration, flooding can significantly impact Alachua County's neighborhoods and cultural resources nearby or within their boundaries. This impact can vary depending on the severity of the hazard, the vulnerability or age of the neighborhood, and the inequitable socio-economic conditions of the neighborhood. Older subdivisions were designed with stormwater regulations that were not as effective as today's standards, and multiple factors contribute to flooding in the community. Inequitable effects include:

1. FLOODING AND PROPERTY DAMAGE

The most obvious impact is the risk of flooding during heavy rainfall or storms. As Hurricane Irma demonstrated, floodwaters can inundate neighborhoods, causing household property damage, displacing residents, and disrupting daily life. High concentrations of internally drained basins without ways to move the water quickly may exacerbate the severity and frequency of flooding events. Uninsured or underinsured homeowners, renters, and small businesses face particular challenges, since they would not have access to funds to rebuild completely after a disaster. Also, those without the agency or power to work with legal and financial representatives are less likely to receive disaster recovery from state or federal support. Immediately following a flood event, the poorest, single parents, and the elderly are most vulnerable since they have fewer resources to care for their dependents and/or leave damaged areas.

Impact Overview continued...

2. AFFORDABLE HOUSING FLOOD IMPACTS

The analysis demonstrated a disproportionate number of assisted housing and affordable housing properties (manufactured and multifamily) is highly vulnerable compared to single-family, condominium, and other property types, suggesting that resources need to target these residents and property types.

3. INFRASTRUCTURE DAMAGE

Floodwaters can also damage critical infrastructure such as roads, bridges, utilities, community services, and environmental assets. Repairs and reconstruction can be costly and time-consuming, impacting the local economy and community services. Historically, disadvantaged populations around the United States have waited longer than wealthier populations for repairs or modernization that could have helped to avoid loss. In addition, power outages are frequent during and after storms. The actual outages are caused by wind, but people associate them with the rain and the flooding they see.

4. ECONOMIC LOSS

Frequent flooding in a neighborhood can lead to decreased property values, making it challenging for residents to sell their homes or attract new investments. Businesses may suffer losses due to property damage and disruption of operations. Economic issues may be both hyper-local and spread farther than the County at the same time: Rural livelihoods are impacted when I-75 is shut down, including increasing air quality impairments from trucks driving on rural roads closer to work and home, decreasing access, or increasing commutes to services and employment. Regional and national supply chains may be disrupted when this major artery is impacted.

5. DISPLACEMENT AND MIGRATION

Repeated flooding in designated and non-designated floodplain areas may force residents to relocate, causing population shifts and altering the demographics of the affected neighborhoods. Lower-income households may move into less-expensive property previously vacated due to flood impacts like mold. In addition, neighborhoods that flood less frequently and have historically contained high proportions of affordable housing (affordable housing that is not necessarily designated as traditional affordable housing) may face climate gentrification as wealthier residents offer to buy their property, causing lower-income people to move farther from jobs, schools, and affordable areas. Conversely, given flood pressures in other parts of the state, population increases due to climate migrants will start measurably increasing around 2040 by up to an additional 26,000 people by 2100 and beyond. This is a concern of 68% of the survey respondents. The population will grow and move due to current regulations, with an increase in density in some areas and a spread into rural areas. This will increase the number of properties and families exposed to flooding and exacerbate flooding by decreasing permeable surfaces.

6. PUBLIC HEALTH AND SAFETY

Floodwaters can pose risks to public health by contaminating water sources with pollutants, sewage, or chemicals. Additionally, flood events may require emergency evacuations, risking residents' safety. Evacuations are particularly challenging for the very young, the very old, the homebound, and those with mental and physical ailments. Protecting pets is a high priority for many families and can lead to decisions to remain in unsafe areas. Following a flood event, homes and businesses may become dangerous if standing water and persistent moisture in organic materials cause mold, impairing respiratory health.

7. CULTURAL, HISTORICAL, AND CRITICAL SITES

Floodplains may contain culturally significant resources, such as hospitals, religious sanctuaries, and schools. Flooding can damage or destroy these resources, resulting in cultural heritage and identity loss. In addition, the Climate Vulnerability Assessment highlights the vulnerability of places and services that are likely important for well-being and quality of life, including libraries, Supplemental Nutrition Assistance Program (SNAP) retailers, and community centers.

8. NATURAL ECOSYSTEMS

Floodplains often support diverse ecosystems that urban development or flood control measures can negatively impact. Flood prevention that alters the natural water flow or encroaches on these areas can disrupt wildlife habitats and reduce biodiversity. As climate migration increases and demand for new housing starts, dig and fill development may decrease the amount of permeable land that absorbs water (as mentioned above), thereby exacerbating flooding. Also, some natural ecosystems like prairies support grazing, and when these working lands are flooded, livestock is disrupted.

Recommended Actions

Several measures can be taken to mitigate the negative impacts of enhanced flooding on neighborhoods and cultural resources:

PHYSICAL INFRASTRUCTURE

FLOOD CONTROL INFRASTRUCTURE

Construct or improve flood control structures like levees, dams, and stormwater infrastructure and basins can help manage and reduce flood risks.

PLANNING

FLOODPLAIN MANAGEMENT

Implement effective floodplain management strategies, including proper land-use planning, zoning regulations, and stormwater management codes to reduce the exposure of communities to flood hazards.

- Given the expected climate change-driven migration, this is a crucial tactic for Alachua County. Increase housing density, allowing additional floors on existing structures and new structures, and requiring skinny streets and permeable surfaces in parking lots are all significant priorities that impact vulnerable people sometimes far from this built environment.
- Limitations or special requirements for building in the floodplain should include properties within at least the 100-year floodplain.
- Consider expected future flood extents rather than federally regulated 100-year floodplains for planning purposes.

Recommended Actions continued...

POLICY

ELEVATING STRUCTURES
In some places in the County, the state building code has a 1-foot freeboard requirement. Requirements to raise buildings and infrastructure above the base flood elevation can protect them from some flood damage.

CONSERVATION AND RESTORATION
Preserve natural floodplains, wetlands, prairies, and forests and restoring degraded ones can enhance their capacity to absorb floodwaters and support ecosystems. Alachua County's historical emphasis on natural area conservation and the survey results show how much County residents appreciate natural areas, making this an obvious priority.

DEVELOP FUTURE CONDITIONS MAPS FOR REGULATORY PURPOSES
The County should develop future conditions for regulatory permitting.

RENTAL PROPERTY PROTECTION
Develop policies and programs that ensure rental properties meet safety standards, such as no mold or working air conditioning.

ENCOURAGE PERVIOUS AREAS
Increase pervious areas that can naturally drain stormwater and improve water quality.

CLIMATE-ADJUSTED DESIGN RAINFALL
Require that rainfall change factors are used when designing stormwater infrastructure for available design storms and where appropriate.

FINANCE

STORMWATER OR OTHER FEES
Account for modernizing and improving the resilience of stormwater infrastructure to handle future rainfall in the County's stormwater fee.

PRIVATE PROPERTY ADAPTATION
Implement a Private Property Adaptation Program that will aid residents to find flood solutions and support to implement them. This could also be expanded to heat.

COMMUNICATION

FLOOD WARNING SYSTEMS
Install early warning systems can help residents evacuate and move their cars in time during flood events, preventing loss of life and property damage.

COMMUNITY EDUCATION
Raise awareness about flood risks and educating communities about preparedness measures can improve resilience.

Agricultural Changes & Our Food Supply

This section summarizes the technical report titled, "Task 3.2 – Focus Areas."

