



State of Mississippi Local Mitigation Strategy Planning Non-Participating Jurisdiction Adoption Addendum Form

Jurisdiction Requesting Adoption Approval:
Date of Jurisdiction Adoption:
Title of County LMS Plan:

1. Review of the Multi-Jurisdictional Hazard Analysis

The requesting jurisdiction must review the hazard analysis (risk assessment) of the LMS Plan and answer the following questions.

Explain the requesting jurisdiction's review process of the LMS Plan's hazard analysis: <i>(Verify the risk assessment was reviewed for the requesting jurisdiction's hazard risk)</i>
Do additional hazard risks exist for the requesting jurisdiction that were not addressed in the LMS Plan? Yes No
If yes, provide a description of any hazard risks unique to the requesting jurisdiction not already addressed in the LMS Plan: <i>(discussion should include location information, probability of future conditions, hazard occurrences, specific impacts, vulnerability to hazard, etc.)</i>

2. Agreement with Mitigation Goals and Addition of Mitigation Actions

The requesting jurisdiction must review the mitigation goals stated in the LMS Plan and answer the following questions regarding goals, mitigation projects, and mitigation capability.

Does the requesting jurisdiction agree with the stated mitigation goals of the LMS Plan? Yes No
Are there additional mitigation goals specific to the requesting jurisdiction to be added? Yes No <i>If yes, the requesting jurisdiction should get approval from the County LMS Work Group and state the goals below.</i>

Additional goal(s), if applicable:

Does the requesting jurisdiction have a project, or projects, on the County's LMS Project List?

Yes No

If yes, include the County's LMS Project List as an attachment.

If no, the requesting jurisdiction must add projects to the County's Project List before submittal.

Describe the capability of the requesting jurisdiction to support the LMS Plan's mitigation strategy:
(Capabilities may include existing authorities, policies, programs, funding, etc.)

3. Documentation of Involvement

The requesting jurisdiction must discuss involvement in the planning process.

Explain how the requesting jurisdiction and the public were given the opportunity to participate in the original LMS Update Planning Process:

(This information can be found within the Planning Process of the Approved LMS Plan)

Pages in LMS where information was found:

How has the requesting jurisdiction recently participated in the County's LMS Planning Process? (*i.e., attendance in LMS Work Group meetings, proposal of projects, etc.*)

How will the requesting jurisdiction participate in the planning process of the next major update of the County's LMS Plan (required every five years)?

Required Attachments:

Jurisdiction Adoption Resolution

Current LMS Project List

Note: *This form and all attachments must be included as an appendix/annex to the approved LMS Plan until the next major update.*

Authorization of Review and Approval:

County LMS Chair Signature

Date

Gluckstadt, MS, Mayor

Date

Gluckstadt, Mississippi

This section presents the jurisdictional annex for Gluckstadt, Mississippi.

Mitigation Council Committee

<p>Chris Buckner Public Works Director City of Gluckstadt 107 Lone Wolf Drive Gluckstadt, MS 39110 769-235-9629</p>	<p>Vikki Good Public Works Assistant City of Gluckstadt 107 Lone Wolf Drive Gluckstadt, MS 39110 769-567-1763</p>
<p>Ruth Marie Stogner Grant Writer City of Gluckstadt 343 Distribution Drive Madison, MS 39110 601-209-1126</p>	<p>William Hall Planning and Zoning Administrator City of Gluckstadt 343 Distribution Drive Madison, MS 39110 769-567-2306</p>
<p>Lindsay Kellum City Clerk City of Gluckstadt 343 Distribution Drive Madison, MS 39110 769-567-2306</p>	<p>Jayce Powell Alderman City of Gluckstadt 343 Distribution Drive Madison, MS 39110 601-506-9829</p>
<p>Henry Davis Fire Chief Gluckstadt Fire Department 639 Yandell Road Canton, MS 39046 601-260-1363</p>	<p>Nicholas Rushton Division Chief Gluckstadt Fire Department 639 Yandell Road Canton, MS 39046 601-953-5510</p>

Public Participation

A public meeting of the Mitigation Council was held at Gluckstadt City Hall on June 18, 2024 at 9:30 a.m.. During the meeting, attendees heard a presentation on the importance of hazard mitigation planning, discussed the specific risks to the City of Gluckstadt, and provided insight and comments on Mitigation Actions to be included in this Plan. Attendees included members of the Mitigation Council as well as some citizen representation. A sign-in sheet was maintained to document participation and is included below.

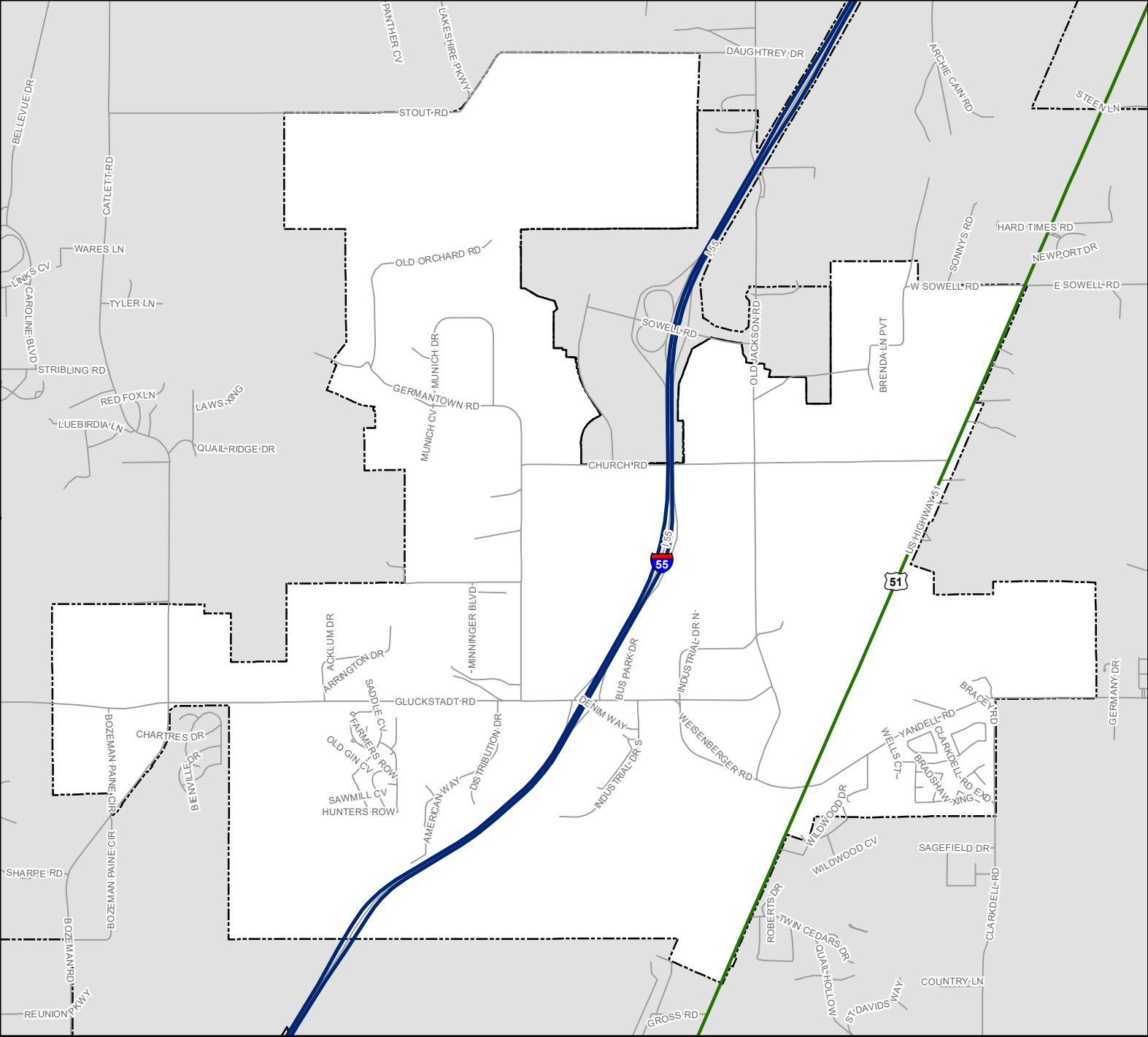
Location

The City of Gluckstadt is located in Madison County, north of Madison, Mississippi and south of Canton, Mississippi. Gluckstadt is approximately 18 miles north of Jackson, Mississippi and 197 miles south of Southaven, Mississippi.

Transportation Network

- U.S. Highway 51
- Interstate 55

City of Gluckstadt, MS



LEGEND

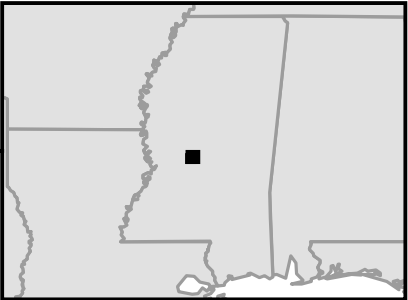
- Interstates
- Major Highways
- Major Local Roads
- Local Roads
- Municipalities
- Counties



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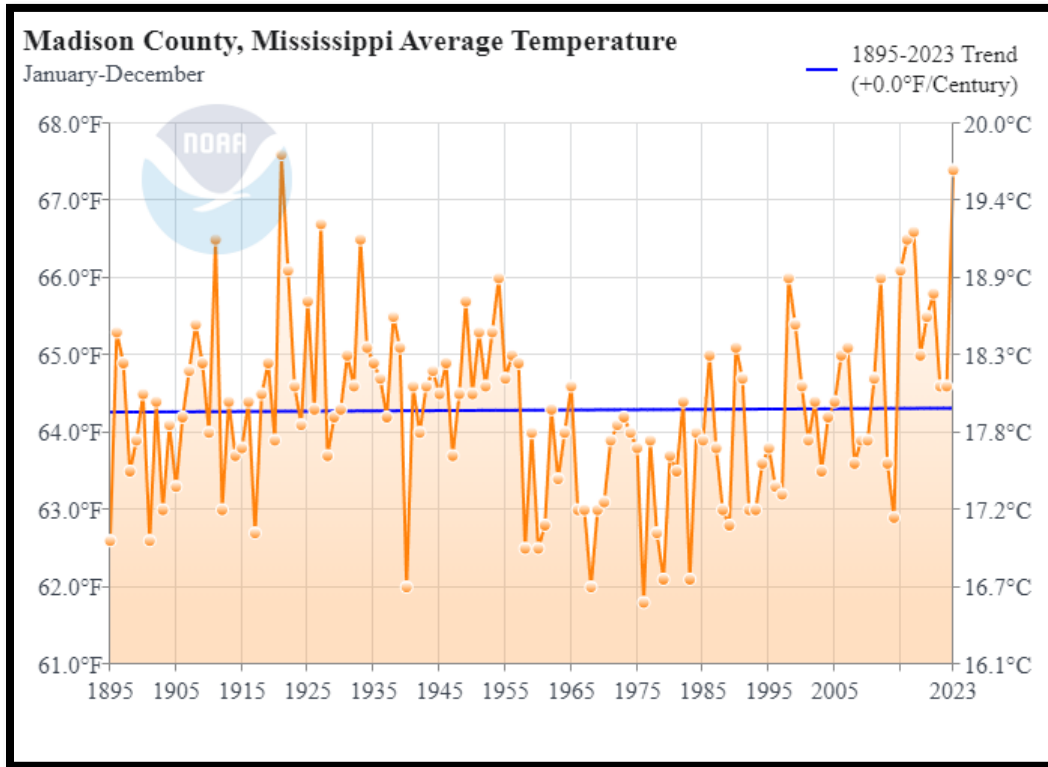


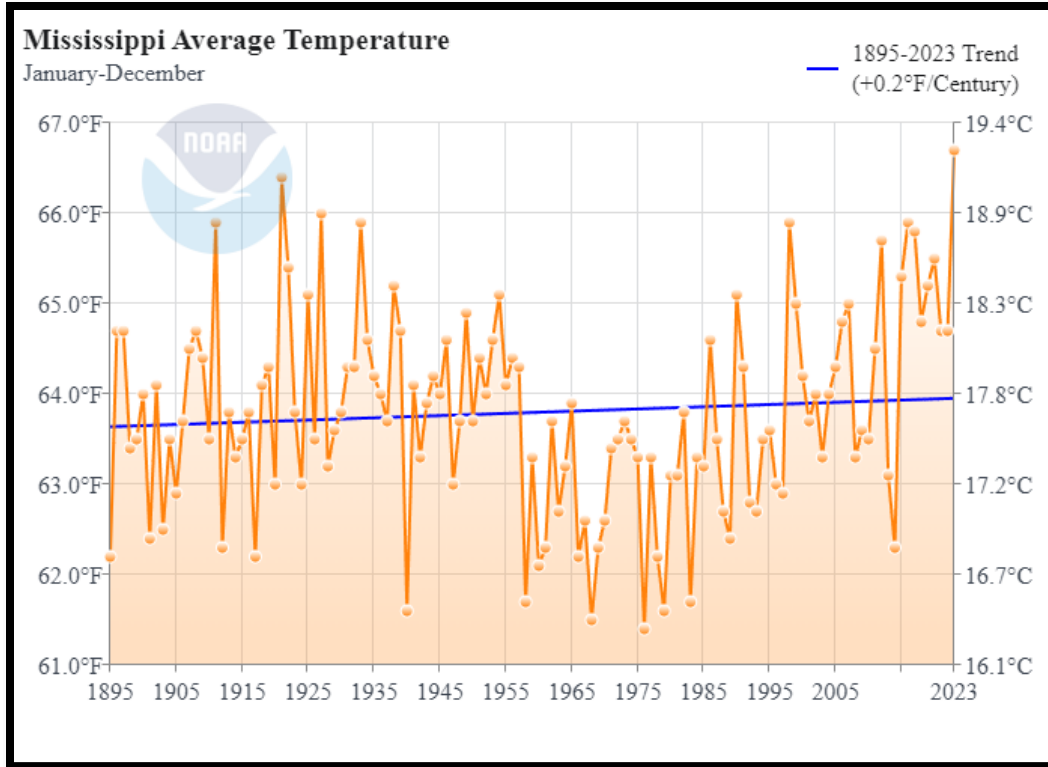
Climate

According to the NOAA National Centers for Environmental Information, “State Climate Summaries,” Mississippi’s climate, and therefore, the City of Gluckstadt’s climate is characterized by “relatively mild winters, hot summers, and year-round precipitation.”

Temperatures average annually about 81 degrees in July and about 48 degrees in January. On average, the warmest month is July, and the coolest month is January. Prevailing southerly winds provide moisture for high humidity and potential discomfort from May through September. Locally violent and destructive thunderstorms are a threat on an average of about 60 days each year. Normal precipitation averages 4.8 inches per month throughout the area annually. Traceable amounts of sleet and snowfall are also typical.

