

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
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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.

		<i>2020</i>	<i>2040</i>	<i>2070</i>
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**

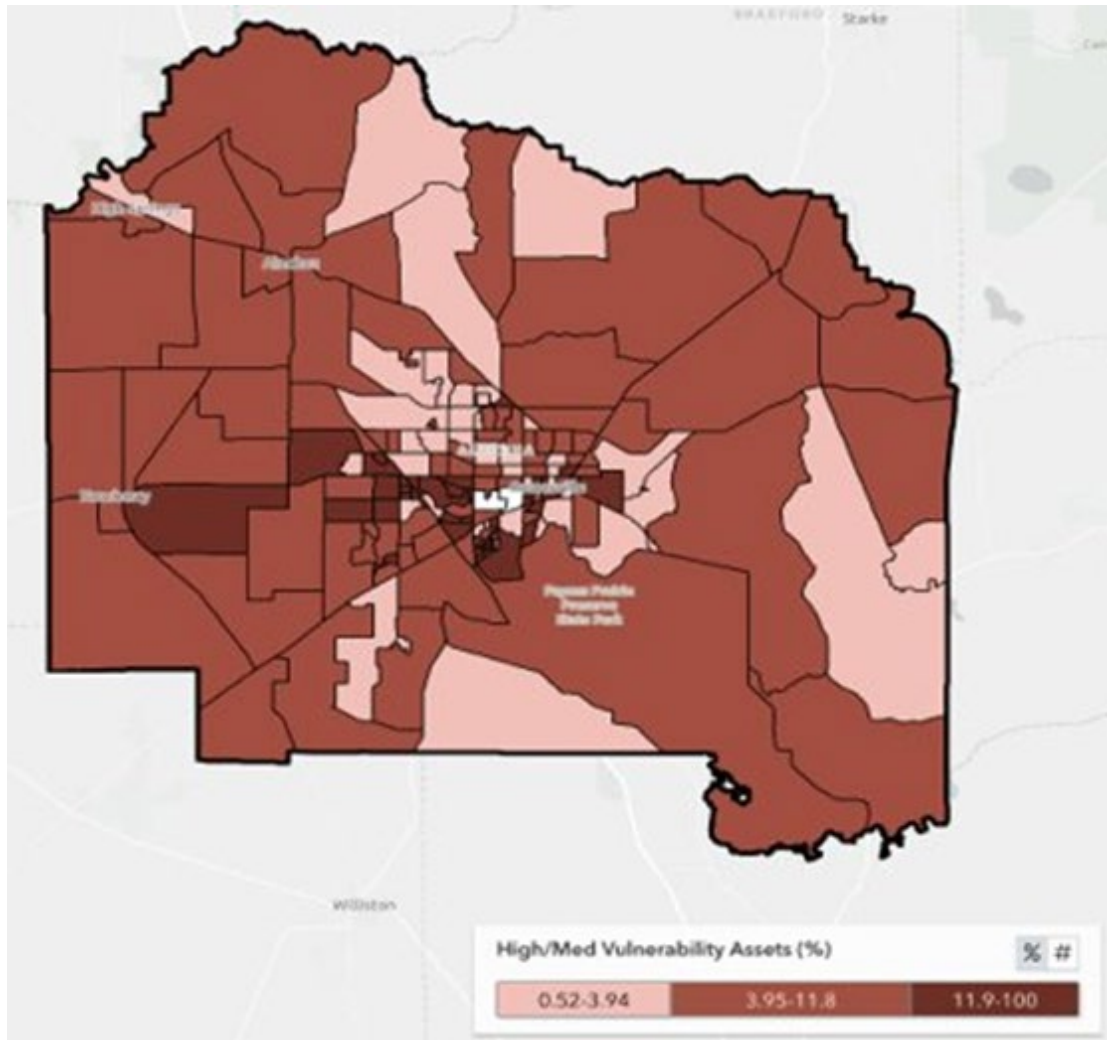


Figure 3.1. Percent of Residential Properties Highly Vulnerable to Current 100-Year Rainfall-Induced Flooding by Census Block Group

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 oversight	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	
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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
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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 oversight 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 portal has re-opened: [Elevate Florida | Florida Disaster](#)

References

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