Based on the best available science, in Alachua County the average daily maximum temperature will increase by approximately 6°F by the end of the century, a substantial increase in average temperatures. Even more concerning is the combination of temperature and humidity. The project data show a 10-time increase in extremely hot days, which makes working on farms or outdoor construction much more challenging.[3] As rainfall rates become more extreme, the existing 100-year floodplain may expand farther, creating challenges for farmers and farm workers.

> The combination of hotter days, longer draught, and extreme rainfall will challenge Alachua County's econimically vital agriculture industry.

Impact Overview

As drought, extreme temperatures, and precipitation intensity increase with climate change, Alachua County's rural and agricultural areas may be significantly impacted. These impacts will challenge and disrupt farming, livestock, and rural livelihoods. Loss of plants due to drought was a concern of 72% of the survey respondents, followed by demands on freshwater and risk to food production concerning over 60% of respondents.

1. CROP FAILURE AND REDUCED YIELDS

Drought and heat can lead to water stress, reducing soil moisture and inadequate crop irrigation. Insufficient water availability can cause plants to wither, resulting in crop failure and lower yields. Increased temperatures reduce yields on valuable crops such as blueberries. Similarly, depending on the flooding duration and plant life stage, flooded crops (which are likely increasingly as the 100-year storm event is expected to increase in volume from 10 to 15 inches) can result in crop failure and lower yields. Reduced crop yield affects producers financially, resulting in lower wages and job loss (and potentially housing and meal loss) for farm workers.

Impact Overview continued...

2. INCREASING FERTILIZER USAGE

Because of the potential for decreasing crop yields, the farm sector may increase fertilizer use, impacting worker health and farm profitability. Surface-water and groundwater quality may be further degraded due to nutrient-contaminated runoff and nutrients leaching during infiltration. Rising nutrients in groundwater could impact community members who rely on domestic wells for potable water. For example, although snap beans will initially increase productivity and forage grass will remain viable, corn and snap beans will eventually decrease yield. Farmers will explore solutions to increase crop yields, and the impact of increased fertilizer use should be considered.

3. LIVESTOCK AND ANIMAL HUSBANDRY

During droughts, pastures and grazing lands dry up, reducing the availability of feed for livestock. Flooded pastures can have a similar effect. This forces farmers to seek alternative feed sources, which can be costly and have subsequent effects on the livelihoods of workers. Moreover, heat stress can negatively affect animal and farm worker health and reduce livestock productivity.

4. WATER SCARCITY

Although the drought hazard data contain a lot of variability, drought will increase from April to July. Drought can lead to water scarcity for agricultural activities, livestock, and domestic use. Demand will likely increase for water for agricultural purposes, potentially requiring modifications to current domestic uses allocations. Competition for limited water resources can also create tensions among farmers, communities, and other water users.

5. ECONOMIC LOSSES

Agricultural losses due to drought, flooding, and heat can result in significant economic setbacks for rural communities. Farm income declines, agricultural businesses suffer, and rural unemployment rates may rise. In addition to corn no longer being a viable crop, regardless of an increase in fertilizer and water use, dairy and dry cows will require 50 more days of active cooling by 2030.

6. SOIL EROSION

Drought and extreme temperatures can exacerbate soil erosion, especially when little vegetation is available to hold the soil in place. By considering factors such as rainfall and evapotranspiration, keeping agricultural production up without supplemented water will be difficult. In addition, soil erosion can lead to land degradation, making it even more challenging to grow crops in the future. It can contribute to water-quality degradation in streams that receive farm runoff.

7. FIRE RISK

Due to the projected increase in the severity of drought combined with the expanding wildland-urban interface and the potential for increased fuel loads, wildfire risk is expected to rise. As a result, managing wildfires will become more challenging. Wildfires pose a significant threat to infrastructure, the health of County residents, and water quality.

8. MIGRATION AND SOCIAL DISRUPTIONS

Although the impacts of drought and flooding may force families involved in the farm economy to migrate from rural parts of the County in search of better opportunities in different sectors, a more likely scenario is that this migration will be caused by in-migration driving up demand for farmland conversion to housing, which could cause a reduction in available agricultural land without proper urban planning. In either case, this can lead to increased farm-worker unemployment and pressure on urban infrastructure and services.

9. IMPACT ON BIODIVERSITY

Flood, drought, reduced freeze events, and heat can also affect the natural habitats of wildlife and plant species, potentially leading to shifts in biodiversity patterns. Species from south Florida are migrating north, which can cause increased competition and affect the ecosystem in unexpected ways.

This section summarizes the technical report titled, "Task 3.1.3 & 3.1.4 - Changes to Local and Regional Water Use and Changes to Surface and Groundwater Hydrology."

Drought can lead to water scarcity for agricultural activities, livestock, and domestic use. Competition for limited water resources can also create tensions among farmers, communities, and other water users.

Water Supply and Surface Water

Water use projections are complicated not only by population change, changes in acreages of land uses, and changes in the portion of irrigated agriculture, but also by changes in climate. Although the drought hazard data are variable, drought will increase from April to July. Drought can lead to water scarcity for agricultural activities, livestock, and domestic use. Demand for water for agricultural purposes will likely increase, potentially requiring modifications to current domestic use allocations. Competition for limited water resources can also create tensions among farmers, communities, and other water users.

As part of the Climate Vulnerability Assessment for Alachua County, a report discussing predicted changes to local and regional water use and changes to surface- and groundwater hydrology was developed. Climate changes are expected to have impacts in some sectors of water use but are not expected to have the same degree of implications for all water use types. Separate projections were made for non-agricultural and agricultural water use to develop an overall estimate of future water use for Alachua County. These estimates were separated because of the different drivers and trends for these types of use.

Agricultural Water Use

The extent of agricultural acreage in Alachua County has gradually decreased as land use has shifted to more urban land uses, with a decrease of 21,000 acres of agricultural lands between 1985 and 2015 in Alachua County. From 1985 to 2022, irrigated acreage increased by approximately 4,000 acres, or 47%. These conversions to irrigation are consistent with increased land values and crop prices, which encourage higher yields, increased predictability, and higher-value crops. Furthermore, crop modeling suggests that irrigation will become essential to maintain yields as temperatures rise.

The analysis considered three scenarios for future irrigated acreage to estimate agricultural water usage. For each scenario (low, medium, and high), we calculated average irrigation by multiplying the irrigated acres by the climate-adjusted irrigation rate. These calculations provide a range of projected agricultural water usage, indicating that overall irrigation could more than double if land continues to be converted to irrigated agriculture at the current rate. Alternatively, if agricultural acreage continues to decline and irrigated agriculture maintains its share of total acreage, we may experience a slight decrease in agricultural water usage.

Non-Agricultural Water Use

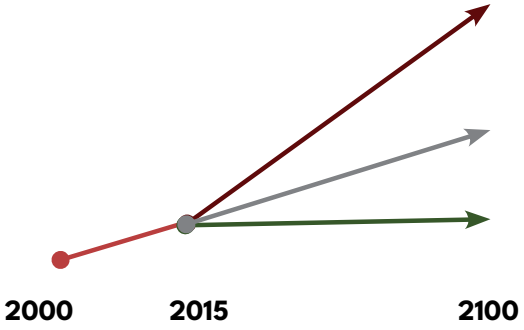
Water usage for all sectors except agriculture was estimated by combining historical trends and projected population changes. Although individual sectors were considered, estimating future use by sector did not seem advantageous for this study. To predict non-agricultural water usage, we calculated gross per capita water use for three scenarios to illustrate potential outcomes:

Low Estimate:
Per capita water use continues to **decrease,** following the trend observed between 2000 and 2015.