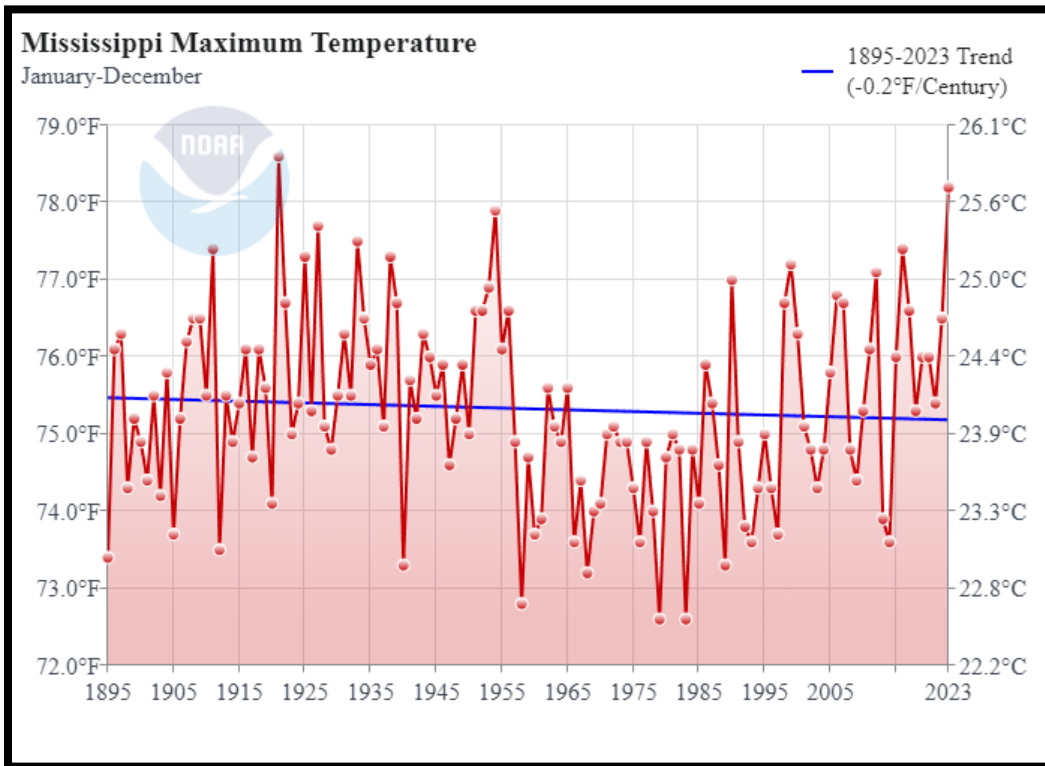
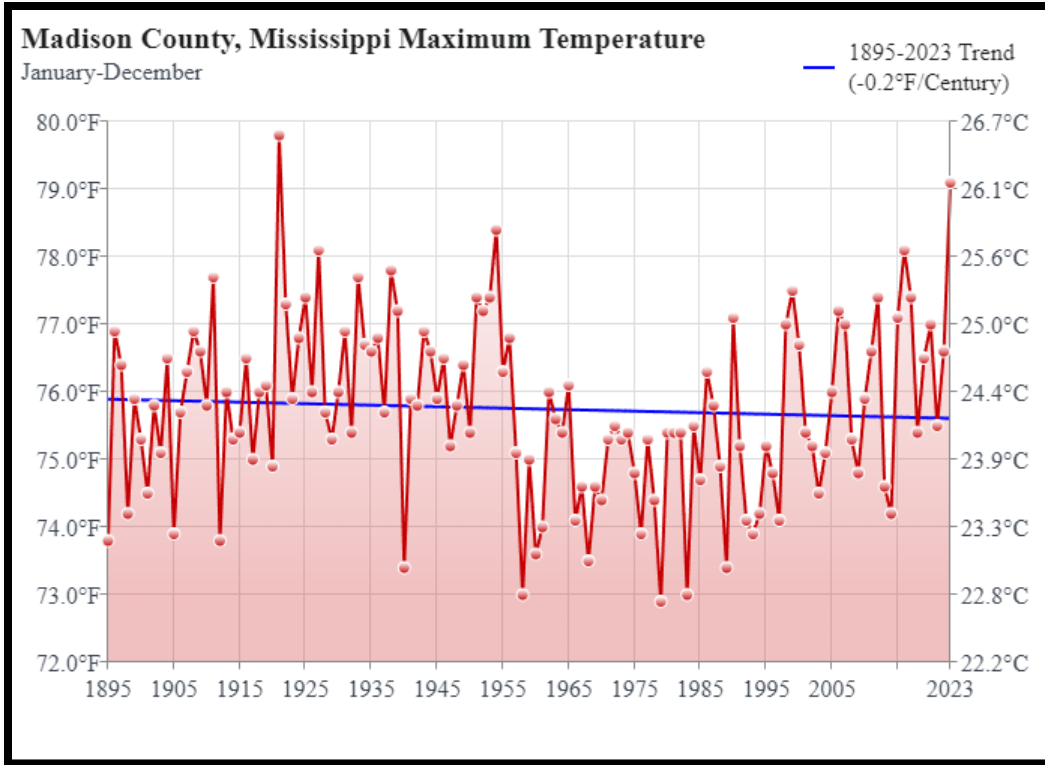
However, climate shift and change may impact the vulnerability, risk, and extent of hazards for the City of Gluckstadt. Historical data can be used to predict future impacts as a result of climate change. According to NOAA’s National Centers for Environmental Information: Climate at a Glance tool, the trend line for average annual temperature for the City of Gluckstadt has remained the same in the time period of 1895 to 2023, and the average annual temperature for Mississippi has increased by 0.2 degrees, suggesting that the annual average temperature is remaining essentially the same at 63.7 degrees.





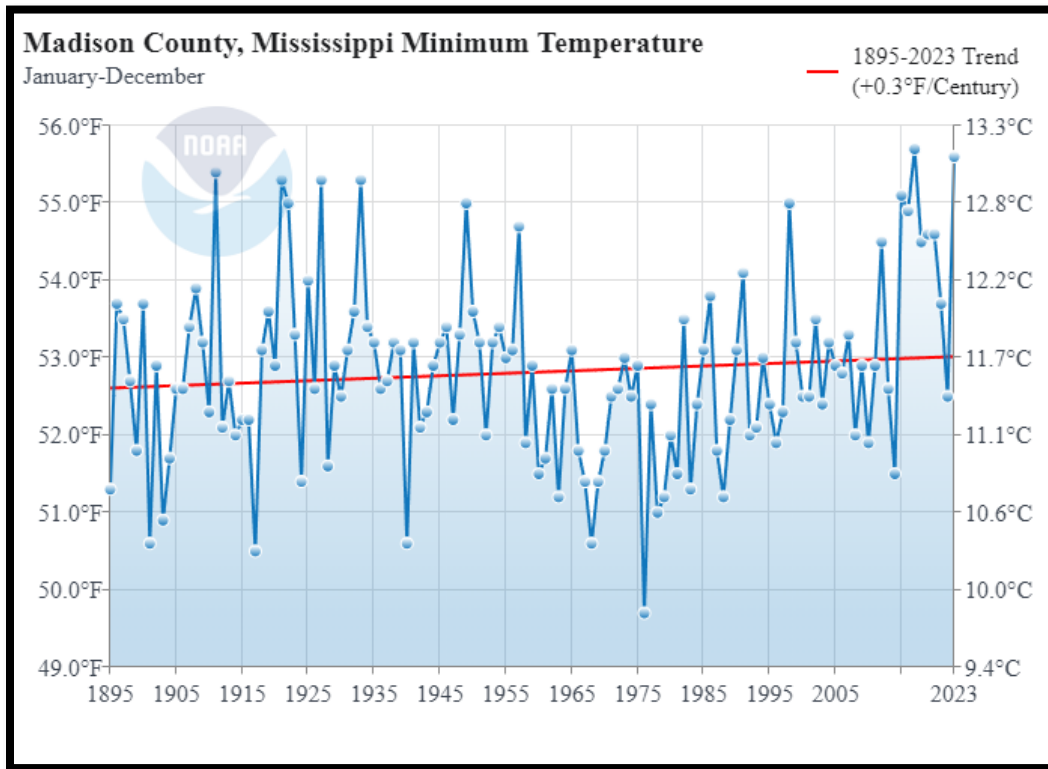
NOAA National Centers for Environmental information, Climate at a Glance: Regional Mapping, published June 2023

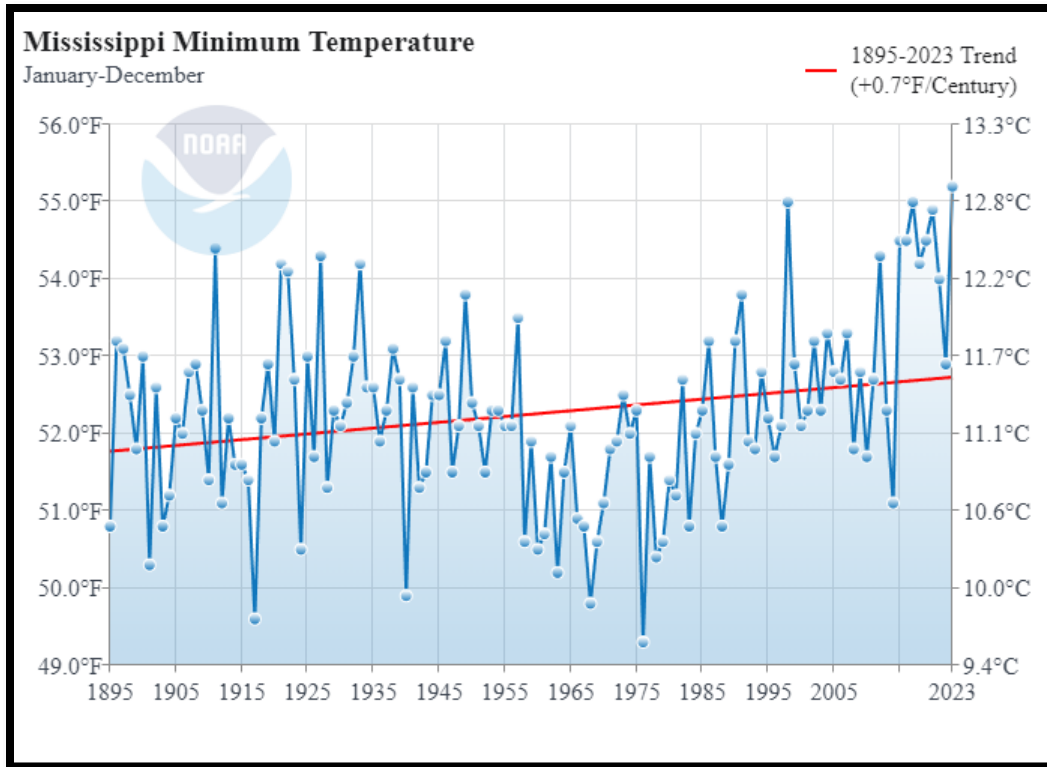
The average maximum annual temperature in Madison County has decreased by 0.2 degrees, from 75.9 to 75.7 degrees and Mississippi has decreased by 0.2 degrees, from 75.5 degrees to 75.3 degrees, during the time period of 1895 to 2023.



NOAA National Centers for Environmental information, Climate at a Glance: Regional Mapping, published June 2023

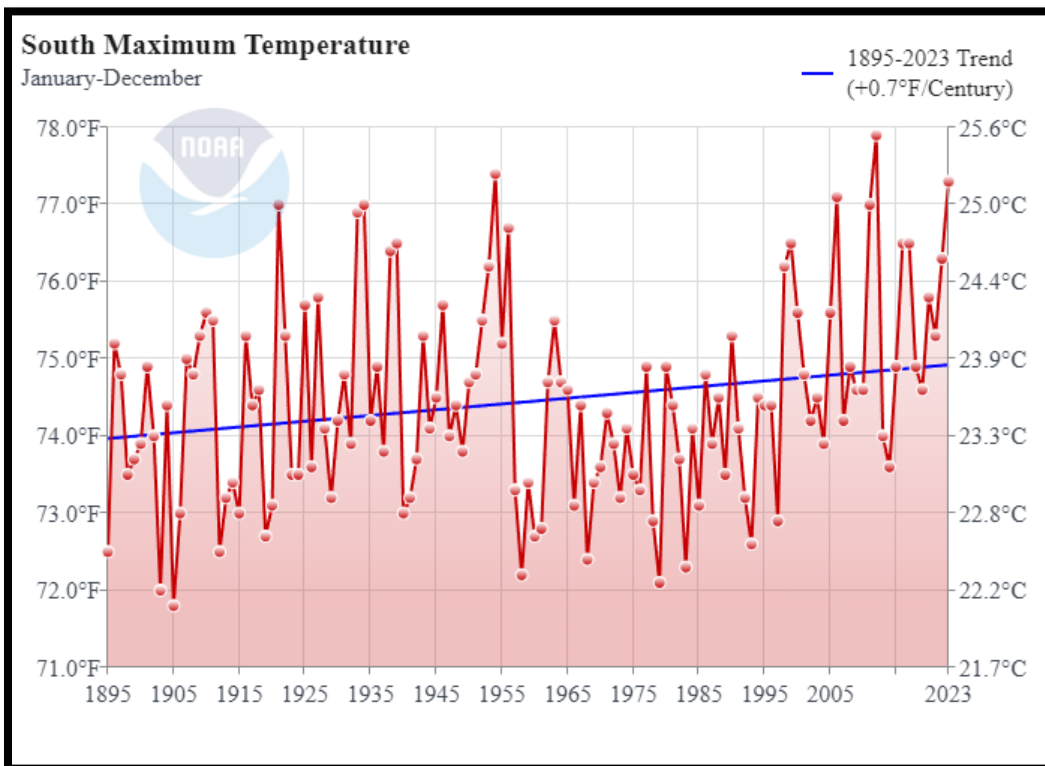
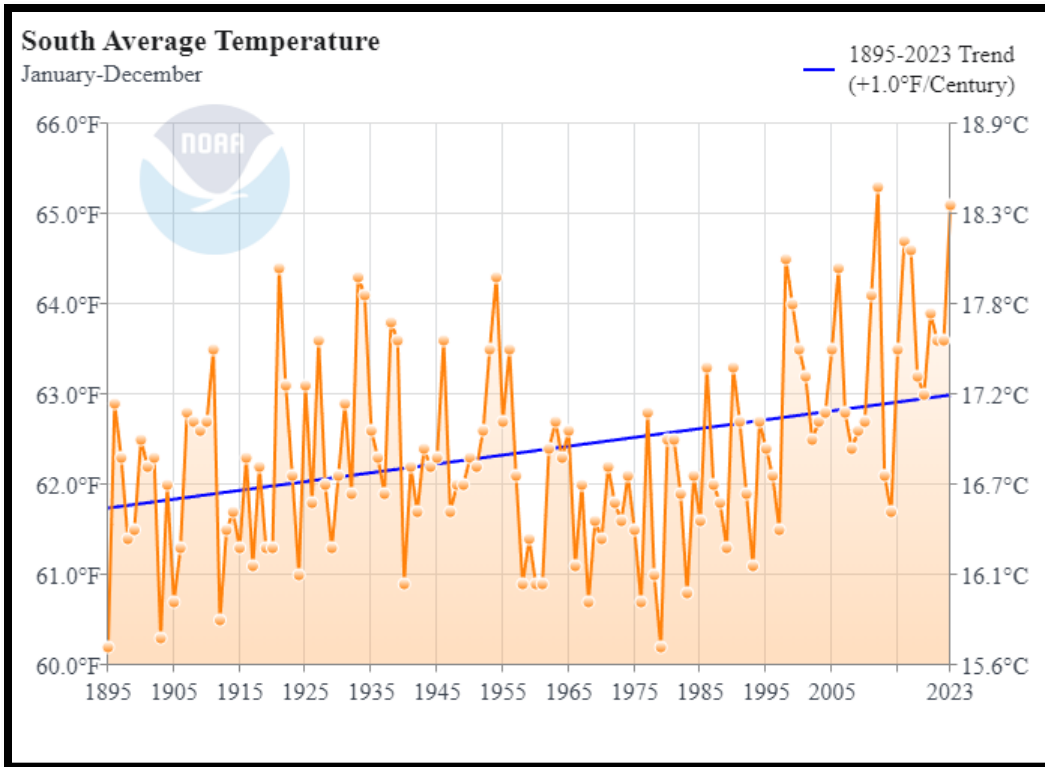
In contrast, the average minimum annual temperature for Madison County has increased by 0.3 degrees from 52.6 to 52.9 degrees and Mississippi has increased by 0.7 degrees from 51.8 to 52.5 degrees.

