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.

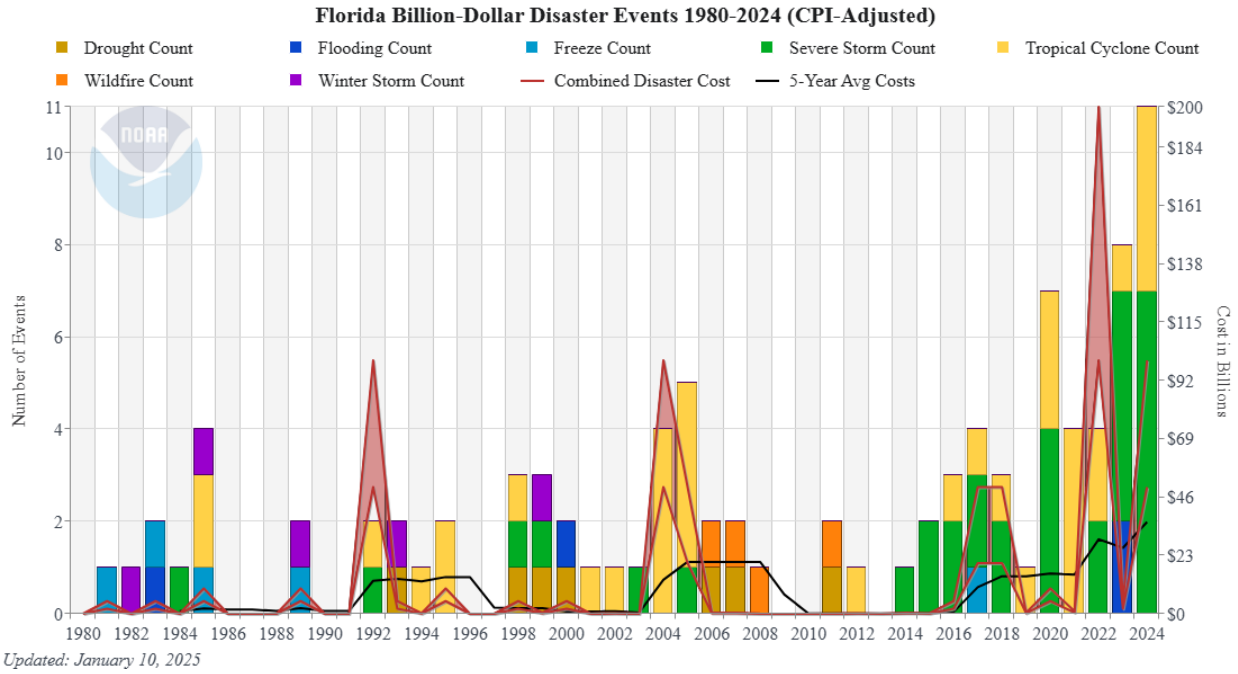

Figure 0.1 – Florida Billion-Dollar Disaster Events 1980-2024[5]

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.