Medium Estimate:
Per capita water use **remains** at 2015 levels.

High Estimate:
Per capita water use **increases steadily** from 2015 (118 gallons per capita per day) to 2100 (137 gallons per capita per day).

This increase is driven by factors such as more irrigation for landscaping due to rising temperatures, increased use of automatic irrigation systems for lawns, and higher demands for power generation.



The calculated per capita water use values were multiplied by population estimates to forecast future water usage for each scenario. Estimates indicate that water usage will remain stable (low estimate) or nearly double from 2015 levels to the high estimate. The absence of ongoing decreases in water use is mainly due to the projected significant population growth in the County during the planning period.

Additional Agricultural Implications

In addition to evaluating natural hazards and socio-economic factors, the Climate Vulnerability Assessment delves into the agricultural implications of impending climate change. By studying the intersection of climate patterns and agricultural practices, the assessment offers critical insights into how Alachua County's agricultural sector may be affected in the future. This includes examining factors such as changing precipitation patterns, temperature fluctuations, and the increased frequency of extreme weather events, all of which could significantly impact crop yields, livestock management, and overall agricultural productivity. Agricultural production in Alachua County is pivotal for the local economy and the sustenance of its residents. Alachua County is responsible for producing several important agronomic row crops, including peanuts (5,000 acres), field corn (3,000 acres), and cotton and tobacco (400 acres). In addition to field crops, bahiagrass and bermudagrass are other important forage crops that are produced. Agriculture is the third largest employer in Alachua County and provides more than 27,000 jobs making up to 17.5% of the county's workforce.[8]

Agriculture indirectly sustains various local businesses such as banking, legal services, real estate, transportation, packing, marketing, and food distribution. Alachua County boasts over 180,000 acres of agricultural land, comprising 54% of the total land use. Most farms in the County (98%) are categorized as 'small farms' (less than 75 acres), with 88% being individually or family owned. Pastureland constitutes the most significant portion of agricultural land in Alachua County (37.5%), and cropland makes up only 31.3%.

Field maize production is important in Florida and the County since it is used for grain and silage and is widely used in the dairy and livestock industries (Wright et al., 2022).[9] Bahiagrass is the most common warm-season perennial grass grown in Florida and the County and is mainly used for livestock feed due to its adaptation to low soil fertility and low input management (Wallau et al., 2019).[10] Florida ranks first nationally in the production of snap beans (USDA NASS, 2022).[11] Snap bean production is an essential part of agriculture in the County since it is the second-most produced vegetable after watermelons. A suitable crop model for watermelon production was not available.

Crop simulation models were used to predict how future climate conditions will affect agricultural production in Alachua County. Three crop models were used to simulate a field (maize/corn), forage (bahiagrass), and vegetable (snap bean) crop in the County under four different management practices: 1) rainfed (non-irrigated) and non-fertilized, 2) rainfed and well-fertilized, 3) well-irrigated and non-fertilized, and 4) well-irrigated and well-fertilized.

By using crop simulation models and exploring various management scenarios, the team better understands how changing climate conditions may affect crop yields and overall agricultural productivity. Each crop type will be impacted by climate change in different ways, and crop-specific strategies will need to be developed.

Recommended Actions

To address these challenges, proactive measures are essential, including:

PHYSICAL INFRASTRUCTURE

WATER MANAGEMENT
Implement water management and conservation strategies, such as rainwater harvesting, greywater recycling, efficient irrigation techniques, and water storage systems.

AGRICULTURAL TECHNOLOGY
Invest in climate-smart agriculture and technologies to adapt to changing climatic conditions. For example, the County can work with the University of Florida to encourage partnerships and develop new technology to assist farmers in drought conditions.

POLICY

LAND MANAGEMENT
Require sustainable land management practices to prevent soil erosion and degradation, preserve agricultural land, reduce water use, protect water quality, and reduce wildfire risk.

HEAT STRESS PREVENTION PRACTICES
Implement policies that can reduce heat stress and related health risks, such as shade requirements or worker education.

AGGRESSIVE WATER CONSERVATION PROGRAMS
Reduce landscape irrigation, etc.
Implement polices that support and encourage smart irrigation systems in new developments and retrofits. Promote landscape polices that reduce water use.

FINANCE

WORKER RECOVERY
Find methods to support farmers and farm workers with financial assistance during challenging seasons.

LOCAL SUPPORT PROGRAMS
Develop programs that support consuming agriculture grown locally.

PLANNING

LAND USE
Consider existing land used for agriculture alongside population growth estimates to ensure that rural agricultural land remains protected over time.

DESKTOP EXERCISES
Hold desktop exercises with farmers (or partner with organizations) to understand how specific threats/ hazards may impact them and aid farmers in addressing those impacts.

COMMUNICATION

EVOLVING CROPS
Promote drought-resistant and heat-tolerant crop varieties to improve agricultural resilience.

FARMER EDUCATION
Educate farmers and workers on the health risks of extreme heat and drought and methods for prevention of those risks.

Conclusion

Alachua County can build a **sustainable** and **prosperous** future for all its residents by **working together** toward a **shared vision of resilience.**

As Alachua County looks to the future, climate change will require a change in the way the County plans. The increase in temperatures, droughts, and precipitation will significantly impact the County, its operations, and the people who live and work there. In the coming years, the County will need to implement actions to prepare for these impacts.

The County needs to address the concerns by hardening infrastructure, implementing water management techniques, investing in agricultural technology, enacting County policies for land management, and creating plans to manage climate change concerns.

Finally, fostering collaboration and engagement with community members and stakeholders will be crucial for developing and implementing effective climate adaptation and mitigation strategies. Alachua County can build a sustainable and prosperous future for all its residents by working together toward a shared vision of resilience.

Resources

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Alachua County Climate Action Plan – Draft Appendix B

The following are the specific objectives and policies from the Alachua County Comprehensive Plan that were either referenced in or pertain to the content in the CAP:

Agriculture and Food Security (Chapter 1)

OBJECTIVE 1.8 Increase the use of locally grown and/or processed foods in County facilities where food is provided and encourage other local government facilities to do the same.

> **Policy 1.8.2** Alachua County shall work to facilitate partnerships between local farmers and local government organizations such as the Alachua County School Board to implement the 2009 Alachua County Hunger Abatement Plan and future updates and provide healthy, fresh foods in local schools and other institutions.
>
> **Policy 1.10.3** Work with IFAS and local agricultural groups to encourage use of sustainable agricultural practices that maximize carbon sequestration, conserve energy and water, minimize soil erosion and protect ecosystems and water quality.
>
> **Policy 1.3.1** Alachua County shall promote access to healthful, affordable and nutritious food.
>
> **Policy 1.3.1.1** Promote food security and public health by encouraging locally-based food production, distribution, and choice in accordance with the Future Land Use Element.
>
> **Policy 1.3.1.2** Alachua County shall consider programs to encourage property owners to make use of vacant properties as community gardens.

Energy Security and Efficiency (Chapter 2)

GOAL

REDUCE GREENHOUSE GAS EMISSIONS AND FOSSIL FUEL CONSUMPTION; MITIGATE THE EFFECTS OF RISING ENERGY COSTS; AND PROMOTE THE LONG-TERM ECONOMIC SECURITY OF ALACHUA COUNTY THROUGH ENERGY CONSERVATION, ENERGY EFFICIENCY AND RENEWABLE ENERGY PRODUCTION.