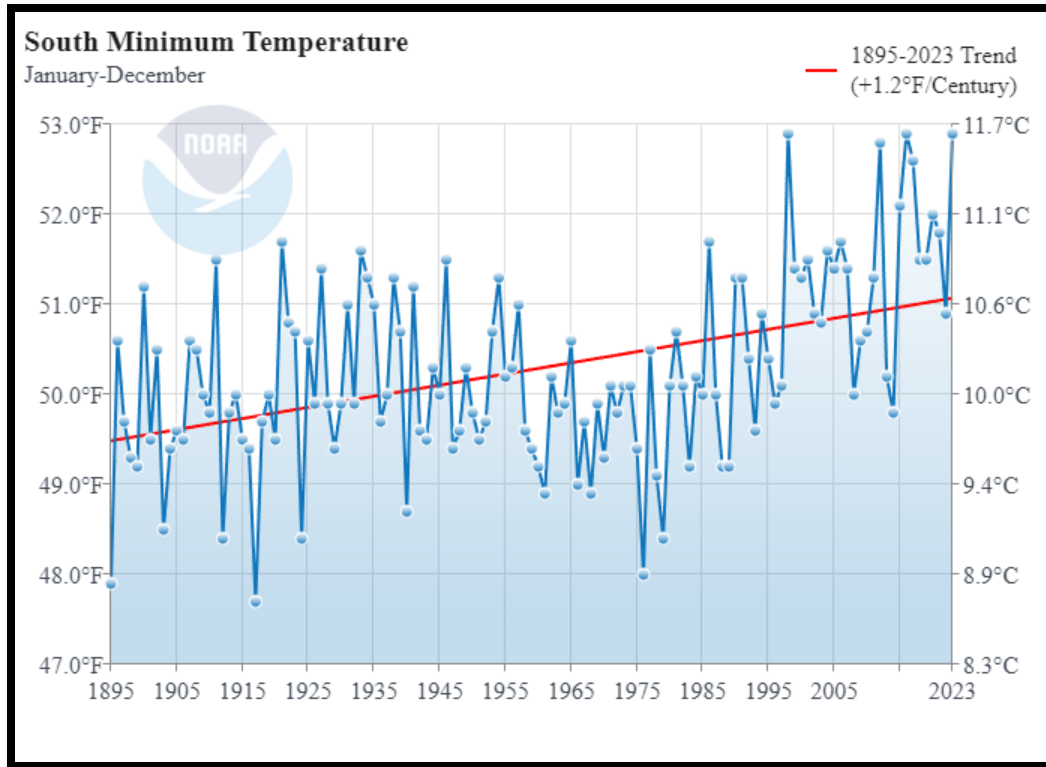




NOAA National Centers for Environmental information, Climate at a Glance: Regional Mapping, published June 2023

Also, according to the Climate at a Glance tool, the South Region, which includes Mississippi, has seen an increase in the average annual temperature from 1895 to 2023. The average annual temperature has risen one whole degree from 61.9 degrees to 62.9 degrees. The average maximum temperature annually has increased 0.7 degrees from 74 degrees to 74.7 degrees. The average minimum temperature annually for the South region has increased by 1.2 degrees from 49.6 degrees to 50.8 degrees.



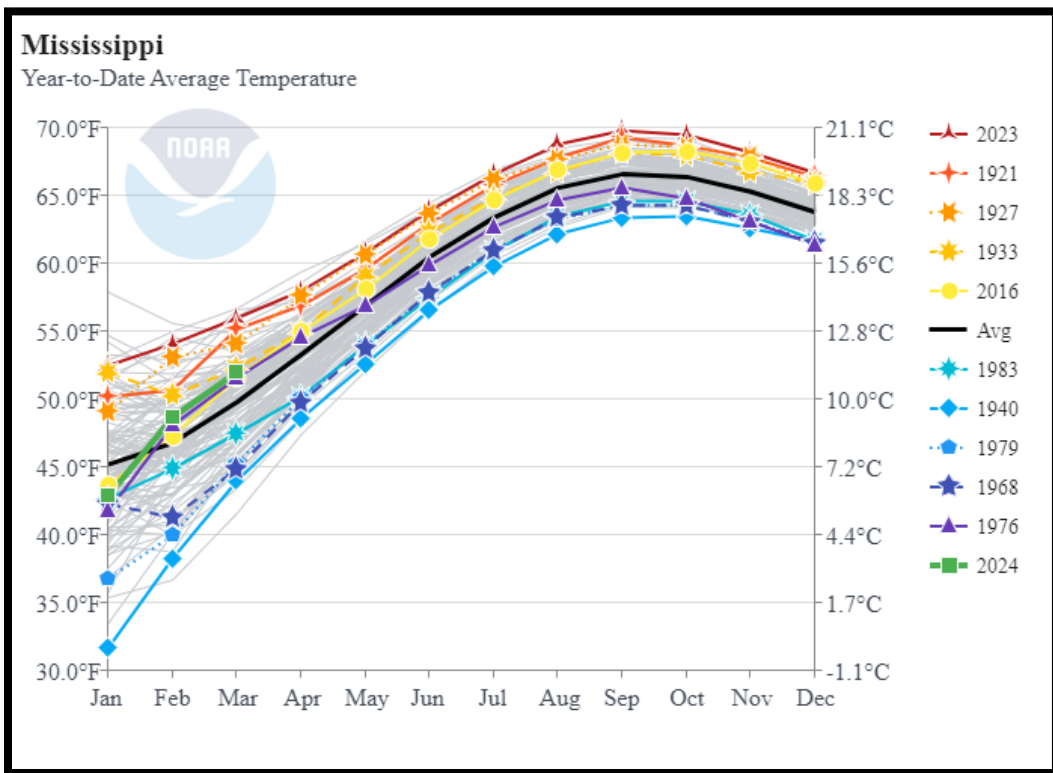
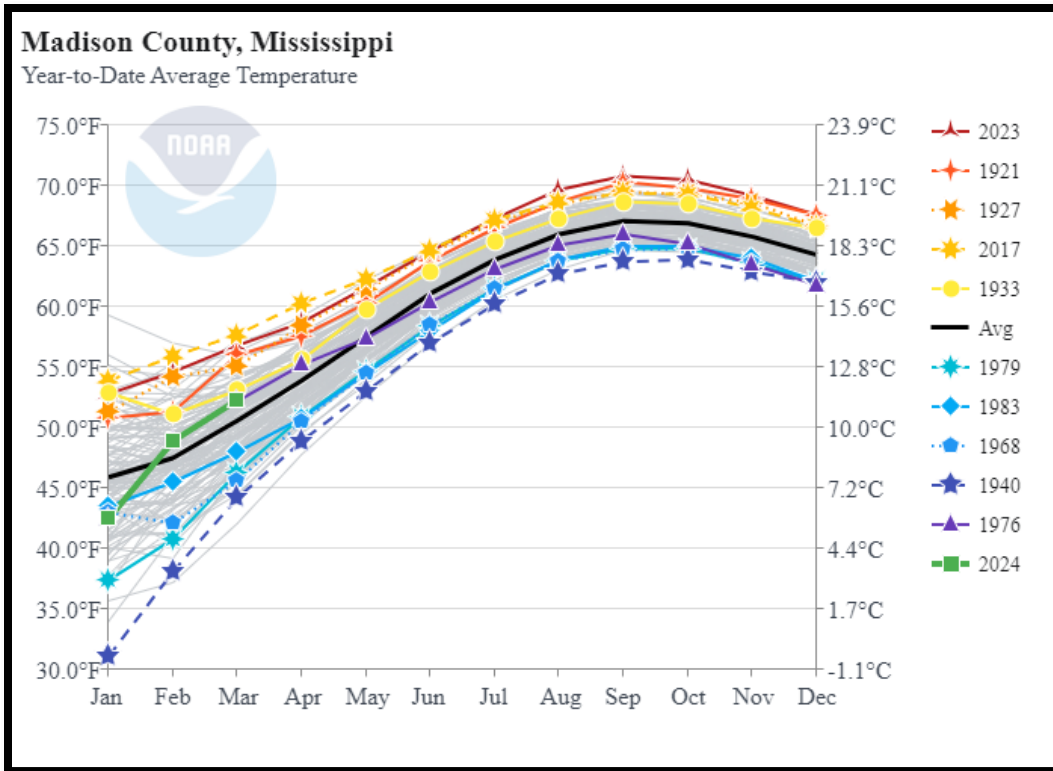


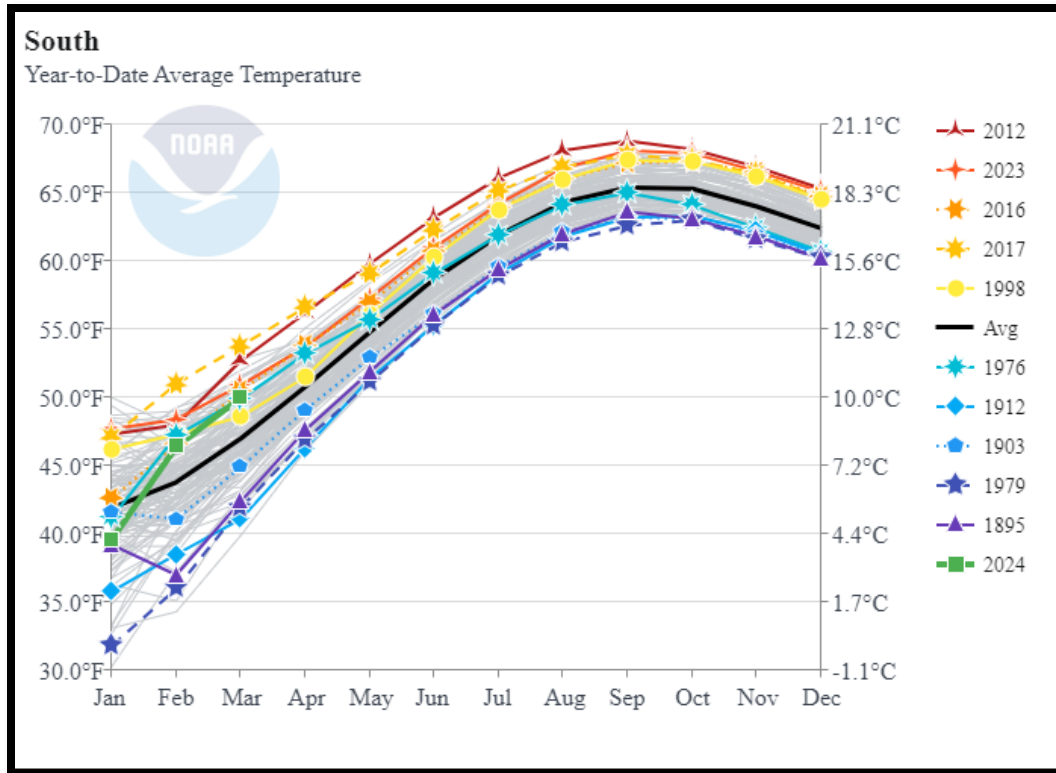
Based on these trends, it could be inferred that the greatest impact on temperature is not necessarily increased minimums but rather warmer maximum temperatures. The rate of change is very low; therefore, impacts are likely to be minimal.

Additional considerations for the period from 1895 to 2023 include charting the five warmest years and the five coolest years for Madison County, Mississippi, and the South region. As noted below from the Climate at a Glance tool, in Madison County, the warmest average temperature was in 2023 with it being the most recent one. In Mississippi, the year with the warmest average temperature was also 2023. For the South region, the warmest year was 2012 and the most recent warmest year was 2023.

The coolest average temperature was 1976 for Madison County and Mississippi. The most recent coolest year for Madison County is 1979 and 1983 for Mississippi. The coolest year for the South region was 1895 with 1979 being the most recent coolest year for the region.

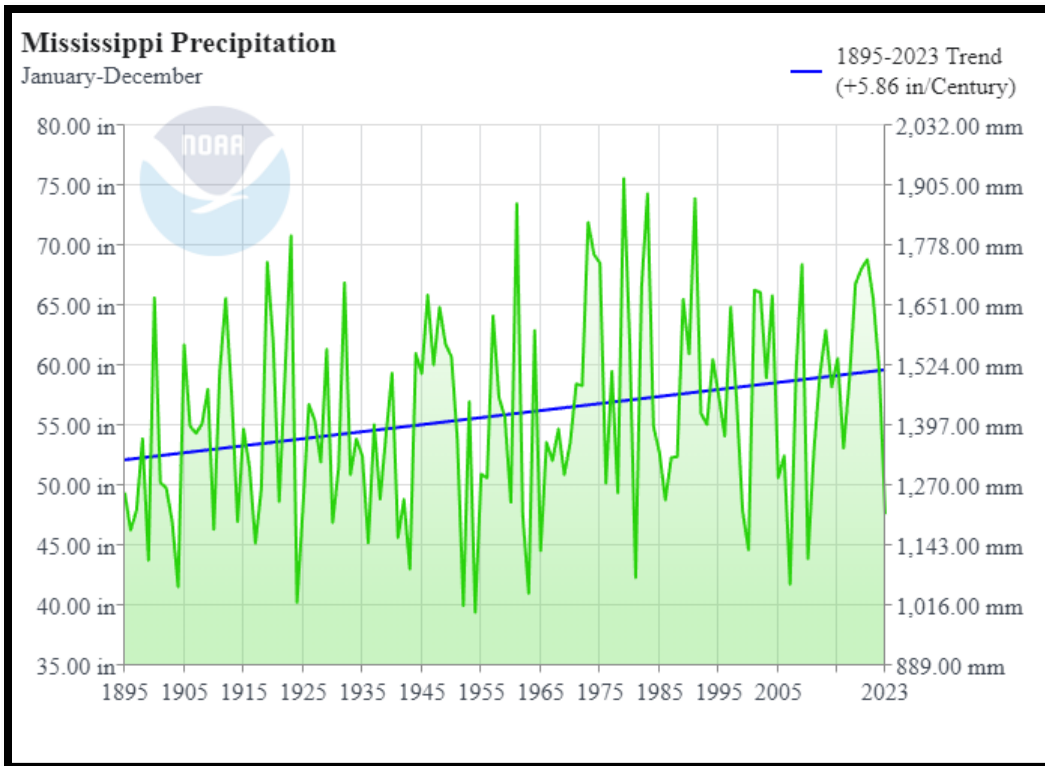
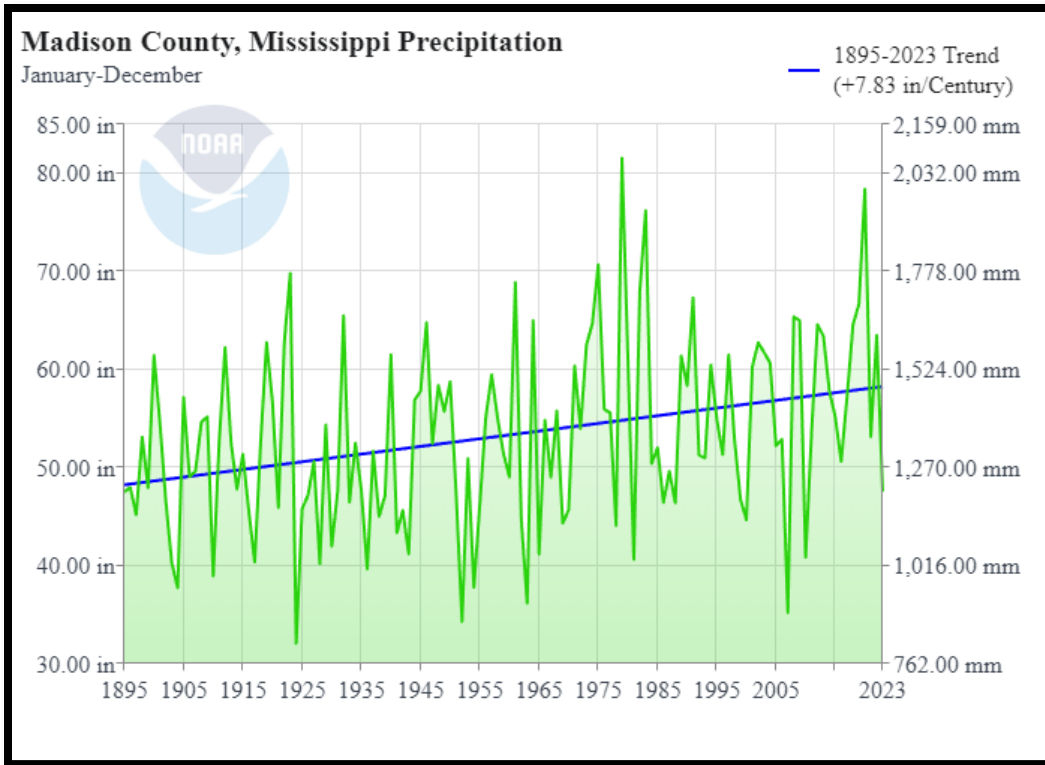
This historical data paints a picture of climate change in the future. The clustering of warmest then coolest years appears to be cyclical in nature with a slight increase over time. However, there is no significant indication that the average annual temperature is increasing more rapidly in recent years as compared to historical data.

