

Flood Risk in Jackson



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Reconnecting Big Rivers Project
A collaboration between JSU and UCB

Photo: Mark Wakefield <https://www.usatoday.com/story/news/nation/2020/02/16/mississippi-river-flooding-jackson-pear-river-rising/4781520002/>

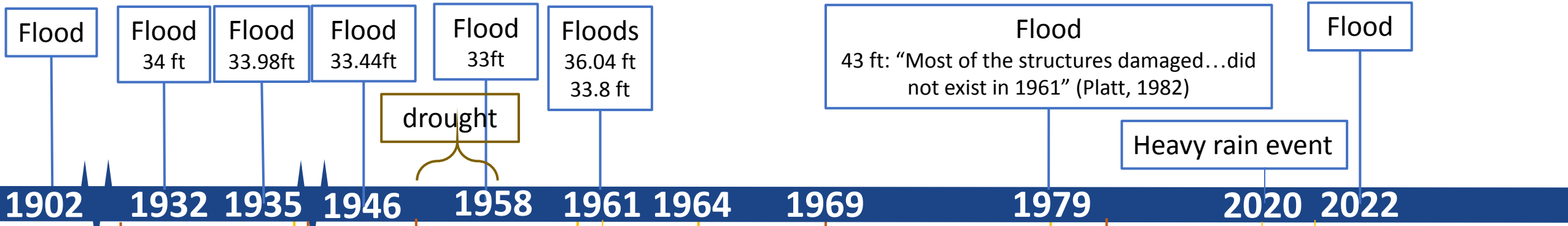
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Timeline of Flooding in Jackson, MS

1930-1967: 8 flood events 33ft or higher

1967-2005: 23 flood events 33ft or higher



1930 gas wells dug

1939 gas wells dry

1951 Flowood Chartered

Floodplain zoned for residential, commercial, and industrial use

Floodplain zoning ordinance

1936 USACE proposes a channel improvement plan

Reservoir Created

1964-67 Levees created

Prisoners forced to work on flood response

Miss. Department of Environmental Quality demanded the reservoir be lowered due to invasive algae bloom. Reduced flooding

WPA private levees built

Prisoners forced to work on flood response

"There is no reason why the project should not give indefinite protection from flooding to the area." - Major General Thomas H. Hayes of the U.S.A.C.E. (Platt, 1982)

Levee Board pushing the idea of the One Lake plan..