STRATEGY

Priority 1

Practice energy conservation.

Priority 2

Maximize energy efficiency.

Priority 3

Promote and invest in renewable energy production.

1.0 REDUCTION GOALS

OBJECTIVE 1.1

Reduce countywide greenhouse gas (GHG) emissions by 80% from 2009 baseline emissions by 2050, with an intermediate goal of a 40% reduction by 2020 and a short term goal of 5% annual reduction.

> **Policy 1.1.2** The County shall work with other local governments, groups and organizations to achieve Objective 1.1 through coordinated reduction strategies, and to encourage adoption of a common method for estimating local and regional GHG emissions.

2.0 THE BUILT ENVIRONMENT

OBJECTIVE 2.1 - Community

Encourage energy conservation and energy-efficient design in the built environment of Alachua County.

> **Policy 2.1.1** The land development regulations shall provide, and encourage the use of, energy efficient design techniques such as passive solar design for streets and houses, sustainable landscaping, and techniques identified in Objective 5.1 of the Conservation and Open Space Element and Policy 2.2.5 of the Housing Element.
>
> **Policy 2.1.2** Work with the community to develop an incentive program to encourage new structures and retrofits to exceed the required minimum energy and water efficiency standards of the Florida Building Code.
>
> > **Policy 2.1.2.1** As one incentive, the County shall develop a program where the efficiency rating of a structure, such as the Energy Performance Level (EPL) rating for residential structures or the equivalent for non-residential structures, can be used as a basis for recognition of buildings exceeding a defined threshold for efficiency.

Policy 2.1.2.2 Owners of recognized structures shall be encouraged to participate in a performance monitoring program to track the energy usage of the buildings over time, as an indicator of success in achieving reductions.

Policy 2.1.2.3 The incentive program shall be evaluated periodically to determine whether adjustments to the established threshold are warranted.

Policy 2.1.3 Alachua County shall work with other local governments and local groups and organizations to develop a community weatherization program to improve the energy efficiency of existing structures.

OBJECTIVE 2.2 - COUNTY GOVERNMENT

The County shall explore new opportunities and adopt measures to conserve energy, maximize energy efficiency and use renewable energy in County facilities.

Policy 2.2.1 Weatherize all County buildings to the maximum extent practical.

Policy 2.2.2 The County shall incorporate into its annual Capital Improvements budget a category for energy and water conservation and efficiency projects for County facilities.

Policy 2.2.3 Construct all new County facilities to conform to a nationally recognized, high performance energy efficiency standard and to Florida Water Star^{SM} standards.

Policy 2.2.4 The County shall work with the School Board of Alachua County and other local governments to seek funding and develop strategies to build energy and water efficient schools, retrofit and upgrade existing schools to be more energy and water efficient, and use renewable energy sources for school facilities.

6.0 RENEWABLE ENERGY

OBJECTIVE 6.1

Encourage renewable energy production and a countywide system of distributed residential and commercial power generation.

Policy 6.1.1 Encourage all utilities within Alachua County to retrofit existing systems to incorporate net metering and establish net metering agreements.

Policy 6.1.2 Alachua County shall pursue implementation of an efficiency and renewable energy financing program, such as a Property Assessed Clean Energy (PACE) program.

OBJECTIVE 6.2

Increase the use of solar and other forms of renewable energy by County residents, businesses and agricultural operations.

Policy 6.2.1 Encourage and provide incentives for installing solar arrays on rooftops and other impervious spaces, and remove any barriers to their installation in such areas.

Policy 6.2.2 Provide incentives for use of open space areas within Rural Clustered Subdivisions for renewable energy production in accordance with Policy 6.2.12 of the Future Land Use Element.

8.0 EDUCATION AND PUBLIC INFORMATION

OBJECTIVE 8.1

Provide educational information to the public to promote and encourage energy conservation, energy-efficiency and renewable energy use.

Policy 8.1.1 The County shall work with other local governments, groups and organizations to educate and inform the public regarding energy conservation practices, including strategies identified in Objective 2.2 of the Housing Element.

Policy 8.1.2 Make information available to the community on potential energy conservation incentives such as county recognition of energy efficient homes and developments, credits toward transportation fees, streamlined permitting requirements for redevelopment, and financial incentives available at the state and federal level.

Policy 8.1.3 Partner with local utility providers, municipalities and the University of Florida to make information available to the public on their personal energy usage and possible conservation techniques, the benefits of using renewable energy, and the local, state and federal incentives and programs available to assist with the installation of solar and other forms of renewable energy.

Flood Management and Infrastructure (Chapter 3)

GOAL 1

PROTECT NATURAL DRAINAGE FEATURES AND THE QUALITY OF WATERS AND PROTECT NEW AND EXISTING DEVELOPMENTS IN ACCORDANCE WITH ADOPTED LEVELS OF SERVICE FOR FLOODPLAIN MANAGEMENT, WATER QUANTITY AND WATER QUALITY.

Policy 3.1.1 To ensure water quality and flood protection, new development shall provide facilities designed to control and treat stormwater runoff at the following levels of service:

LEVELS OF SERVICE

Floodplain Management

All new building lots shall include adequate buildable area above the 100-year floodplain and all new habitable structures must be outside the floodplain. Existing lots of record as of May 2, 2005, without buildable area above the floodplain may only develop subject to limitations such as intensity, impervious surface ratio (ISR), clearing, limits on the use of fill material and requirement for appropriate on-site sewage disposal. No development shall adversely impact the functions of the floodplain. Silviculture and agricultural uses shall be required to follow appropriate Best Management Practices.)

Facility	**Level of Service**
Residential floor elevation	1 foot above the 100 year/critical-duration storm elevation
Non-residential floor elevation	1 foot above 100 year/critical-duration storm elevation or flood resistant construction
Water Quantity	
Retention basins	100 year/ critical-duration storm or applicable Water Management District standards
Detention basins	25 year/critical-duration storm with 100 year/critical-duration storm routing analysis
Storm sewer systems	3 year/10 minute
Crossdrains	10/25 year/24hr. storm for closed system 100 Year/24hr for open system
Sidedrains	10 year/20 minute

Heat and Health (Chapter 4)

OBJECTIVE 1.7

Increase equitable access to affordable mental health services.

Policy 1.7.1 Alachua County shall coordinate with service providers and community organizations to promote Mental Health First Aid and other support programs for children, youth, seniors and at-risk populations.

Policy 1.7.2 Alachua County will support community efforts to provide mentoring of youth in partnership with SBAC, after school non-profit organizations, and the Institute for Workforce Innovation.

Policy 1.7.3 Alachua County will support efforts of health professionals to identify populations at-risk to target mental health services.

Land Use and Transportation (Chapter 5)

Future Land Use

PRINCIPLE 1

PROMOTE SUSTAINABLE LAND DEVELOPMENT THAT PROVIDES FOR A BALANCE OF ECONOMIC OPPORTUNITY, EQUITY, ENVIRONMENTAL JUSTICE, AND PROTECTION OF THE NATURAL ENVIRONMENT.

PRINCIPLE 2

BASE NEW DEVELOPMENT UPON THE PROVISION OF NECESSARY SERVICES AND INFRASTRUCTURE. FOCUS URBAN DEVELOPMENT IN A CLEARLY DEFINED AREA AND STRENGTHEN THE SEPARATION OF RURAL AND URBAN USES.

1.0 Urban Residential Policies

OBJECTIVE 1.1 – GENERAL

Encourage development of residential land in a manner which promotes social and economic diversity, provides for phased and orderly growth consistent with available public facilities, and provides for access to existing or planned public services such as schools, parks, and cultural facilities.