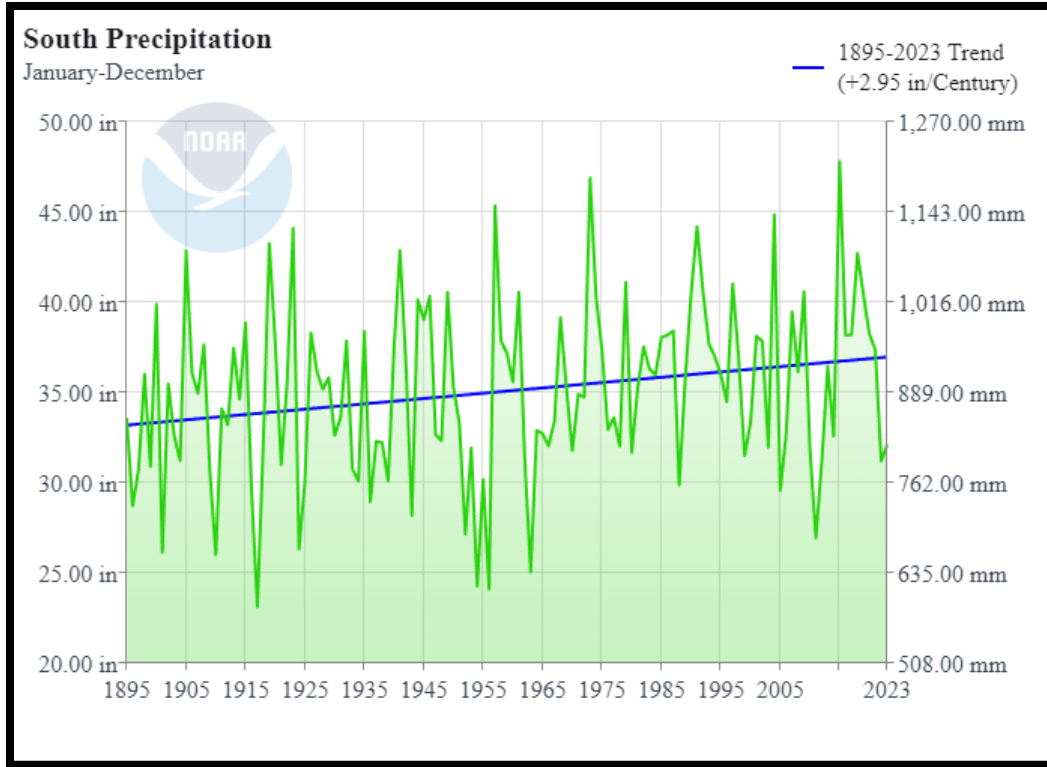




NOAA National Centers for Environmental information, Climate at a Glance: Regional Mapping, published June 2023

Regarding precipitation, all three geographies have seen an increase in precipitation since 1895. The annual average precipitation for Madison County has increased the most at 7.83 inches in the time frame from 1895 to 2023. The average total has increased for the Mississippi by 5.86 inches and the South region has increased by 2.95 inches since 1895. Increased precipitation leads to increased probability for future flooding, but fewer droughts and wildfires.



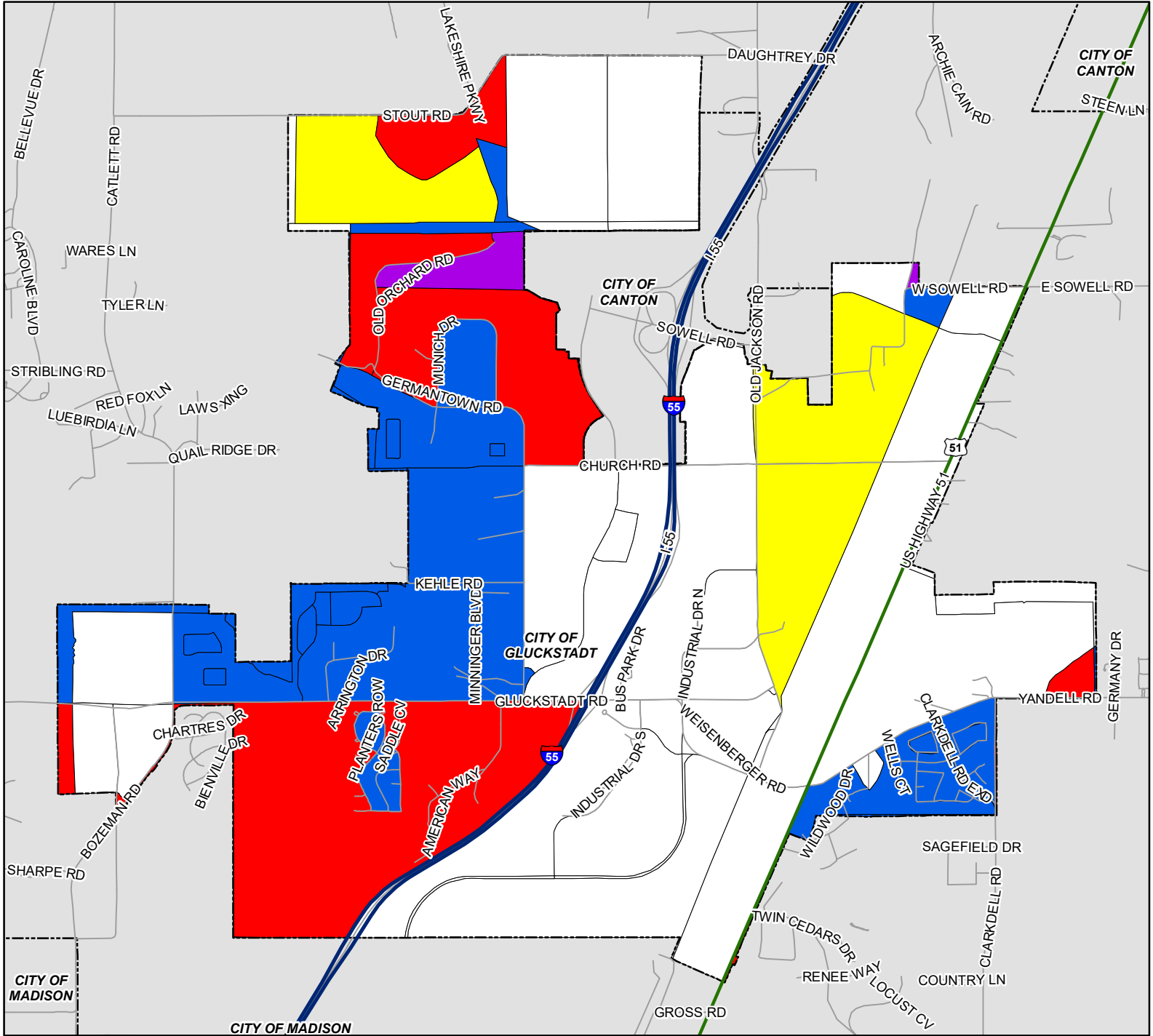


People

According to the 2020 U.S. Census the City of Gluckstadt had a population of 3,208 residents. With Gluckstadt becoming incorporated in 2017, there is no data to gather from the 2010 census for comparison. The largest population segment is those aged 10 to 14 with only 5% of the residents being 65 years or older.

According to the 2022 American Community Survey 5-Year Estimates, less than 1% of the total population is below the poverty level. Map B.3.2 depicts the distribution of the general population density (persons per square mile) by census blocks in the City of Gluckstadt based on 2020 Census data.

Distribution of General Population for the City of Gluckstadt, MS



U.S. Census 2020
PopPerSqMile

- < 100
- 101 - 200
- 201 - 300
- 301 - 400
- > 400

Municipalities
 Interstates
 Major Highways
 Major Local Roads



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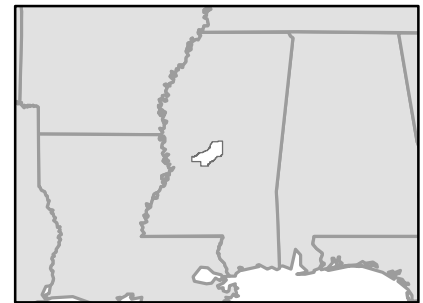


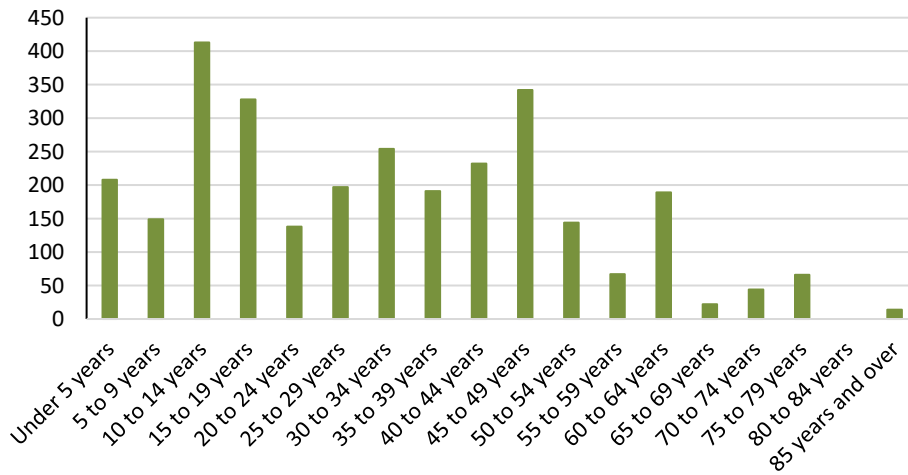
Table B.3.3: Population

District 5 Jurisdiction	2020 U.S. Census			American Community Survey*		
	Total Population	Pop. 65+	% Pop. 65+	Pop. Below Poverty Level	% Below Poverty	2022 Pop. Estimate
City of Gluckstadt	3,208	146	5%	231	<1%	2,998

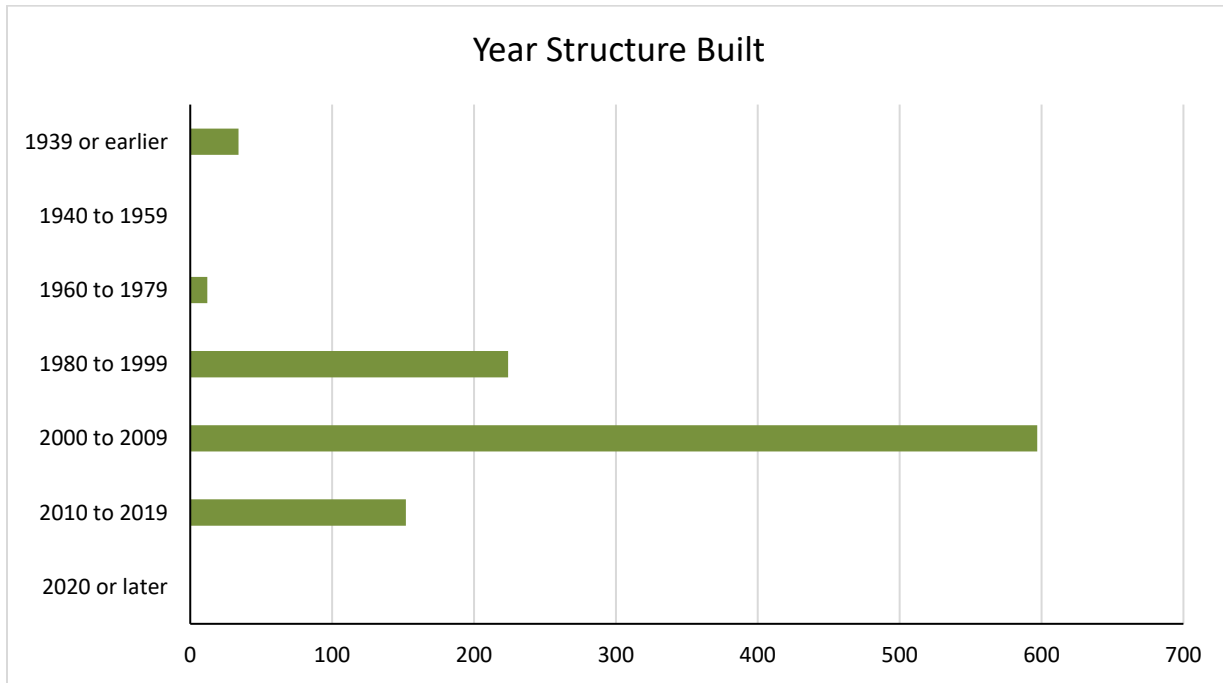
Source: U.S. Census Bureau

*2022 ACS 5-Year Estimates

Population by Age



General Building Stock



The 2020 U.S. Census identified 1,019 housing units in the City of Gluckstadt. The majority of the housing structures in Gluckstadt were built after 2000 at around 74 percent. The housing stock consists of almost all 1-unit detached housing structures (98.75%), and only 1.25% of the housing structures consist of 1-unit attached housing structures. There are zero percent of any multi-unit structures or mobile homes.

Housing Units	
1-unit detached	98.75%
1-unit attached	1.25%
2-units	0.00%
3 or 4 units	0.00%
5 to 9 units	0.00%
10 to 19 units	0.00%
20 or more units	0.00%
Mobile Home	0.00%
Boat or RV etc.	0.00%

Economy

According to the U.S. Census Bureau’s 2022 American Community Survey, 3,835 residents 16 years and older are employed. Retail Trade and Other Services employ the most people with 42.45% of the civilian workforce, followed by Transportation, Communication, and Utilities. Table B1.2.3 provides the Civilian Employed Population for the City of Gluckstadt.

TABLE B.3.4: 2023 Civilian Employed Population

Industry	Employment
Agriculture and Mining	27
Construction	411
Manufacturing	464
Wholesale Trade	173
Retail Trade	651
Transportation, Communication, and Utilities	580
Government	125
Legal Services	5
Finance, Insurance, and Real Estate	106
Automotive Services	39
Educational Services and Health Care	204
Hotels/Lodging, Movies, and Amusements	40
Other Services	976
Unclassified Establishments	34
TOTALS	3,835

Source: U.S. Census Bureau

The U.S. Census Bureau 2022 American Community Survey also provides household income data for the City of Gluckstadt. According to the American Community Survey, 81% of households in the City of Gluckstadt have a household income of \$50,000 or more per year, while only 19% of the households have an income less than \$50,000 per year.

TABLE B.3.5- 2022 Household Income

Household Income	Households	Percentage
Less than \$10,000	37	3.6%
\$10,000 to \$14,999	15	1.5%
\$15,000 to \$24,999	25	2.5%
\$25,000 to \$34,999	19	1.9%
\$35,000 to \$49,999	127	12.5%
\$50,000 to \$74,999	102	10%
\$75,000 to \$99,999	197	19.3%
\$100,000 to \$149,999	118	11.6%
\$150,000 to \$199,999	276	27.1%
\$200,000 or more	103	10.1%

Source: U.S. Census Bureau

Land Uses

Land use regulatory authority in Mississippi is vested in each local jurisdiction. According to state law, zoning and other land use regulations must be based upon a comprehensive plan. A comprehensive plan must include a minimum of four components in order to comply with state regulations. These components include long-range goals and objectives, a land use plan, a transportation plan, and a community facilities plan. The City of Gluckstadt falls within the boundaries and area of study for the Madison County Comprehensive Plan.