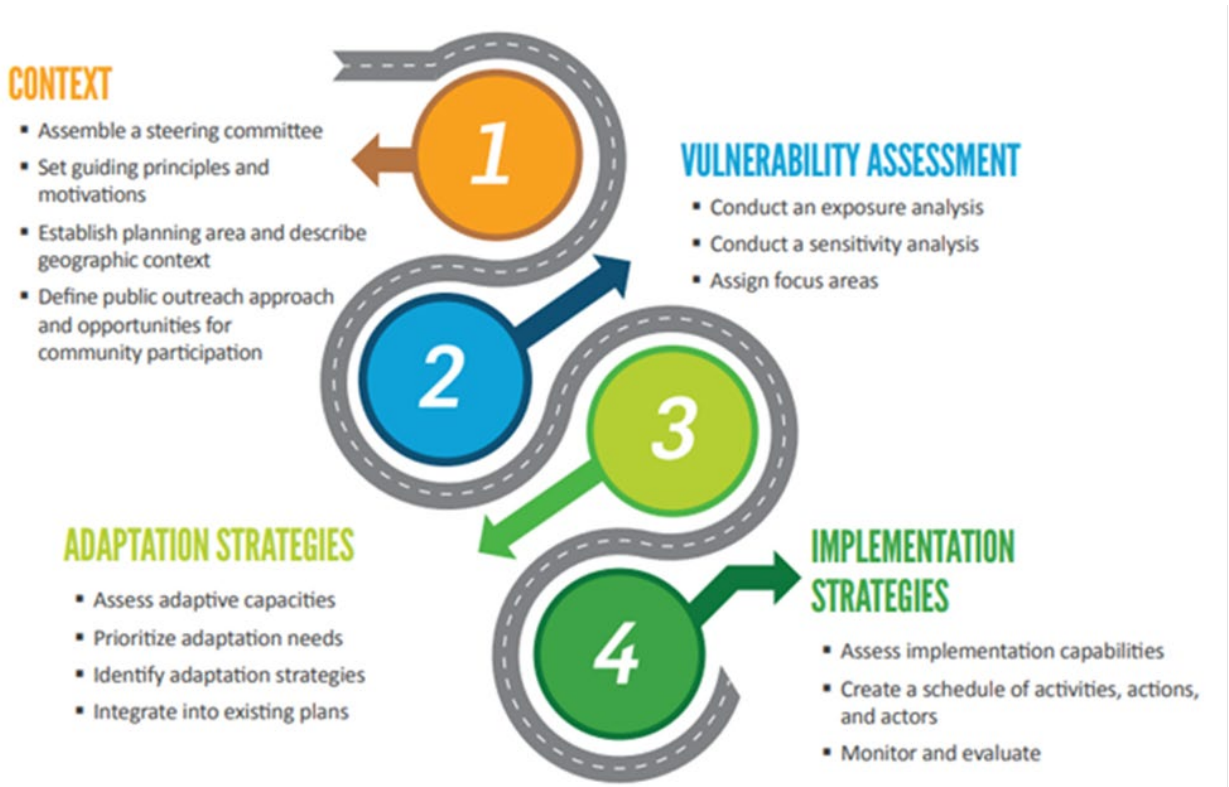

Figure 0.2: Florida Adaptation Planning Guidebook steps to make an Adaptation Plan

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.

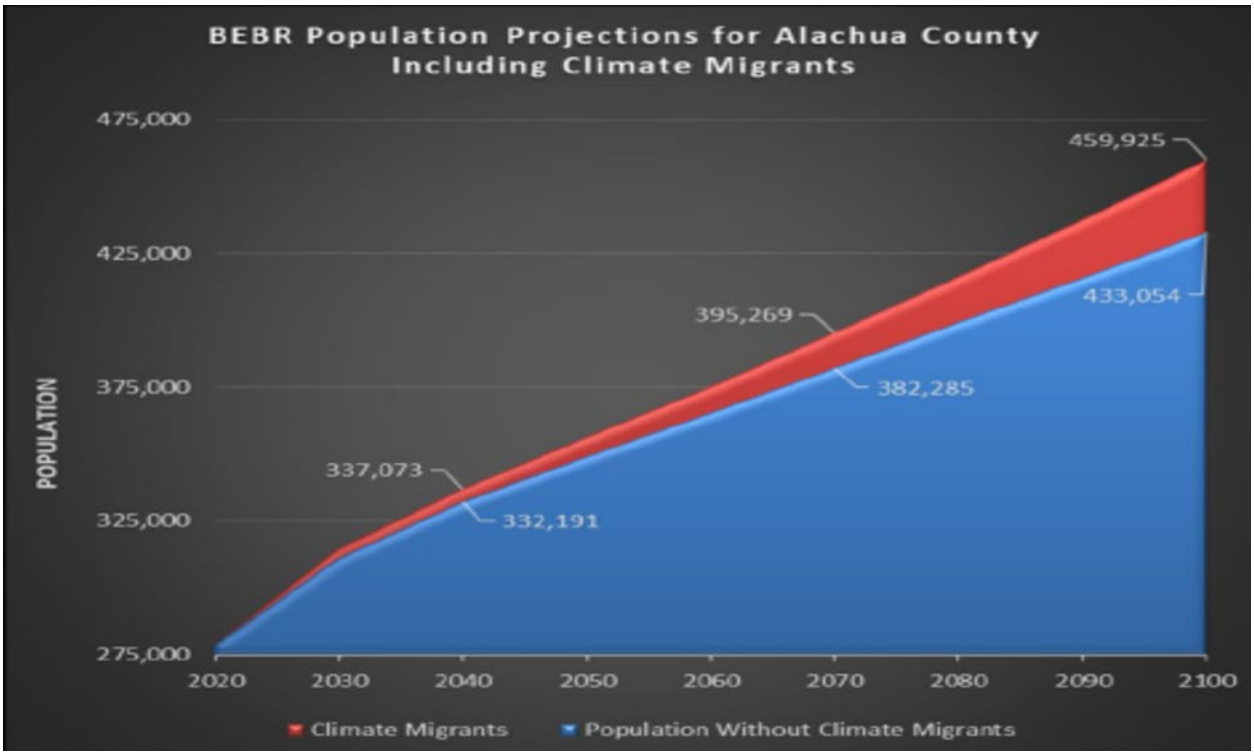

Figure 0.2: Bureau of Economic and Business Research Population Projections for Alachua County including Climate Migrants (2020-2100)

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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