Policy 1.1.3 Urban Residential development shall be consistent with the Conservation policies of Alachua County.

Policy 1.1.4 Higher urban densities than designated on the Future Land Use Map may be allowed for housing as established by policies in the Housing Element of the Comprehensive Plan.

OBJECTIVE 1.2- Location, Mix of Uses, and Implementation Consistent with Market Demand: Provide for adequate future urban residential development that includes a full range of housing types and densities to serve different segments of the housing market, designed to be integrated and connected with surrounding neighborhoods and the community, with opportunities for recreation and other mixed uses within walking or bicycling distance.

Policy 1.2.1.2: Landscapes, buffers, natural areas or transitional development practices shall be utilized in site planning to lessen impacts and integrate development along the edges of different land use categories, screen undesirable views, preserve tree canopy and vegetation in accordance with the Conservation and Open Space Element, and facilitate the safe movement of traffic and pedestrians in vehicle use areas.

OBJECTIVE 1.3 - Density

Gross residential densities shall be established to serve as a guideline for evaluating development in Alachua County.

Policy 1.3.3: A range in urban residential densities should be provided with the highest densities located in or near urban activity centers and transit oriented developments, and lower densities located in outlying areas or areas of the County which have physical limitations to development.

OBJECTIVE 1.4 - Neighborhood Design and Site Standards

Encourage the use of innovative concepts for residential development to allow for appropriate mixes of housing types and mixed-use development within Traditional Neighborhood and Transit Oriented Development, adequately served by necessary supporting facilities, in an efficient, environmentally sensitive, and attractive manner.

Comprehensive Plan, FLUE, Policy 1.4.1: The use of proven, innovative concepts for residential development such as TND and TOD are strongly encouraged.

OBJECTIVE 1.6 – Traditional Neighborhood Developments

To provide for interconnected, mixed-use development through specific site and design standards that create pedestrian and bicycle friendly communities, reduce per capita greenhouse gas emissions and vehicular trips on external roadways and provide development patterns that are transit supportive.

OBJECTIVE 1.7 - Transit Oriented Development

To provide for compact, mixed-use, pedestrian and bicycle friendly communities designed with the densities and intensities needed to support transit service, reduced per capita greenhouse gas emissions and enable an individual to live, work, play and shop in a community without the need to rely on a motor vehicle for mobility.

9.0 Transfer of Development Rights

OBJECTIVE 9.1 - Transfer of Development Right Program

To create a tool that, in addition to other County policies and regulations, will protect the County's environmental resources and promote viable agriculture and the rural landscape while encouraging efficient use of services and infrastructure by concentrating development in more suitable areas of the County.

Transportation Mobility

PRINCIPLE 1

TO ESTABLISH AND MAINTAIN A SAFE, CONVENIENT, AND EFFICIENT TRANSPORTATION SYSTEM FOR ALL USERS THAT IS CAPABLE OF MOVING PEOPLE AND GOODS THROUGHOUT THE COUNTY.

PRINCIPLE 2

TO REDUCE VEHICLE MILES OF TRAVEL AND PER CAPITA GREEN HOUSE GAS EMISSIONS THROUGH THE PROVISION OF MOBILITY WITHIN COMPACT, MIXED-USE, INTERCONNECTED DEVELOPMENTS THAT PROMOTE WALKING AND BICYCLING, ALLOW FOR THE INTERNAL CAPTURE OF VEHICULAR TRIPS AND PROVIDE THE DENSITIES AND INTENSITIES NEEDED TO SUPPORT TRANSIT.

PRINCIPLE 3

DISCOURAGE SPRAWL AND ENCOURAGE THE EFFICIENT USE OF THE URBAN CLUSTER BY DIRECTING NEW DEVELOPMENT AND INFRASTRUCTURE TO AREAS WHERE MOBILITY CAN BE PROVIDED VIA MULTIPLE MODES OF TRANSPORTATION.

1.0 Transportation System Capacity

OBJECTIVE 1.1 - Urban Transportation Mobility Districts:

Urban Transportation Mobility Districts encourage future land use and transportation patterns that emphasize mixed-use, interconnected developments, promote walking and biking, reduce vehicle miles of travel and per capita greenhouse gas emissions, and provide the densities and intensities needed to support transit.

> **Policy 1.1.5:** Over the time horizon of the Comprehensive Plan, as the densities and intensities within the Urban Cluster necessary to support transit are realized, the County shall transition from providing new capital infrastructure for a multi-modal transportation network to providing frequent transit service along rapid transit corridors. The Twenty (20) year Multi-Modal Transportation

Capital Improvements Program provides a schedule of the transition from development of the interconnected network to provision of transportation services.

Policy 1.1.6: The Multi-Modal Infrastructure Projects in the Capital Improvements Element are identified to meet the adopted level of service guidelines and proactively address projected transportation needs from new development and redevelopment within the Urban Cluster by 2040.

Policy 1.1.6.3: With the exception of Interstate 75, roadways shall be limited to no more than a total of four (4) through motor vehicle lanes. All new bridges over Interstate 75 shall contain provisions for transit, bicycle lanes, sidewalks and/or multi-use paths.

Policy 1.1.6.2: Roadway capacity projects shall focus on the development of an interconnected network that provides alternatives to the State Road system, including the provision of additional lanes over Interstate 75.

Policy 1.1.6.7: A network of corridors with dedicated transit lane(s) as shown on the Rapid Transit Corridors Map shall be developed to provide a sense of permanence and provide developers seeking to build Transit Oriented Development with the assurance that there is a commitment to transit. Dedicated Transit Lane(s) shall connect transit supportive development with regional employment, educational and entertainment centers. The design of dedicated transit lanes (s) shall be done in consultation with RTS and FDOT on State Roadways. Rapid Transit Corridors may deviate slightly from the alignment shown to serve a Transit Oriented Development, Traditional Neighborhood Development or Activity Center. A Comprehensive Plan amendment shall be required to modify dedicated transit lane(s) for transportation uses other than provision of transit service.

Policy 1.1.6.8: Dedicated transit lane(s) shall be designed and constructed in conjunction with any new roadway projects consistent with the Rapid Transit Corridors map.

Policy 1.1.6.9: The County shall coordinate the provision of park and ride facilities with transit supportive developments located along Rapid Transit Corridors consistent with the Capital Improvements Element and associated maps.

Policy 1.1.7: A mobility fee shall be adopted to ensure that a development funds mobility and fully mitigates its impact to the transportation system.

(c) The mobility fee should reflect the potential to reduce impact to the major roadway network through an increase in internal capture of trips and increase in pedestrian, bicycle and transit mode share from Transit Oriented Developments and Traditional Neighborhood Developments, including redevelopment of existing areas consistent with design requirements for such types of development.

Policy 1.1.8 (d)**:** Stub-outs of the street network to adjacent parcels with development or redevelopment potential shall be provided. Provisions for future connections should be made in all directions whether streets are public or private, except where abutting land is undevelopable due to environmental or topographical constraints.

Policy 1.1.9: Roadways, dedicated transit lanes and trails identified in the Capital Improvements Element shall be constructed by the development where the facilities either run through or are contiguous with the development.

OBJECTIVE 1.3: To coordinate land use decisions and access locations and configurations in order to maintain and improve the efficiency and safety of the transportation system.