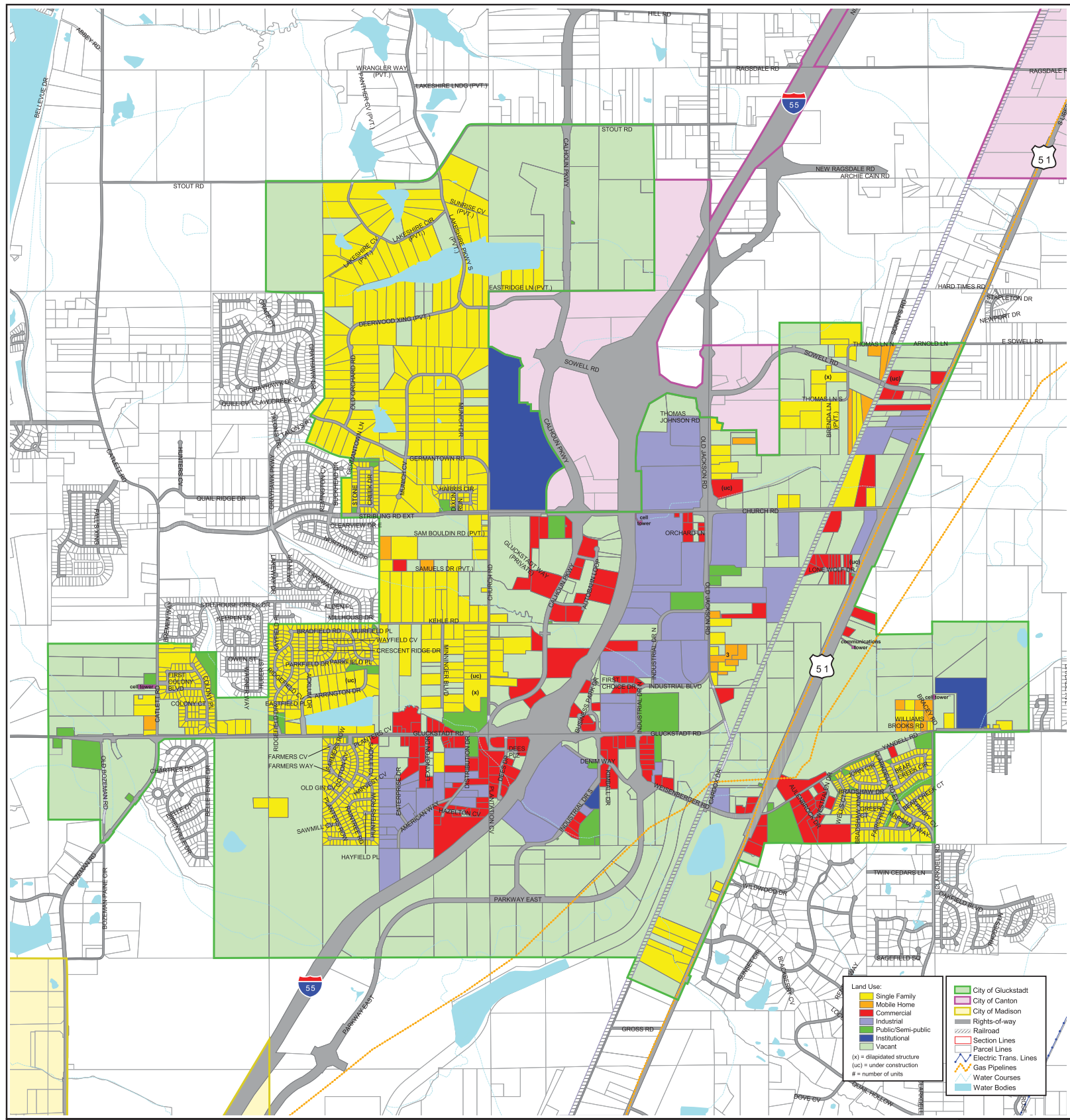
The land use map provides an overview of development patterns within the city. A review of Gluckstadt’s growth reveals that development continues throughout the city which may increase the vulnerability to hazards. All development has been built to the standards and regulations set forth by the Bureau of Buildings. It is anticipated that by meeting these standards the risk to Gluckstadt has been offset.

Future development planned for the City of Gluckstadt for any identified significant residential, commercial, or facility projects planned within the next 5 years are provided in Table 3.5 below.

Table B.3.6- City of Gluckstadt Development		
Project Name	Type of Project	Cost
City Building	Municipal	\$4,000,000
Multi-Use Building/ Shelter	Municipal/Community	\$4,000,000
City Hall	Municipal	\$3,000,000
Source: Gluckstadt Mitigation Council		

Based on the City’s current Comprehensive Plan, which was adopted in 2022, existing land use patterns in the City consist of seven (7) land use categories listed below. Map B.3.7 identifies the City of Gluckstadt Land Uses.

- Single Family Home
- Mobile Home
- Commercial
- Industrial
- Public/Semi-public
- Institutional
- Vacant



Land Use City of Gluckstadt



This map is accurate for planning purposes only.

Data Sources:
 Madison County Chancery Court decree re Cause No. 2017-091; MARIS (MSTM) data; Mississippi Dept. of Transportation (MDOT); Madison County Tax Assessor; Bridge & Watson field survey (July 2022)

Critical Facilities

The City of Gluckstadt identified thirty-five (35) critical facilities and infrastructure components. Each component has been identified as an essential service whose presence or operation is vital to the health, safety, and welfare of the city’s residents. Table B.3.8 and Map B.3.9 identifies each critical facility. There are no critical facilities located in the floodplain.

TABLE B.3.8- Critical Facilities

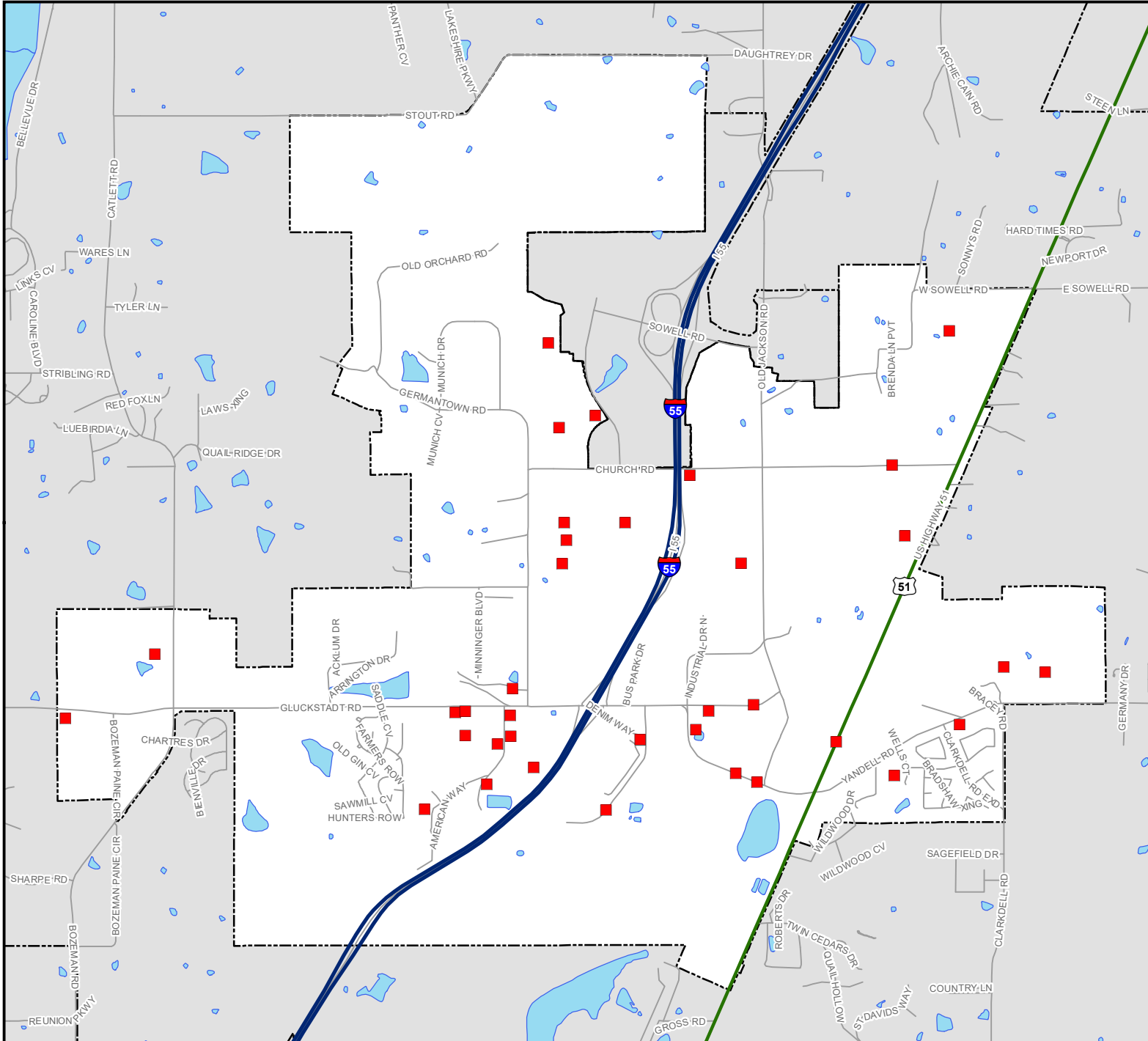
Asset Name	Function	Address	Longitude	Latitude
Bridge	Traffic Flow	162-246 Weisenberger Rd	-90.091209	32.51823
Bridge	Traffic Flow	1273-1293 Gluckstadt Rd	-90.088541	32.517549
Bridge	Traffic Flow	561-519 Industrial Dr S	-90.100686	32.510531
Bridge	Traffic Flow	1724-1756 US-51	-90.084055	32.514468
Railroad Intersection	Traffic Flow/ Transport	290 Weisenberger Rd	-90.089649	32.512310
Railroad Intersection	Traffic Flow/ Transport	633-639 Church Rd	-90.079873	32.531759
Railroad Intersection	Traffic Flow/ Transport	135-141 W Sowell Rd	-90.075651	32.540009
CMU Water Tower	Water Supply			
Cell Tower	Communications	432 Church Rd	-90.094547	32.530844
Cell Tower	Communications	280 Yandell Rd	-90.071753	32.519331
Cell Tower	Communications	107-131 Catlett Rd	-90.133291	32.520187
Park	Community Gathering			
After Zone	Shelter	184 American Way	-90.11387	32.5120
Building Blocks of Madison Crossing	Shelter	243 Yandell Rd	-90.07490	32.51566
Little Footprints Learning Center	Shelter	106 Westfalen Dr	-90.07962	32.51267
Children’s Academy of Madison	Shelter	324 Distribution Dr	-90.10863	32.51470
The Weekday Learning Center	Shelter	319 Distribution Dr	-90.10756	32.51510
Madison Premier Preschool and Afterschool	Shelter	135 Gluckstadt Way	-90.103552	32.536970
Madison Crossing Elementary School	Shelter, Cafeteria	300 Yandell Rd	-90.06870	32.51910
Germantown Middle School	Shelter, Cafeteria	439 Calhoun Station Pkwy	-90.103670	32.538752
Germantown Highschool	Shelter, Cafeteria	409 Calhoun Station Pkwy	-90.10543	32.53560
Madison County Career and Technical	Shelter/ Response Hub	379 Calhoun Station Pkwy	-90.102134	32.538971
Heart to Heart Senior Care Center, Inc	Shelter, Cafeteria	113 Dees Dr Suite G	-90.10596	32.51329

Gluckstadt, Mississippi

City Hall	Government	343 Distribution Dr	-90.10911	32.51219
Police Department	Communication Center	140 Gluckstadt Way		
Gluckstadt Public Works	Government	107 Lone Wolf Dr	-90.07893	32.52759
Bear Creek Water Association	Water Supply	301 Distribution Dr	-90.10759	32.51597
Pinelake Church	Shelter	223 Old Jackson Rd	-90.08998	32.52574
St. Joseph Catholic Church	Shelter	127 Church Rd	-90.10757	32.51808
Greater Ross Chapel Missionary	Shelter	1275 Gluckstadt Rd	-90.09329	32.51678
Mt Pleasant Baptist Church	Shelter	729 Gluckstadt Rd	-90.13983	32.51635
Deloach Family Clinic	Medical	122 Weisenberger Rd	-90.09410	32.51560
TrustCare Kids	Medical	101 Lexington Dr A	-90.11154	32.51650
Pediatric Haven	Medical	112 Westfalen Dr	-90.08049	32.51150
St. Dominic's Family Medicine	Medical	286 Calhoun Station Pkwy	-90.09910	32.52831

Source: Gluckstadt

Critical Facility Data for the City of Gluckstadt, MS



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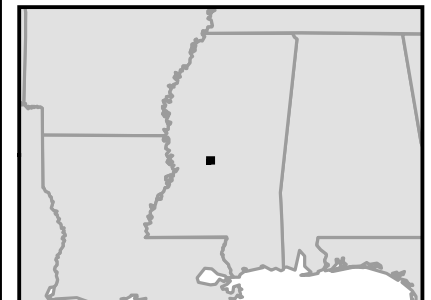
- Critical Facilities
- ⬜ Municipalities
- ▬ Interstates
- ▬ Major Highways
- ▬ Major Local Roads



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Cultural Resources

Cultural resources and historic assets are generally unique or irreplaceable in nature due to their age or unique properties or characteristics. The City of Gluckstadt does not have any cultural resources or historic assets.

RISK ASSESSMENT

Hazard Identification

Through the hazard identification process three (3) natural hazards were identified as potential hazards that threaten the health, safety, and welfare of the residents in the City of Gluckstadt. Section 4 of this plan provides a description of the type, location, and extent of each hazard identified.

Maps B.4.1, B.4.3, B.4.4, and B.4.5 depict the identified hazard areas for dams, flooding, wind, and wildfires. All other hazards are considered to be a threat with varying degrees of risk to the entire city.

To better understand what is at risk in the City of Gluckstadt to the hazards identified, this section of the plan includes both a qualitative and quantitative evaluation of the types of impacts that might occur during a hazard event. The qualitative evaluation describes the types of impacts that may occur while the quantitative evaluation assigns values to measure the potential impact. Information in this section of the plan was developed by combining GIS-based mapping capabilities and demographic data with known hazard boundaries, and the best available data to determine the number of buildings, critical facilities, historic assets, and population exposed to each hazard. The result is an estimated vulnerability or exposure to each hazard.

DAM FAILURE

For dam failures, the City of Gluckstadt has identified three (3) High Hazard dam in the city. The owner of each High Hazard dam has developed and filed an Emergency Action Plan (EAP) with the County Emergency Management Office. The following information was taken from the EAP for each dam:

1. **Stillhouse Creek Dam** is located northeast of the Stillwater Subdivision, off Catlett Road in Madison County. At normal pool elevation, the dam impounds 71 acre-feet with a surface area of about 10 acres. The following roadways will be closed during a breach: Lakeway Drive, Millhouse Drive, Muirfield Place, Bradfield Road, Minninger Blvd, Gluckstadt Road, Distribution Drive, Calhoun Station Parkway, and Plantation Cove. At least 16 businesses and the following residential addresses should be evacuated:

199, 203, 205, 207, 208, 194, 196, 167, 165, 163	Bradfield Place
161	Kehle Road
105, 107, 109, 111, 113, 114, 110, 108, 106, 104, and 102	Muirfield Place
100	Muirfield Drive
141, 139, 137, 135, 133, 131, 129, 127, 125, 123, 121, 119, 134, 132, 130, 128, and 118	Millhouse Drive
107	Lakeway Drive
163	Minninger Blvd

The potential social and economic impacts are significant while the environmental impacts are moderate. A dam break would impact a number of residences but would also impact transportation and commercial operations in the inundation area.