History

Distribution of Risk

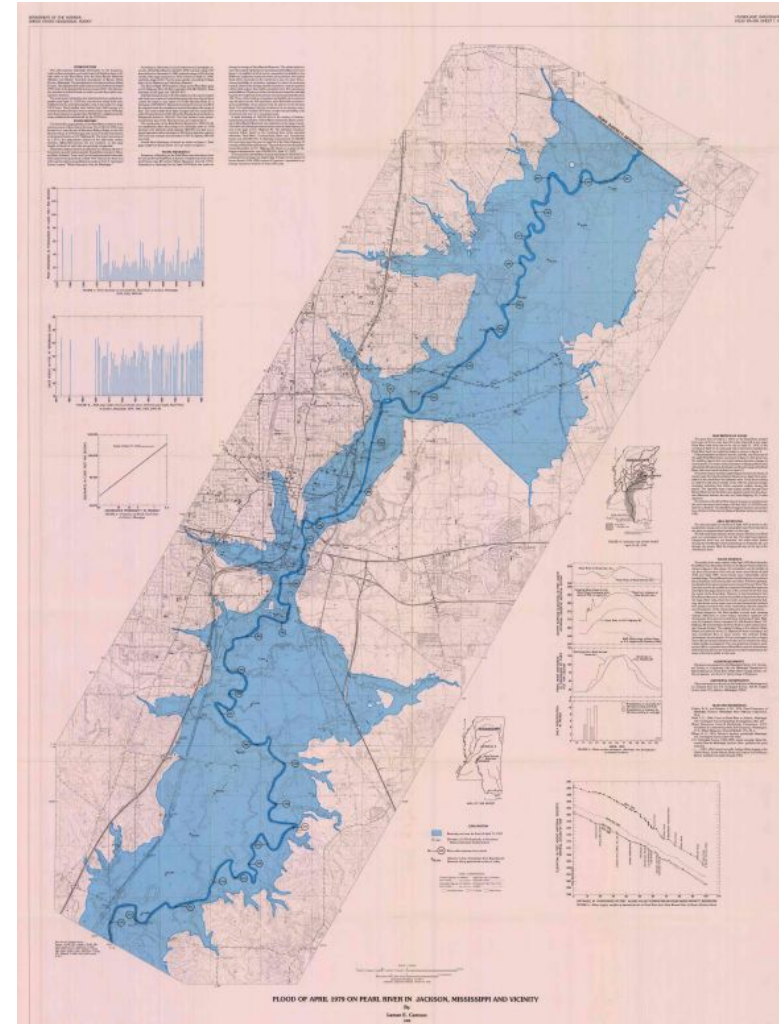
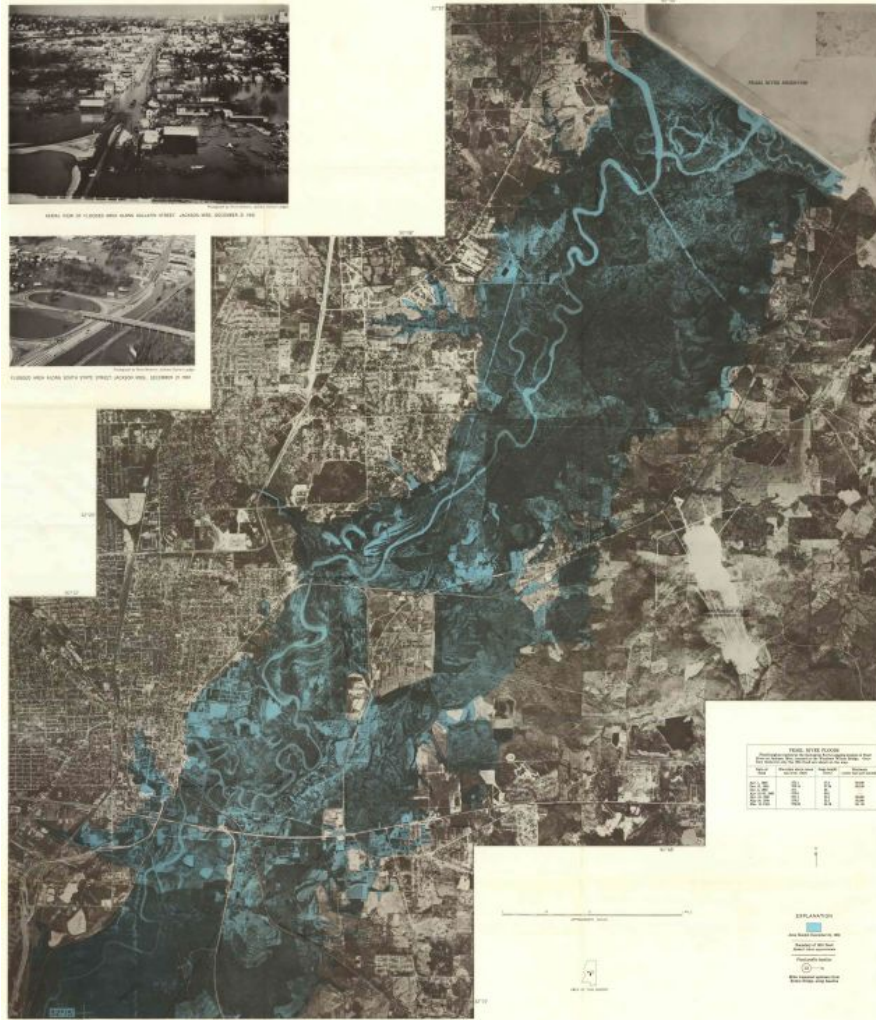
Interviews

Mitigation

Repeated Flooding in Jackson

1961 Flood: 1,200 people displaced

1979 Flood: 6,400 people displaced



History

Distribution of Risk

Interviews

Mitigation



1979



2020

Institutions in the Pearl River floodplain

Pearl River floodplain at Jackson:

- Counties:

- Hinds County
- Rankin County

- Municipalities:

- Jackson
- Flowood
- Pearl
- Richland

- Special districts:

- Pearl River Valley Water Supply District
- Rankin-Hinds Urban Flood and Drainage Control District

Platt (1982)

History

Distribution of Risk

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Mitigation

Ross Barnett Dam

The Pearl River Valley Water Supply District

- 35,000 acres of reservoir, 17,000 acres of land housing 12,900 people
- Not designed to control floods, but water level kept high for water supply, aesthetics, and recreational purposes.
- Summer water level: 297.5ft
- Winter water level: 296ft