Policy 1.3.1: Proposed development shall be reviewed during the Development Review process for the provision of adequate and safe on-site circulation, including pedestrian and bicycle facilities, public transit facilities, access modifications, loading facilities, and parking facilities. In addition to Comprehensive Plan policies, such review shall include FDOT access management standards. Design criteria, standards, and requirements to implement this policy shall be included in the update of the land development regulations.

OBJECTIVE 1.6:

Provide a system of safe, pleasant, convenient, and continuous bicycle and pedestrian network throughout the community.

Policy 1.6.3: Alachua County will promote the development of a multi-modal transportation system consistent with the Capital Improvements Element.

Policy 1.6.4: New development proposals shall be reviewed as part of the Development Review process for the provision of adequate and safe bicycle and pedestrian facilities consistent with policies in the Future Land Use Element. Standards and requirements for bicycle and pedestrian facilities (such as sidewalks, pedestrian paths, bicycle lanes, and bicycle parking) shall be detailed in the land development regulations and include elements such as amount, design, and location.

OBJECTIVE 2.1 – Transit:

To assist the providers of mass transit in Alachua County in their planning efforts through coordination, informational support and participation in planning efforts.

Policy 2.1.1: Alachua County will provide pertinent data to the City of Gainesville to enhance planning for the Regional Transit System (RTS) service area in the unincorporated portion of the County.

Policy 2.1.2: Alachua County shall continue to promote the enhancement of transit through the Long Range Transportation Plan.

Policy 2.1.3: Alachua County shall coordinate with the Regional Transit System (RTS) on all future transit service, express transit service, rapid transit service, and the location and design of park and ride facilities, transit stations and dedicated transit lanes.

Policy 2.1.4: Alachua County shall continue to coordinate transit issues with its municipalities, the Regional Transit System and other transportation providers, transportation disadvantaged programs, Florida Department of Transportation and Metropolitan Transportation Planning Organization.

OBJECTIVE 2.2 – Transportation Disadvantaged:

To coordinate and assist the agencies planning and providing service delivery for the transportation disadvantaged.

Future Land Use

PRINCIPLE 1 Promote sustainable land development that provides for a balance of economic opportunity, equity, environmental justice, and protection of the natural environment.

PRINCIPLE 2 Base new development upon the provision of necessary services and infrastructure. Focus urban development in a clearly defined area and strengthen the separation of rural and urban uses.

Transportation

PRINCIPLE 1 To establish and maintain a safe, convenient, and efficient transportation system for all users that is capable of moving people and goods throughout the county.

PRINCIPLE 2 To reduce vehicle miles of travel and per capita green house gas emissions through the provision of mobility within compact, mixed-use, interconnected developments that promote walking and bicycling, allow for the internal capture of vehicular trips and provide the densities and intensities needed to support transit.

PRINCIPLE 3 Discourage sprawl and encourage the efficient use of the urban cluster by directing new development and infrastructure to areas where mobility can be provided via multiple modes of transportation.

The Comprehensive Plan further defines its Principles through Objectives and Policies. Objectives and Policies supporting current Climate Action Plan efforts or "strategies" are provided below.

Future Land Use Objectives

OBJECTIVE 1.1- General

Encourage development of residential land in a manner which promotes social and economic diversity, provides for phased and orderly growth consistent with available public facilities, and provides for access to existing or planned public services such as schools, parks, and cultural facilities.

Comprehensive Plan, FLUE, Policy 1.1.3: Urban Residential development shall be consistent with the Conservation policies of Alachua County.

Comprehensive Plan, FLUE, Policy 1.1.4: Higher urban densities than designated on the Future Land Use Map may be allowed for housing as established by policies in the Housing Element of the Comprehensive Plan.

OBJECTIVE 1.2- Location, Mix of Uses, and Implementation Consistent with Market Demand: Provide for adequate future urban residential development that includes a full range of housing types and densities to serve different segments of the housing market, designed to be integrated and connected with surrounding neighborhoods and the community, with opportunities for recreation and other mixed uses within walking or bicycling distance.

> **Comprehensive Plan, FLUE, Policy 1.2.1.2:** Landscapes, buffers, natural areas or transitional development practices shall be utilized in site planning to lessen impacts and integrate development along the edges of different land use categories, screen undesirable views, preserve tree canopy and vegetation in accordance with the Conservation and Open Space Element, and facilitate the safe movement of traffic and pedestrians in vehicle use areas.

OBJECTIVE 1.3 - Density

Gross residential densities shall be established to serve as a guideline for evaluating development in Alachua County.

> **Comprehensive Plan, FLUE, Policy 1.3.3:** A range in urban residential densities should be provided with the highest densities located in or near urban activity centers and transit oriented developments, and lower densities located in outlying areas or areas of the County which have physical limitations to development.

OBJECTIVE 1.4 - Neighborhood Design and Site Standards

Encourage the use of innovative concepts for residential development to allow for appropriate mixes of housing types and mixed-use development within Traditional Neighborhood and Transit Oriented Development, adequately served by necessary supporting facilities, in an efficient, environmentally sensitive, and attractive manner.

> **Comprehensive Plan, FLUE, Policy 1.4.1:** The use of proven, innovative concepts for residential development such as TND and TOD are strongly encouraged.

OBJECTIVE 1.6 – Traditional Neighborhood Developments

To provide for interconnected, mixed-use development through specific site and design standards that create pedestrian and bicycle friendly communities, reduce per capita greenhouse gas emissions and vehicular trips on external roadways and provide development patterns that are transit supportive.

OBJECTIVE 1.7 - Transit Oriented Development

To provide for compact, mixed-use, pedestrian and bicycle friendly communities designed with the densities and intensities needed to support transit service, reduced per capita greenhouse gas

emissions and enable an individual to live, work, play and shop in a community without the need to rely on a motor vehicle for mobility.

OBJECTIVE 9.1 - Transfer of Development Right Program

To create a tool that, in addition to other County policies and regulations, will protect the County's environmental resources and promote viable agriculture and the rural landscape while encouraging efficient use of services and infrastructure by concentrating development in more suitable areas of the County.

Transportation Objectives

OBJECTIVE 1.1 - Urban Transportation Mobility Districts: Urban Transportation Mobility Districts encourage future land use and transportation patterns that emphasize mixed-use, interconnected developments, promote walking and biking, reduce vehicle miles of travel and per capita greenhouse gas emissions, and provide the densities and intensities needed to support transit.

> **Comprehensive Plan, TME, Policy 1.1.8 (d):** Stub-outs of the street network to adjacent parcels with development or redevelopment potential shall be provided. Provisions for future connections should be made in all directions whether streets are public or private, except where abutting land is undevelopable due to environmental or topographical constraints.
>
> **Comprehensive Plan, TME, Policy 1.1.6:** Implement the Multi-Modal Infrastructure Projects in the Capital Improvements Element to meet the adopted level of service guidelines and proactively address projected transportation needs from new development and redevelopment within the Urban Cluster by 2040.
>
> **Comprehensive Plan, TME Policy 1.1.6.3:** With the exception of Interstate 75, roadways shall be limited to no more than a total of four (4) through motor vehicle lanes. All new bridges over Interstate 75 shall contain provisions for transit, bicycle lanes, sidewalks and/or multi-use paths.
>
> **Comprehensive Plan, TME, Policy 1.1.6.2:** Roadway capacity projects shall focus on the development of an interconnected network that provides alternatives to the State Road system, including the provision of additional lanes over Interstate 75.
>
> **Comprehensive Plan, TME, Policy 1.1.7:** A mobility fee shall be adopted to ensure that a development funds mobility and fully mitigates its impact to the transportation system through an increase in internal capture of trips and increase in pedestrian, bicycle and transit mode share from Transit Oriented Developments and Traditional Neighborhood Developments, including redevelopment of existing areas consistent with design requirements for such types of development.