Computer model HEC-RAS was used for the dam breach analysis with the results of downstream flood routing being used as the limits for the inundation area. A top of the dam elevation was used for the water surface elevation at the beginning of the dam break in a wet weather case.

2. **Lake Wellington Dam** (previously Gilmer Lake Dam) is located north of Arrington Subdivision off Church Road. The primary function of the lake is recreation for Willington Subdivision, Part I. The dam was constructed in 2009. At its normal pool elevation of 292 feet, Gilmer Lake Dam impounds approximately 100 acre-feet with a surface area of about 20 acres. Streets within the area which will be affected include: Church Road (between Kehle Road and 269 Church Road), Calhoun Station Parkway, and Industrial Drive N (between Old Jackson Road and 135 Industrial Drive). The economic and social impacts will be moderate to significant depending on final elevation of recently constructed commercial buildings within the inundation area. Additional there is potential social impacts related to transportation corridors being closed.

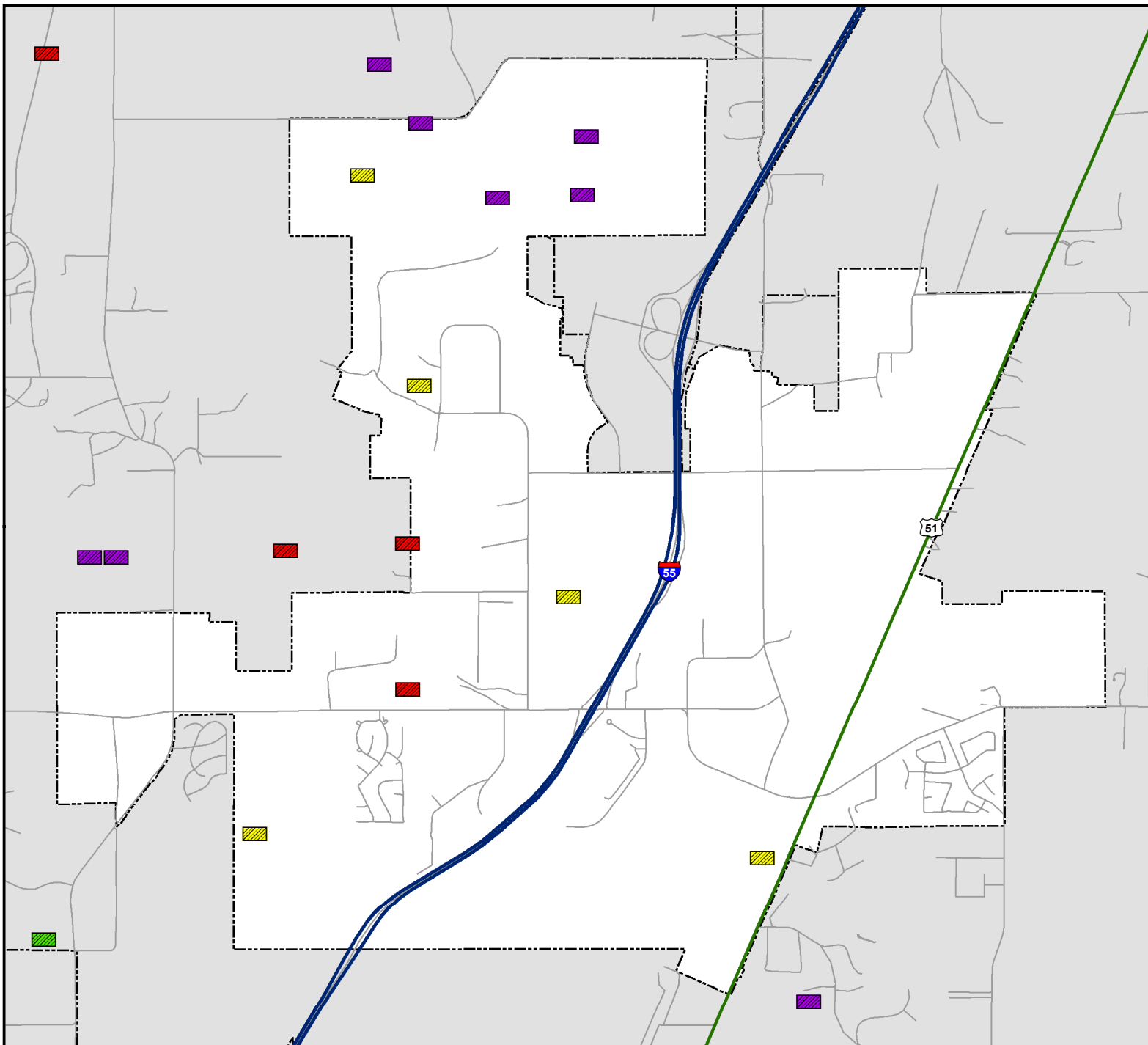
HEC-RAS was used for the dam breach analysis with the results of downstream flood routing being used as the limits for the inundation area. The crest of the emergency spillway elevation was used for the water surface elevation at the beginning of the dam break under wet weather case and sunny day case.

3. **Arrington Lake Dam** is located just north of Gluckstadt Road. Arrington Lake Dam height is 12 feet and the maximum storage capacity is 100 acre-feet. A section of Gluckstadt Road from Calhoun Station Parkway to Red Oak Subdivision will be closed during a breach or failure. There are three homes to be evacuated along Minninger Blvd (163, 168, and 178 Minninger Blvd). A breach would have significant impacts on transportation in the Gluckstadt area as Gluckstadt Road sees 9,200 vehicles per day. Commercial development has also increased in this area and may be impacted.

Computer model HEC-RAS was used for the dam breach analysis. I-55 was considered the lower limits for preparation of the inundation map as the area is below the 100 year flood. Topographic data available from LIDAR was used prepare the inundation map and field surveys conducted by the professional engineer provided data for the dam, spillway, and modified roads.

Provided adequate engineering and maintenance measures are in place, complete failure of a dam or levee in the future is unlikely, meaning they are rare occurrences with an expected occurrence rate of once every 50-years or greater. However, a low possibility will always exist that a future failure may occur simply by their existence. The severity of a dam failure event depends on various aspects related to the size of the dam, the extent of the failure, the velocity of the floodwaters released, and the intensity of the downstream development. EPA and MS DEQ's regulations are adjusted to account for climate change through increased rainfall projections and development. To prevent or limit future occurrence, State regulations require owners of high hazard and significant hazard dams to have their dams inspected by a registered engineer at recurring intervals. In addition, all high hazard and some significant hazard dams are required by State regulations to have an approved Emergency Action Plan in place.

Dam Hazard Data for the City of Gluckstadt, MS



Mississippi Department of Environmental Quality Hazard Class:

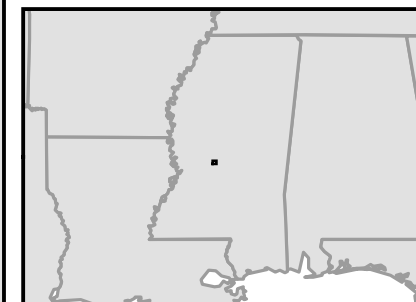
- High Hazard
- Significant Hazard
- Low Hazard
- Unclassified
- Levee Affected Area
- Municipalities
- Pearl River Levees
- Interstates
- Major Highways
- Major Local Roads



Prepared by



Central Mississippi
Planning & Development District



DROUGHT

For a drought hazard, all of the City of Gluckstadt has been identified as the hazard area. Therefore, all assets in the city (population, structures, and critical facilities) are vulnerable to a drought. It is very difficult to quantify the risk posed by drought based on existing data sources. However, Gluckstadt during periods of extended drought can have significant environmental, agricultural, health, economic and social consequences. Agricultural land in the county is most vulnerable to the impact of drought. However, drinking water and sanitary sewer systems can significantly be impacted by drought as well. Substantial events can diminish crop growth, reduce yield production, and diminish carrying capacity for livestock, which can negatively impact the economy. Furthermore, secondary hazards can become a concern during drought conditions. Drought can increase the risk for wildfires, as well as, lower water levels, which can hamper efforts to stop a fire. Erosion can occur, and vegetation growth can become limited, which can result in flash flooding if a period of heavy precipitation follows a drought. Humans and animals can be directly affected by drought as well. Extremely high temperatures combined with excessive humidity can create dangerous conditions outside, and result in illness or even death due to the extreme heat.

EARTHQUAKE

For an earthquake hazard, all of the City of Gluckstadt has been identified as the hazard area. Therefore, all assets in the City of Gluckstadt (population, structures, and critical facilities) are vulnerable. Earthquakes usually occur without warning and can impact areas a great distance from their point of origin. The extent of damage depends on the density of population and buildings and infrastructure construction in the area shaken by the earthquake.

EXPANSIVE SOIL

Expansive soil has been identified as a hazard of concern for all of the City of Gluckstadt. The most extensive damage from expansive soil occurs to highways and streets. Infrastructure damage to underground utilities and sidewalks can be extensive as well. Expansive soil hazards are slow to develop, but can cause a range of structural impacts. Damage to residential homes, commercial buildings, highways, and streets can be financially significant. The City of Gluckstadt is largely comprised of one main type:

Jackson Group (highly expansive soil)

Yazoo Clay, green and gray, calcareous clay containing some sand and marl; Moodys Branch formation at base, shell embedded in glauconitic clayey quartz sand.

Occurrence of expansive soil hazards is widespread throughout the city. Impacts to life, health and safety are minimal for expansive soils. According to FEMA, the anticipated types of structural damage to buildings include: sticking doors; uneven floors, and cracked foundations, floors, walls, ceilings and windows.

FLOODING

Flooding is a slight concern for the City of Gluckstadt. The impact of flooding on life, health and safety is dependent upon several factors including the severity of the event and whether or not adequate warning time is provided to residents. However, exposure to flooding risk is not limited to only those

that live in a defined hazard zone, but everyone that might travel through a flooded area as well. To estimate the population exposed to the 1% flood event, floodplain boundaries were overlaid upon 2020 Census data using GIS mapping capabilities. The 2020 census blocks with their centroid in the flood boundaries were used to calculate the estimated population and housing units exposed to this hazard. However, it should be noted that Census blocks do not follow the boundaries of floodplains and can lead to over or underestimated population figures. Therefore, the estimated population should be used to gather a general understanding of who and what is at risk.

The calculation for the 0.2-percent annual chance flood event has been calculated in the same manner, and is cumulative in nature, meaning the population exposed to the 1-percent flood event will also be exposed in the 0.2-percent annual chance flood event. Therefore, those exposed to the 1-percent annual flood should be added to the 0.2-percent annual flood event.

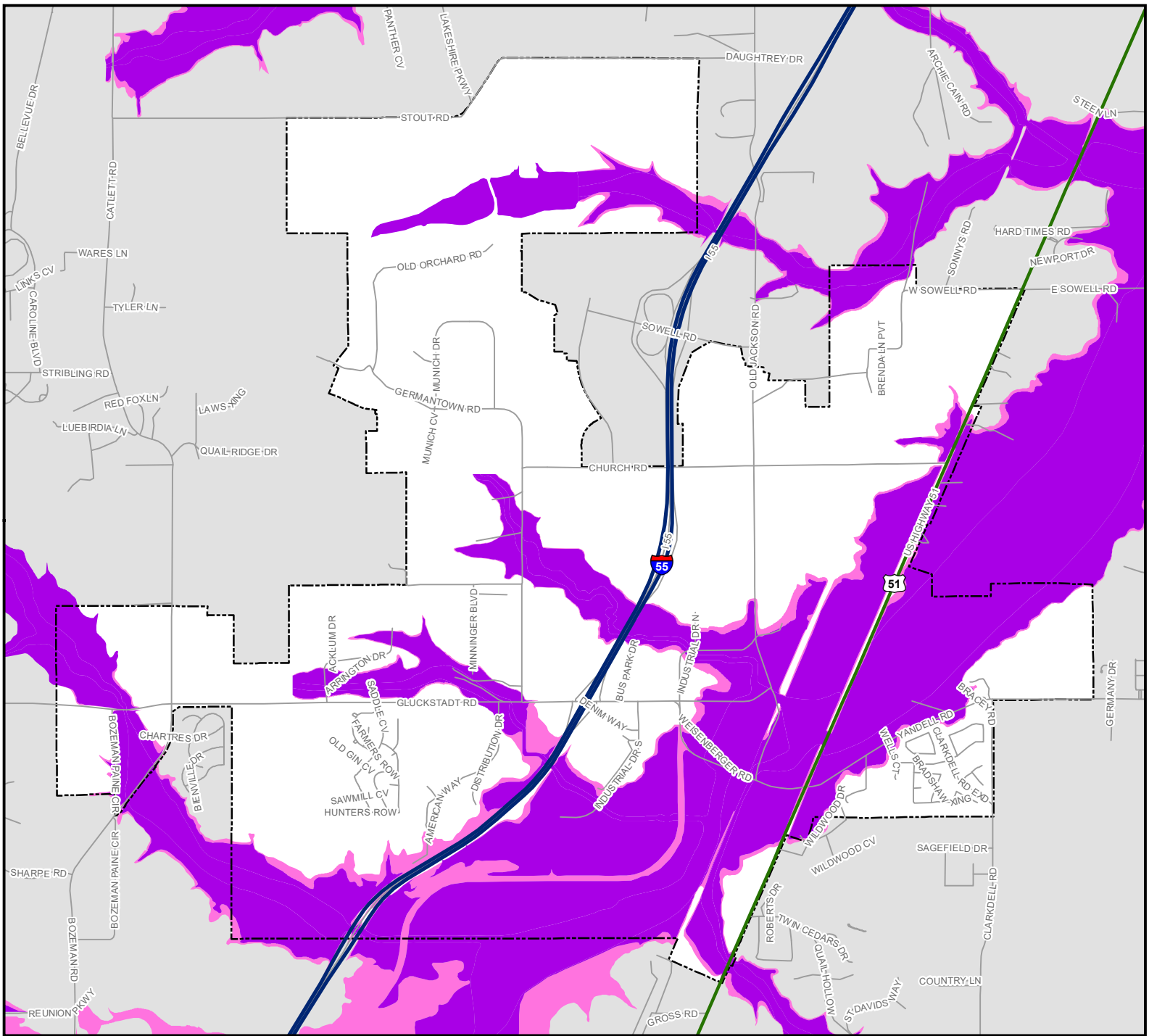
Using this method, it is estimated that 75 people and 28 housing units are exposed to a possible flood event in the City of Gluckstadt. In addition, eleven (13) critical facilities are located in the floodplain.

Table B.4.2- Identified Hazard Area Flooding

Flooding	Population	% of Total Population	Housing Units	% of Total Housing
1-percent	75	2.34%	28	2.75%
0.2-percent	0	0%	0	0%

Source: 2020 Census

FEMA Floodplain Data for the City of Gluckstadt, MS



FEMA DFIRM FLOOD DATA

Flood Zones

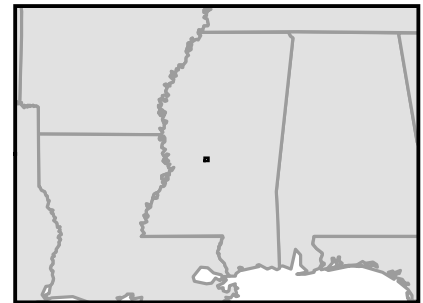
- 0.2% Annual Flood Hazard
- 100 Yr Floodplain
- Protected by Levee
- Municipalities
- County Boundaries
- Interstates
- Major Highways
- Major Local Roads



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**Central Mississippi
Planning & Development District**

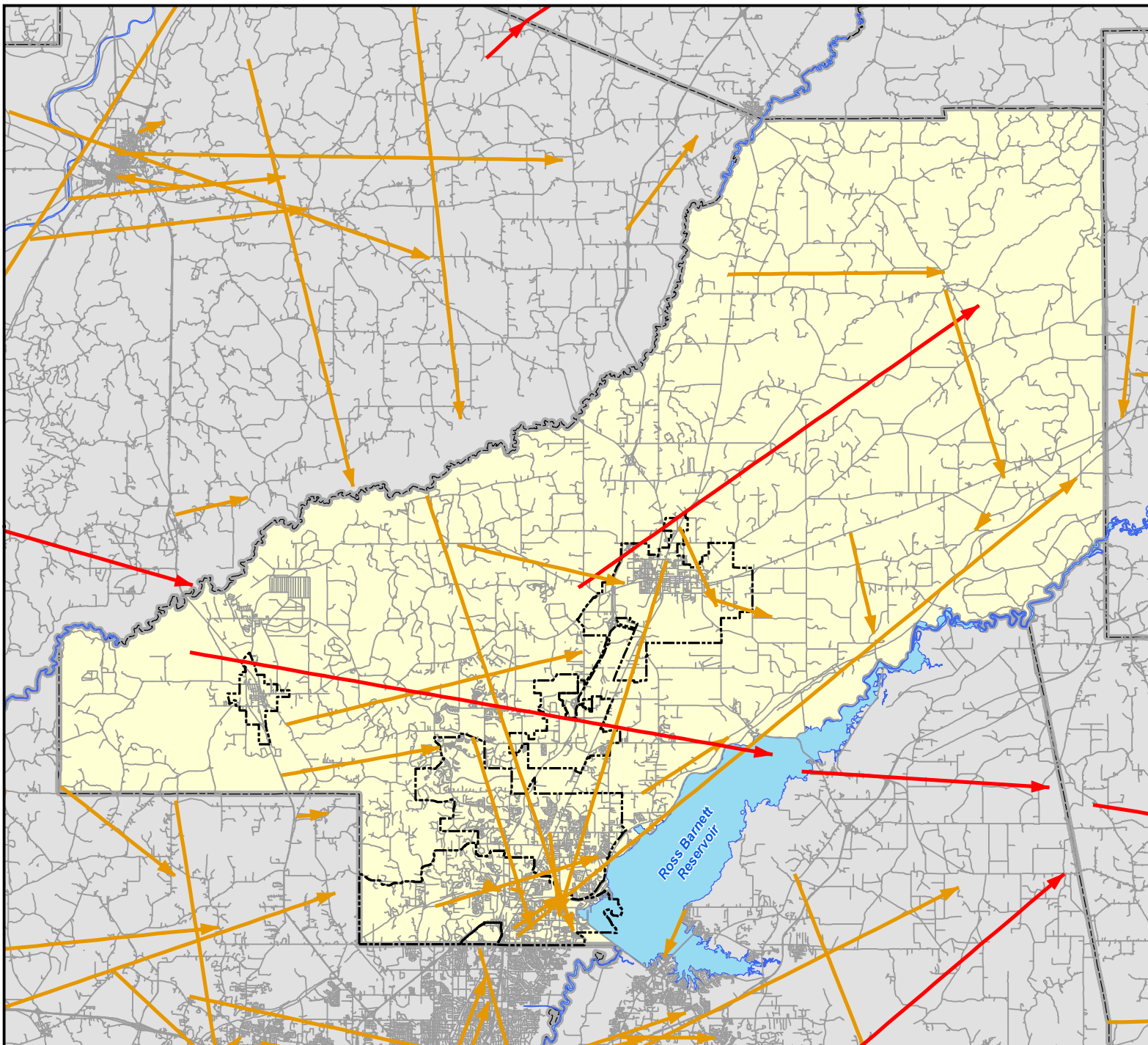


TROPICAL STORMS

For tropical storm hazards, all of the City of Gluckstadt has been identified as the hazard area. While the City of Gluckstadt is not at risk to a direct impact of a tropical storm it is most likely to experience wind and other spin-off effects such as tornadoes, heavy downpours, or localized flooding. High winds and air speeds of a hurricane often result in power outages, disruption to transportation corridors, loss of workplace access, property damage, loss of life, and the need to shelter and care for those directly impacted by the event. In general, loss of life and property due to high winds is confined to the coastal area. Furthermore, residential structures are generally more susceptible to wind damage than commercial and industrial structures because of the differences in building construction. Data pertaining to previous impacts of high wind speed in the City of Gluckstadt are detailed on the next page.

Climate change will have an impact on the probability of future occurrences as warmer sea surface temperatures, increased water vapor, and higher sea levels all contribute to this change. According to NOAA, higher coastal inundation levels are expected to occur, increased rainfall rates, more intensity storms, and higher proportion of very intense storms are all anticipated as a result of global warming. As such, Gluckstadt is likely to experience the effects of increased rainfall, more intense storms reaching in-land communities, and more frequent very intense that may cause catastrophic damage, such as Katrina.

NOAA SRVGIS Wind Data for Madison County, MS



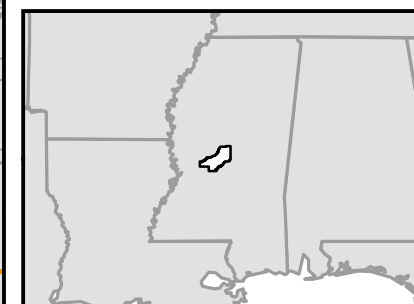
NOAA SRVGIS High Wind Wind Speed

- Up to 20 Knots
- 21 - 40 Knots
- 41 - 60 Knots
- 61 - 80 Knots
- Above 80 Knots
- Municipalities
- Interstates
- Major Highways
- Major Local Roads

January 2011 - December 2020
Time Frame for all Data Represented

Incidents Per Year

Year	Madison Co.	Statewide
2011	3	190
2012	4	147
2013	0	58
2014	0	86
2015	0	38
2016	1	93
2017	1	157
2018	6	152
2019	4	118
2020	3	134



SEVERE STORMS

For severe storms (hail and lightning), all of the City of Gluckstadt has been identified as the hazard area. Therefore, all assets in the city (population, structures, and critical facilities) are vulnerable. People and property can be exposed to damage, injury and loss of life from severe storm events. Severe storms can result in significant structural damage to buildings, downed power lines and trees, and loss of life. Damage to buildings is dependent upon several factors including wind speed and duration, and building construction. Depending on the type and duration of a severe storm, the impacts can be extremely localized or widespread. Potential impacts of a severe storm include broken tree branches, uprooted trees, snapped utility lines, damaged and/or torn-off roofs, communication tower damage, totally destroyed homes and businesses, and loss of life. Downed trees and power lines can block roadways and create extended power outages.

Future severe thunderstorms are unavoidable in Mississippi due to its geographical location. Annual occurrences of severe thunderstorms are highly likely, meaning multiple severe thunderstorms are expected to occur annually.

Furthermore, Climate Central and NCEP North American Regional Reanalysis state that because of climate change and warming trends since 1979, the number of days with a Convective Available Potential Energy (CAPE) at or above 1000 J/kg has increased in Mississippi by at least 20 days. The CAPE is the amount of energy available for rising air that is needed to form thunderstorms. The higher the CAPE values the greater the potential for thunderstorms.

TORNADO

For a tornado hazard, all of the City of Gluckstadt has been identified as the hazard area. Therefore, all assets in the city (population, structures, and critical facilities) are vulnerable. A tornado can leave a small path of destruction with very little to no visible damage, or it can leave a community completely destroyed with hundreds of lives lost. Everyone working or living above ground is vulnerable to the wrath of a tornado. Inadequate warning or access to a tornado shelter can contribute to the number of fatalities resulting from a tornado. Damage from tornadoes comes from the strong winds they contain. High wind speeds associated with tornadoes can cause automobiles to become airborne, rip ordinary homes to shreds, and turn broken glass and other debris into lethal missiles. The biggest threat from tornadoes is from flying debris and human life being tossed about in the wind.

Mississippi is located in the middle latitudes, which provide some of the most favorable environment for tornado development. On average, 33 tornadoes occur in Mississippi annually according to the National Weather Service. Therefore, future occurrences of tornado activity within the City of Gluckstadt are unavoidable and highly likely with multiple annual occurrences expected. However, scientists can't predict the precise location of when and where the next tornado will occur. Tornadoes are the most unpredictable force of nature; they can strike anywhere at any time as long as atmospheric conditions are favorable.

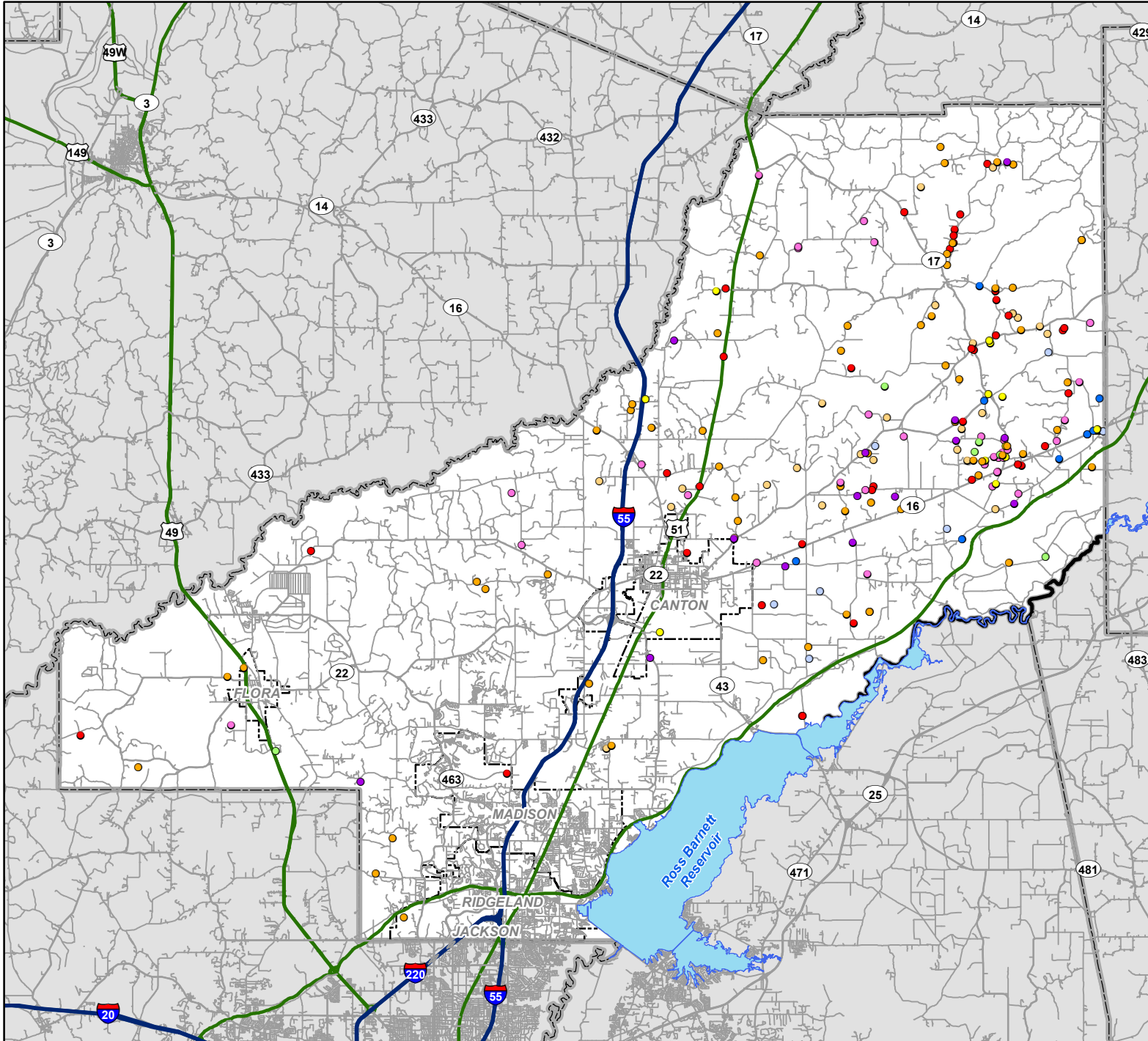
Due to the lack of records prior to 1950, recent advancements in detection techniques, and lack of scientific understanding, it is difficult to quantify the impact of climate change on tornadoes specifically. However, patterns related to the clustering of tornadoes, meaning more tornadoes in a single time period and geographic area has been noted. Mississippi is one of the states that has

seen an increase in tornado activity in the recent past; therefore, it is safe to assume that the number of tornadoes may continue to increase.

WILDFIRE

For wildfire hazards, all of the City of Gluckstadt has been identified as the potential hazard area. Therefore, all assets in the city (population, structures, and critical facilities) are vulnerable. The most vulnerable are those within a short distance of the interface between the built environment and the wildland environment. Potential losses include human life of residents and responders, infrastructure, structures, and natural resources. Buildings constructed of wood or vinyl siding are generally more likely to be impacted by fire than those constructed of brick or concrete. Map B.4.5 identifies the Wildland Urban Interface for Mississippi.

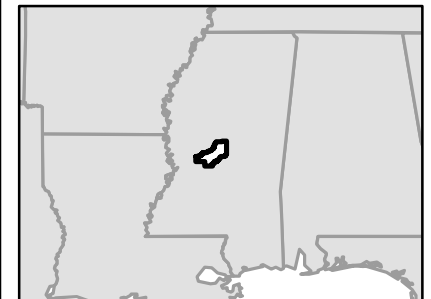
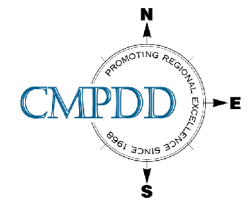
MFC Wildfire Fiscal Year Data for Madison County, MS



MS Forestry Commission Wildfire Year

- 2013
- 2014
- 2015
- 2016
- 2017
- 2018
- 2019
- 2020
- 2021
- 2022
- 2023
- Interstates
- Major Highways
- Major Local Roads
- Municipalities

January 2013 - December 2023
Time Frame for all Data Represented



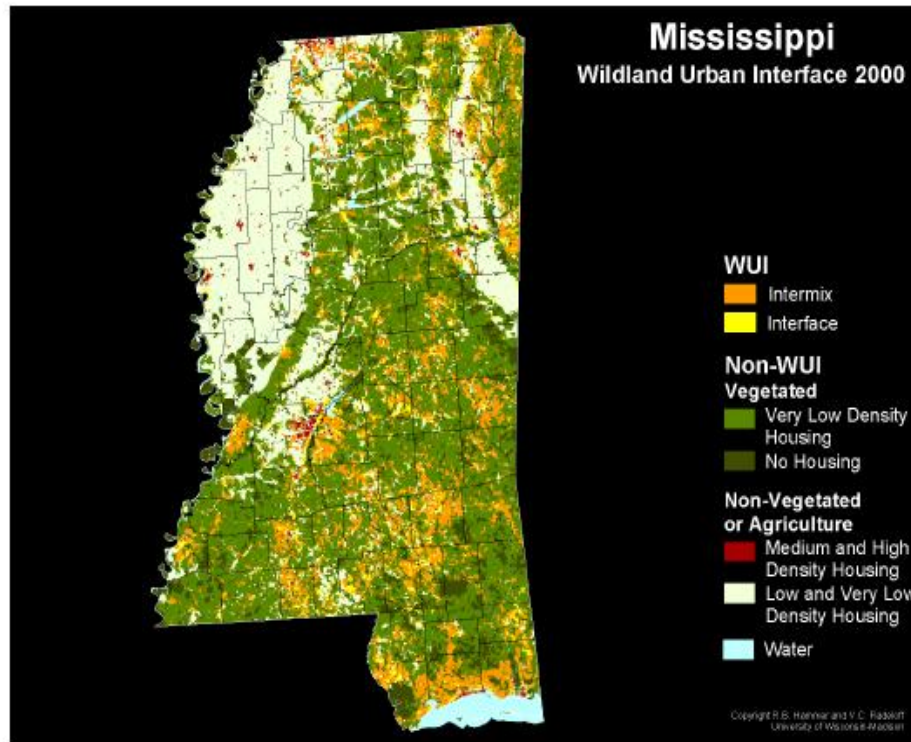
Wildland Urban Interface

USDA Forest Service
Southern Center for Urban Forestry Research & Information

December 17, 2004

Wildland-Urban Interface: Mississippi¹

The Wildland-Urban Interface (WUI) is the area where houses meet or intermingle with undeveloped wildland vegetation. This makes the WUI a focal area for human-environment conflicts such as wildland fires, habitat fragmentation, invasive species, and biodiversity decline. Using geographic information systems (GIS), U.S. Census and USGS National Land Cover Data was integrated to map the Federal Register definition of WUI (Federal Register 66:751, 2001).