Comprehensive Plan, TME, Policy 1.1.9: Roadways, dedicated transit lanes and trails identified in the Capital Improvements Element shall be constructed by the development where the facilities either run through or are contiguous with the development.

OBJECTIVE 1.3: To coordinate land use decisions and access locations and configurations in order to maintain and improve the efficiency and safety of the transportation system.

Comprehensive Plan, TME, Policy 1.3.1: Proposed development shall be reviewed during the Development Review process for the provision of adequate and safe on-site circulation, including pedestrian and bicycle facilities, public transit facilities, access modifications, loading facilities, and parking facilities. In addition to Comprehensive Plan policies, such review shall include FDOT access management standards. Design criteria, standards, and requirements to implement this policy shall be included in the update of the land development regulations.

OBJECTIVE 1.5 - Integrate Natural, Historic, and Scenic Resources: Avoid, minimize**,** and *mitigate adverse impacts* upon natural and historic resources and scenic quality during the siting, design, construction, operation, and maintenance of the transportation system. Use the transportation system to enhance natural and historic resources and scenic quality *where possible*.

Comprehensive Plan, TME, Policy 1.5.1: Transportation facilities shall be located, designed, constructed, and maintained to avoid, minimize and mitigate adverse impacts Conservation and Preservation areas consistent with Objective 3.6 of the Conservation and Open Space Element.

Comprehensive Plan, TME, Policy 1.5.2: Appropriate conservation, arboricultural, and horticultural standards shall be used in the design, construction, and maintenance of transportation facilities in order to promote energy conservation, enhance habitat connectivity, provide for the safe passage of wildlife, and improve scenic quality, consistent with Objectives 5.3 and 5.4 of the Conservation and Open Space Element.

Comprehensive Plan, TME, Policy 1.5.3: The county determines through the adoption of this Comprehensive Plan that there is no need for, or public purpose for any new turnpikes, expressways or toll roads in Alachua County that are significantly outside of the rights of way of existing highways. This policy constitutes a finding of fact that the construction of any new expressways, turnpikes or toll roads significantly outside of existing highway rights of way by any agency of government or other entity does not serve a public purpose, and would be inconsistent with this adopted Comprehensive Plan.

OBJECTIVE 1.6: Provide a system of safe, pleasant, convenient, and continuous bicycle and pedestrian network throughout the community.

Comprehensive Plan, TME, Policy 1.6.3: Alachua County will promote the development of a multi-modal transportation system consistent with the Capital Improvements Element.

Comprehensive Plan, TME, Policy 1.6.4: New development proposals shall be reviewed as part of the Development Review process for the provision of adequate and safe bicycle and pedestrian facilities consistent with policies in the Future Land Use Element. Standards and requirements for bicycle and pedestrian facilities (such as sidewalks, pedestrian paths, bicycle lanes, and bicycle parking) shall be detailed in the land development regulations and include elements such as amount, design, and location.

OBJECTIVE 2.1 – Transit: To assist the providers of mass transit in Alachua County in their planning efforts through coordination, informational support and participation in planning efforts.

> **Comprehensive Plan, TME, Policy 2.1.1:** Alachua County will provide pertinent data to the City of Gainesville to enhance planning for the Regional Transit System (RTS) service area in the unincorporated portion of the County.
>
> **Comprehensive Plan, TME, Policy 2.1.2:** Alachua County shall continue to promote the enhancement of transit through the Long Range Transportation Plan.
>
> **Comprehensive Plan, TME, Policy 2.1.3:** Alachua County shall coordinate with the Regional Transit System (RTS) on all future transit service, express transit service, rapid transit service, and the location and design of park and ride facilities, transit stations and dedicated transit lanes.
>
> **Comprehensive Plan, TME, Policy 2.1.4:** Alachua County shall continue to coordinate transit issues with its municipalities, the Regional Transit System and other transportation providers, transportation disadvantaged programs, Florida Department of Transportation and Metropolitan Transportation Planning Organization.

OBJECTIVE 2.2 – Transportation Disadvantaged: To coordinate and assist the agencies planning and providing service delivery for the transportation disadvantaged.

Natural Resources and Conservation (Chapter 6)

1.0 Conservation Overview

> **Policy 1.1.1:** The County shall promote the long-term maintenance of natural systems through a comprehensive approach that involves education, public participation, regulations, incentives, acquisition, intergovernmental coordination, and other appropriate mechanisms.

Policy 1.2.1: Any decision may directly or indirectly affect the conservation, management, preservation, enhancement, and use of the natural resources of Alachua County. It is the intent of this Element that County officials, staff, and citizens constantly monitor all decisions for the effects they may have on appropriate conservation and use of resources, and that such decisions be made with consideration given to the principles and policies of the Comprehensive Plan and this Element.

2.0 Environmental Information Management

Policy 2.2.1 The County shall encourage environmental stewardship among all citizens of Alachua County by advancing conservation principles in the everyday operations of Alachua County.

3.0 Environmental Land Use Categories

Policy 3.1.3 Conservation areas shall be developed only in a manner consistent with protection of the ecological integrity of natural resources, and in accordance with standards which are outlined subsequently in this Element.

Policy 3.6.15 The County shall identify and protect green infrastructure through the development review process by protecting conservation resources and natural areas and allow and encourage proven environmentally-friendly development techniques, like low impact development that minimize impacts to natural resources and water quality and maintain existing hydrologic conditions.

4.0 Natural Resources

Policy 4.1.8 The County shall establish a tree planting program to improve air quality in designated areas.

OBJECTIVE 4.5 - GROUNDWATER AND SPRINGS:

Protect and conserve the quality and quantity of groundwater and springs resources to ensure long-term public health and safety, potable water supplies from surficial, intermediate, and Floridan aquifers, adequate flow to springs, and the ecological integrity of natural resources.

OBJECTIVE 4.6 - SURFACE WATER SYSTEMS

Ensure the protection and improvement of the water quality, biological health, and natural functions of surface water systems in Alachua County.

OBJECTIVE 4.7 - WETLAND ECOSYSTEMS

Wetland acreage and function shall be protected.

OBJECTIVE 4.8 - FLOOD PLAINS AND FLOODWAYS

Protect and maintain the natural functions of floodplains, floodways, and all other natural areas having hydrological characteristics of the one hundred (100)-year flood elevation. Natural functions include water purification, flood hazard mitigation, water supply, and wildlife habitat and connectivity.

OBJECTIVE 4.10 - STRATEGIC ECOSYSTEMS

Protect, conserve, enhance, and manage the ecological integrity of strategic ecosystems in Alachua County.

6.0 Land Conservation Program

> **Policy 6.2.1:** The County shall establish and maintain the Alachua County Forever program to acquire and manage environmentally significant lands for the protection of water resources, wildlife habitat, and natural areas suitable for resource-based recreation.

OBJECTIVE 6.3 - ECOLOGICALLY FUNCTIONAL LINKAGES

Develop a linked network of protected natural areas and open space that can be managed to support the protection, enhancement and restoration of functional and connected natural systems while providing unique opportunities for recreation, and economic development.

> **Policy 6.6.5** The County shall restore and enhance degraded natural areas on County-owned preservation, conservation and recreation lands, including removal of invasive non-native plants and animals, reforestation, re-establishment of burn regimes for fire-adapted ecosystems, and restoration of shorelines and natural hydrology, as needed.