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University of Wisconsin-Madison

From original GIF (and data) at: <http://silvis.forest.wisc.edu/library/wuilibrary.asp>

The wildland-urban interface mapping was completed with funding by the North Central Research Station, the Pacific Northwest Forest Inventory and Analysis Program, and the Northern Global Change Program of the USDA Forest Service under the National Fire Plan.

Contacts for this project include:

Volker C. Radeloff
Dept. of Forest Ecology & Management
University of Wisconsin - Madison
1630 Linden Drive
Madison, WI 53706
(608) 293-4349

Roger B. Hammer
Dept. of Rural Sociology
University of Wisconsin - Madison
1180 Observatory Drive
Madison, WI 53706
(608) 263 2989

Susan I. Stewart
USDA Forest Service
North Central Research Station
1033 University Avenue, Suite 360
Evanston, IL 60201
(847) 866-9311 (Ext. 18)

¹ Characteristics and location of the wildland-urban interface in the United States, S.I. Stewart, V.C. Radeloff and R.B. Hammer, 2nd International Wildland Fire Ecology and Fire Management Congress; November 19, 2003, Orlando, FL (US)

Dudley R. Hartel
Center Coordinator

(706) 559-4236
dhartel@fs.fed.us

Page: 1 of 1

WINTER STORMS

For winter storm hazards, all of the City of Gluckstadt has been identified as the hazard area. Therefore, all assets in the city (population, structures, and critical facilities) are vulnerable to a winter storm event. The very young, elderly and persons with special needs are most vulnerable to winter storms. Furthermore, infrastructure components such as power lines and waterlines are more vulnerable to winter storms than structures. Ice accumulation can bring down trees, electrical wires, telephone poles and lines, and communication towers. Communications and power can be disrupted for days while utility companies work to repair damage. Even a small accumulation of ice may cause extreme hazards to motorists and pedestrians. Bridges and overpasses are particularly dangerous because they freeze before other surfaces. Furthermore, extensive crop damage can be caused by freezing temperatures and the accumulation of ice.

Climate change may also lead to increased winter precipitation. According to numerous sources, a warmer atmosphere holds more moisture thus leading to more precipitation during fewer storms. The probability of future occurrences is anticipated to increase in amount but may see a decrease in frequency.

Vulnerable Assets

There are approximately 1,751 parcels in the City of Gluckstadt with an assessed value of \$78,158,505, according to the Madison County Tax Assessor. The tables below provide details regarding the number of parcels and the estimated value of assets at risk to each hazard. Detailed information regarding the number of parcels at risk to expansive soil is not available at this time.

Table B.4.6- Vulnerable Assets

Hazard	Identified Hazard Area ¹	Total Housing Units ²	Critical Facilities ³	Historic Assets ⁴	Population ⁵
Dam/Levee Failure	1	N/A	N/A	N/A	N/A
Drought	Citywide	1,019	35	N/A	3,208
Earthquake	Citywide	1,019	35	N/A	3,208
Expansive Soil	Isolated Areas	N/A	N/A	N/A	N/A
Flooding⁶					
100 year floodplain	29.99%	28	10	N/A	75
500 year floodplain	4.08%	0	3	N/A	0
Tropical Storm	Citywide	1,019	35	N/A	3,208
Severe Storms	Citywide	1,019	35	N/A	3,208
Tornado	Citywide	1,019	35	N/A	3,208
Wildfire	Citywide	1,019	35	N/A	3,208
Winter Storm	Citywide	1,019	35	N/A	3,208

¹ Based on identified High Hazard Dams.

² Based on 2020 Census Data

³ Based on local data provided by the City of Gluckstadt

⁴ Based on National Park Service Register of Historic Places

⁵ Based on 2020 Census Population. Floodplain population is based on census block centroid data.

⁶ Results for the flood hazard are not cumulative. Numbers of assets for events of increasing magnitude should be read as in addition to the preceding magnitudes.

N/A indicates data is not available at this time due to data limitations.

Real Property	Assessment
Total Assessed Value of Realty	\$78,158,505
Total Appraised Value	\$597,535,847
Number of Parcels	1,751

Vulnerability Summary

As a result of the risk assessment conducted, the Mitigation Council determined the overall vulnerability should consider the risk to people, structures, systems, resources and activities. Gluckstadt examined six (6) risk characteristics to determine the overall vulnerability level the City faces from natural hazards and they included:

1. The percentage of the city at risk to an impact from each hazard;
2. The health and safety consequences that can occur;
3. The amount of property damage, including critical facilities, that can occur;
4. The environmental damage that can occur;
5. The economic disruption, including systems and activities, that can occur; and

6. The probability of a future occurrence.

Table B.4.7 Vulnerability Summary Assessment

	Earthquake	Expansive Soil	Dam/Levee Failure	Flooding	Drought	Tropical Storms	Severe Storms (hail & lightning)	Tornadoes	Wildfires	Winter Storms
Area Impacted	4	4	1	2	4	4	4	4	3	4
Health and Safety Consequences	2	0	2	2	1	2	2	3	1	2
Property Damage	2	2	2	2	2	2	2	4	1	2
Environmental Damage	2	1	1	2	2	2	1	2	1	1
Economic Disruption	3	2	2	3	2	3	2	3	0	3
TOTAL RISK CHARACTERISTIC SCORE	13	9	8	11	11	13	11	16	6	12
Probability of Occurrence	3	1	1	5	4	2	5	5	5	5
Total Risk Rating for Each Hazard (Sum of Vulnerability X Probability of Occurrence)	39	9	8	55	44	26	55	80	30	60

Table B.4.8 Hazard Summary

Hazard	Vulnerability Summary
Earthquake	High
Expansive Soil	Low
Dam/Levee Failure	Low
Flooding	High
Drought	High
Tropical Storms	High
Severe Storms (Hail & Lightning)	High
Tornadoes	High
Wildfire	Medium
Winter Storms	High

CAPABILITIES ASSESSMENT

This section identifies the following capabilities for the City of Gluckstadt:

- Planning Regulatory Capabilities
- Administrative and Technical Capabilities
- Fiscal Capabilities
- Notification Capabilities

Table B.5.1- Planning and Regulatory Findings

Planning and Regulatory Capability	Implementation
Comprehensive Plan	Yes
Capital Improvements Plan	No
Economic Development Plan	No
Local Emergency Operations Plan	Yes
Continuity of Operations Plan	Yes
Transportation Plan	Yes
Stormwater Management Plan	Yes
Community Wildfire Protection Plan	No
Building Codes	Yes
Site Plan Review	Yes
Zoning Ordinance	Yes
Subdivision Ordinance	Yes
Floodplain Management Ordinance	Yes

Table B.5.2- Administrative and Technical Findings

Personnel Capability	Implementation
Building Inspector	Yes
Floodplain Manager	Yes
Emergency Manager	Yes
Community Planner	Yes
Zoning Administrator	Yes
Civil Engineer	No
GIS Specialist	Yes
Fire Department	Yes
Law Enforcement	Yes
Public Works Department	Yes
CRS Designed Community	Yes
Storm Ready Designed Community	No
Firewise Designated Community	No

Table B.5.3- Financial Findings

Financial Resources	Able to Access
Capital Improvement Project Funds	No
Authority to Levy Taxes for Specific Purposes	Yes
Fees for water, sewer, gas, or electric services	No
Impact Fees for Development	No
Incur Debt through Bonds	Yes

Eligible for State Grant Programs (e.g. CDGB Program)	Yes
Eligible for Federal Grant Programs (e.g. Pre-Disaster Mitigation Grants)	Yes

Table B.5.4- Education and Early Warning Findings

Outreach Activities	Implementation
Outdoor Warning Sirens	Yes
Community Text Message/Email Notification System	Yes
CERT Team	Yes
Public Education Program	Yes
Website with Preparedness Information	Yes

Table B.5.5- National Flood Insurance Program Findings

Gluckstadt	Community ID	Current Effective Map Date	Policies In-Force	CRS Class Rating
The information regarding the National Flood Insurance Program has been requested from FEMA but has not yet been received.				

Source: MEMA as of 06/15/2020

MITIGATION STRATEGY

Goals and Objectives

The City of Gluckstadt adopts the stated goals and objectives established by the Mitigation Council which are as follows:

GOAL 1: Engage all of Copiah County in the development, implementation, and maintenance of a multi-jurisdictional Hazard Mitigation Plan.	
Objectives:	
1.1	Appoint members to the Copiah County Mitigation Council
1.2	Local officials shall promote Copiah County’s Plan and support community mitigation programs
1.3	Develop a multi-jurisdictional plan that is feasible, beneficial and easy to understand
1.4	Establish a process to keep the multi-jurisdictional plan up-to-date
GOAL 2: Develop an understanding of the hazards threatening Gluckstadt and the techniques to minimize the vulnerability to those hazards.	
Objectives:	
2.1	Increase local knowledge of hazards and hazard mitigation approaches
2.2	Establish a method to gather and maintain information needed for defining risk and understanding vulnerabilities
2.3	Utilize the best available data to identify the location and potential impacts of hazards on people, property, and the natural environment
2.4	The public, especially those living or working in identified hazard areas, should have facilitated access to information needed to understand their vulnerability to hazards and the effective techniques to reduce those risks
GOAL 3: To protect life and property to the best of Gluckstadt’s ability.	
Objectives:	
3.1	Protect and maintain critical facilities in Gluckstadt
3.2	Improve the enforcement of requirements for building in the floodplain and removal of repetitive flood properties when appropriate
3.3	Identify adequate resources to meet health and safety needs after a disaster
3.4	Improve systems that provide warning and emergency communications
3.5	Improve preparation and response to a public health emergency.
GOAL 4: Promote public awareness.	
Objectives:	
4.1	Inform the public of the risk to natural hazards and ways to increase the public’s capability to prepare, respond, recover and mitigate the impacts of natural hazards
4.2	Form public and private partnerships to promote mitigation practices
GOAL 5: Encourage the development and implementation of long-term cost effective and environmentally sound mitigation projects	
Objectives:	
5.1	Identify projects that provide maximum risk protection
5.2	Local officials shall promote the mitigation plan and seek assistance to carry-out mitigation programs

The City of Gluckstadt has not previously adopted a Hazard Mitigation Plan or Mitigation Action Plan; therefore, there is no previous actions to review.

Mitigation Action Plan for 2024-2027

Once the Mitigation Council reviewed potential needs for the city, the Council then used the information gathered as part of this plan to develop a mitigation strategy for the City of Gluckstadt for 2024 through 2027. Each action is designed to assist the city by reducing losses, decreasing risk, and improving disaster recovery efforts. The actions contained in this plan are based upon the risk and capability assessments completed as part of this plan, and the goals and objectives established for District 5. Each action, if completed, will lay the framework to reduce the city’s overall vulnerability to future natural hazard events. The completion of each action listed below is dependent upon available resources and funding to complete each action. This Action Plan may be modified from time to time, as detailed in Section 7 of this plan, as priorities change, or as resources within the City of Gluckstadt increase or decrease.

Mitigation Action 1:

Seek funding assistance to upgrade remote capabilities allowing employees to work off-site if required during hazard events and develop a protocol for activation.

Hazard Addressed:	All Hazards
Entity:	City of Gluckstadt
New or Reoccurring Action:	New
Priority (High, Medium, Low)	High
Estimated Cost:	\$250,000
Potential Funding Sources:	General Funds, MEMA, FEMA, State Homeland Security
Lead Agency:	Mayor and Board of Alderman, City Clerk
Implementation Schedule:	On-going annually

Mitigation Action 2:

Seek funding assistance to form or maintain retention ponds throughout the City.

Hazard Addressed:	Flooding
Entity:	City of Gluckstadt
New or Reoccurring Action:	New
Priority (High, Medium, Low)	High
Estimated Cost:	\$2,000,000
Potential Funding Sources:	General Funds, MEMA, FEMA, State Homeland Security
Lead Agency:	Public Works
Implementation Schedule:	On-going annually

Mitigation Action 3:

Coordinate with all available media outlets to assist with informing residents on what to do, where to go, and how to recover from hazard events (e.g. TV stations, local radio and newspapers, Facebook and other social media accounts, websites, etc.) This includes maintaining Gluckstadt on the Go or creating a city-wide radial notification alert system.

Hazard Addressed:	All Hazards
Entity:	City of Gluckstadt
New or Reoccurring Action:	New
Priority (High, Medium, Low)	Medium
Estimated Cost:	No Cost
Potential Funding Sources:	N/A
Lead Agency:	Mayor’s Office
Implementation Schedule:	On-going annually

Mitigation Action 4:

Seek funding assistance to obtain any equipment and/or supplies that aid in the hazard damage removal process.

Hazard Addressed:	All Hazards
Entity:	City of Gluckstadt
New or Reoccurring Action:	New
Priority (High, Medium, Low)	Medium
Estimated Cost:	\$300,000
Potential Funding Sources:	General Funds, MEMA, FEMA
Lead Agency:	Mayor, Board of Alderman
Implementation Schedule:	On-going annually

Mitigation Action 5:

Purchase and maintain emergency generators for use by the Gluckstadt Police Department.

Hazard Addressed:	All Hazards
Entity:	City of Gluckstadt
New or Reoccurring Action:	New
Priority (High, Medium, Low)	High
Estimated Cost:	\$80,000
Potential Funding Sources:	General Funds, MEMA, State Homeland Security Program
Lead Agency:	Mayor's Office, Public Works, and Police Department
Implementation Schedule:	On-going annually

Mitigation Action 6:

Seek funding to purchase and/or maintain an effective outdoor siren warning system.

Hazard Addressed:	All Hazards
Entity:	City of Gluckstadt
New or Reoccurring Action:	New
Priority (High, Medium, Low)	High
Estimated Cost:	\$500,000
Potential Funding Sources:	General Funds, MEMA, FEMA, Pre-Disaster Mitigation Funding
Lead Agency:	Police and Fire Departments
Implementation Schedule:	On-going annually

Mitigation Action 7:

Maintain a public outreach strategy designed to educate citizens of the risks posed by natural hazards and the protective measures they can take to avoid or minimize those risks.

Hazard Addressed:	All Hazards
Entity:	City of Gluckstadt
New or Reoccurring Action:	New
Priority (High, Medium, Low)	High
Estimated Cost:	\$5,000 annually
Potential Funding Sources:	General Funds, FEMA Pre-Disaster Mitigation Funding
Lead Agency:	Mayor's Office, City Clerk
Implementation Schedule:	On-going annually

Mitigation Action 8:

Seek funding assistance to improve capacity of "Personal Protective Equipment" (PPE) and develop a protocol to make supplies available to staff during a Public Health Emergency.

Hazard Addressed:	Public Health Emergency
Entity:	City of Gluckstadt
New or Reoccurring Action:	New
Priority (High, Medium, Low)	High
Estimated Cost:	\$10,000
Potential Funding Sources:	General Funds, Department of Health
Lead Agency:	Mayor, Board of Alderman
Implementation Schedule:	On-going annually