Waste Management and Resource Recovery (Chapter 7)

> **Policy 1.2.5** Incinerator and mass burn facilities will not be included in the County solid waste system. The use of tires, plastics or plastic derived materials as a fuel source or as feedstock for a waste to energy facility is prohibited in the County solid waste system.

OBJECTIVE 1.5

The County shall develop and implement a waste reduction strategy that includes waste prevention, source reduction, reuse, recycling and biological disposition, resulting in a reduction of solid waste disposed per capita.

Policy 1.5.6 The County shall provide coordination and assistance to all local municipalities, and institutions to maintain effective and efficient recycling programs.

Policy 1.5.9 The County shall improve the yard trash management program and shall encourage the public to increase efforts to utilize landscape and yard waste at home through backyard mulching and composting programs.

Policy 1.5.11 The County shall continue to investigate other methods of waste management and alternatives to landfill disposal of solid waste, including source reduction.

OBJECTIVE 1.7

The County will continue to provide safe and economic disposal and recycling of household hazardous waste (HHW).

Water and Aquifer Protection (Chapter 8)

Vocabulary and Acronyms

V2 Alachua County Climate Action Plan (CAP) Chapters

Introduction – *[to be completed]*

Adaptation	Adjustment in natural or human systems to a new or changing environment that exploits beneficial opportunities or moderates negative effects. (EPA Watershed Academy)
Fresh Food Pathways	
Food system	
Algae Bloom	Excessive algae in a body of water, largely a result of nitrogen and phosphorus runoff.
Anthropogenic	Human caused; human made.
Aquifer	"A large underground limestone reservoir;" "the primary source of drinking water in Alachua County." (University of Florida)
Best Management Practices (BMPs)	"… defined by law as a means, a practice or combination of practices determined by the coordinating agencies, based on research, field testing and expert review, to be the most effective and practicable on-location means, including economic and technological considerations, for improving water quality in agricultural and urban discharges." (FDACS)
Climate Anxiety	Intense fear of climate change and its impacts.
Climate Vulnerability Analysis	An analysis of Representative Concentration Pathways (RCPs) and Shared Socio-economic Pathways (SSPs). RCPs are "scenarios based on a defined set of emissions and concentrations of greenhouse gases, aerosols, and chemically active gases and land cover assumptions that lead to a heating effect called radiative forcing." SSPs are scenarios that "represent pathways based on possible socioeconomic futures that account for various assumptions on how the global population will mitigate and adapt to climate change."(Alachua County Climate Vulnerability Analysis)
Edible Grove	Land with "food-bearing trees and plants available to residents." (City of Gainesville)

EMPOWER Project	Energy Modernization for People Opportunity, Work, Equity and Renewables Program; "evaluates the benefits and challenges of developing solar project in low-income neighborhoods." (U.S. Department of Energy)
EVs	Electric vehicles
Extreme Heat	Excessive and prolonged high temperatures, often surpassing normal seasonal averages, posing risks to health, infrastructure, and ecosystems (County Vulnerability Analysis)
Food Desert	"… Regions of the country often feature large proportions of households with low incomes, inadequate access to transportation, and a limited number of food retailers providing fresh produce and healthy groceries for affordable prices" (USDA, 2012).
Green Roof	Some kind of vegetation, primarily in the form of rooftop gardens, on roofs. They have been proven to be an effective method of mitigating UHIs (EPA, 2023).
Greenhouse Effect	The process by which GHGs "trap" heat inside the atmosphere. While this is a natural process, adding excessive amounts of greenhouse gases increases temperatures beyond a suitable point.
Greenhouse Gas (GHG)	Water vapor, carbon dioxide (CO2), nitrous oxide (N2O), methane (CH4), ozone (O3), etc. These appear naturally in the atmosphere, though anthropogenic emissions are contributing to excess amounts.
GRU	Gainesville Regional Utilities
Mitigation	Measures to reduce the amount and rate of future climate change by reducing emissions of heat-trapping gases or removing carbon dioxide from the atmosphere. (NCA5 Glossary)
Municipal Solid Waste (MSW)	Waste from households
Net Zero	When anthropogenic CO2 emissions equal anthropogenic CO2 removals; carbon neutrality (IPCC, 2018).
Race to Zero	A group of over 11,000 non-state actors committed to halving emissions by 2030; created by the United Nations High Level Climate Champions.

Resiliency	The capacity of interconnected social, economic and ecological systems to cope with a climate change event, trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity and structure. Climate resilience is a subset of resilience against climate-induced or climate-related impacts. (NCA5 Glossary)
Reuse Economy	An economy which minimized single-use plastic through reusing goods.
Runoff	Water that flows over surfaces or through subsurfaces as a result of precipitation. Runoff can pollute vegetation, waterbodies, and soils if it carries contaminants.
Sea Level Rise	The gradual rise in the average global sea levels, primarily attributed to the melting of polar ice caps and expansion of our oceans resulting from an increase in global temperatures.
Sensitivity	The extent to which an exposed asset is impacted
Sustainability	This describes activities that include, but are not limited the following goals: • Tend to improve social conditions for all kinds of people • Increase economic opportunities • Improve environmental protection or restoration efforts Will continue to have these effects for the foreseeable future (Alachua County)
Urban Farming	Agriculture (growing of crops and raising livestock) in an urban area through backyard farming, vertical farms, green walls, and more.
Urban Heat Island (UHI)	Excess heat in urban areas as a result of infrastructure re-emitting heat from the sun (EPA, 2023).
Urban Sprawl	Urban development pattern characterized by decentralization and fragmentation, subsequently creating a higher reliance on personal vehicles (OECD, 2018).
Walkable City	A city where infrastructure and city planning is centered around walking and biking rather than cars, ensuring easy access to walkways, bicycle lanes, etc

Wastewater	
Wildland Urban Interface (WUI)	The interface where wildland and forest vegetation meet residential structures and is where wildfire poses the highest risk to people and infrastructure (Alachua County Climate Vulnerability Analysis)
Zero Waste	Zero Waste principles recognize a Hierarchy of Material Management in the following order from most preferred to least preferred: 1) Extended Producer Responsibility and Product Redesign; 2) Reduce Waste, Toxicity, Consumption, and Packaging; 3) Repair, Reuse, and Donate; 4) Recycle; 5) Compost; 6) Down Cycle and Beneficial Reuse; 7) Waste-Based Energy as disposal; 8) Landfill Waste as disposal. (City of Gainesville)

Agriculture and Food Security

Food System	A food system encompasses all the steps and actors involved in producing, processing, distributing, and consuming food. It is a complex network that involves social, economic, environmental, and cultural factors. It is made up of several interdependent processes, including aggregation and distribution mechanisms, environmental support systems, and consumer behavior and demand.
USDA	United Stated Department of Agriculture
UF/IFAS	University of Florida Institute of Food and Agricultural Sciences
Food Insecurity	**Low food** reports of reduced quality, variety, or desirability of diet. Little or no indication of reduced food intake. **Very low food**: reports of multiple indications of disrupted eating patterns and reduced food intake.[1]
Food Desert	"Low-income census tracts with a substantial number or share of residents with low levels of access to retail outlets selling healthy and affordable foods"[2]
Food Hub	An aggregation and distribution facility that emphasizes purchasing from local producers to sell to institutional purchasers
ACF	Alachua County Forever
ALCB	Agricultural Land Conservation Board
AFT	American Farmland Trust

[1] Food Security in the U.S. - Definitions of Food Security | Economic Research Service
[2] Mapping Food Deserts in the United States | Economic Research Service