November 18, 1962



History

Distribution of Risk

Interviews

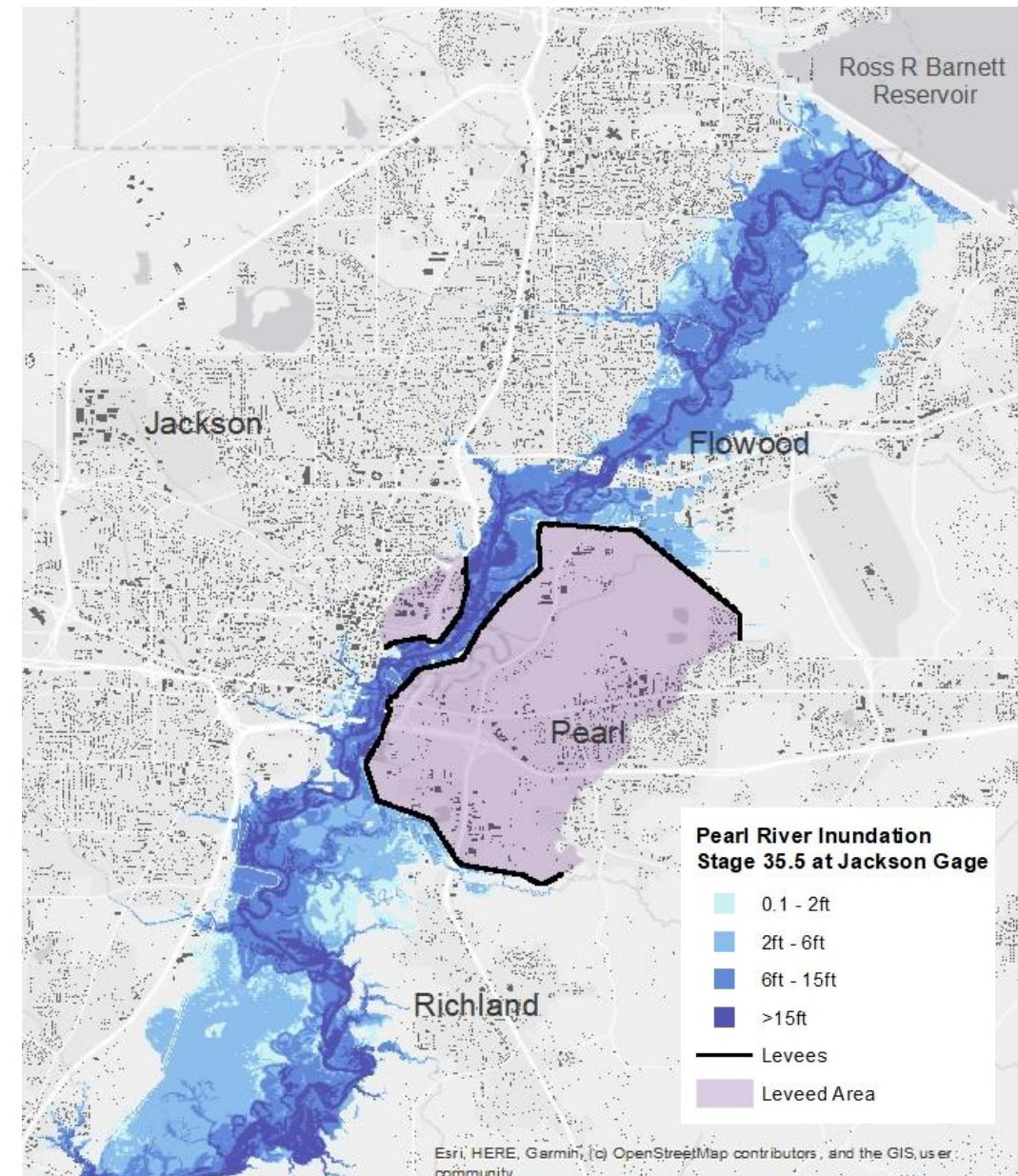
Mitigation

Jackson's levees

1964-1967 USACE constructed the levees, costing \$8 million for the federal government, and \$1 million for the local governments:

- 1.5 mile levee on the Jackson side, protecting 420 acres
- 10.3 mile levee constructed on the Rankin County side, protecting 5,870 acres.
- 5 miles of the river was channelized

“There is no reason why the project should not give indefinite protection from flooding to the area.” - Major General Thomas H. Hayes of the U.S. Army Corps of Engineers (Platt, 1982)



History

Distribution of Risk

Interviews

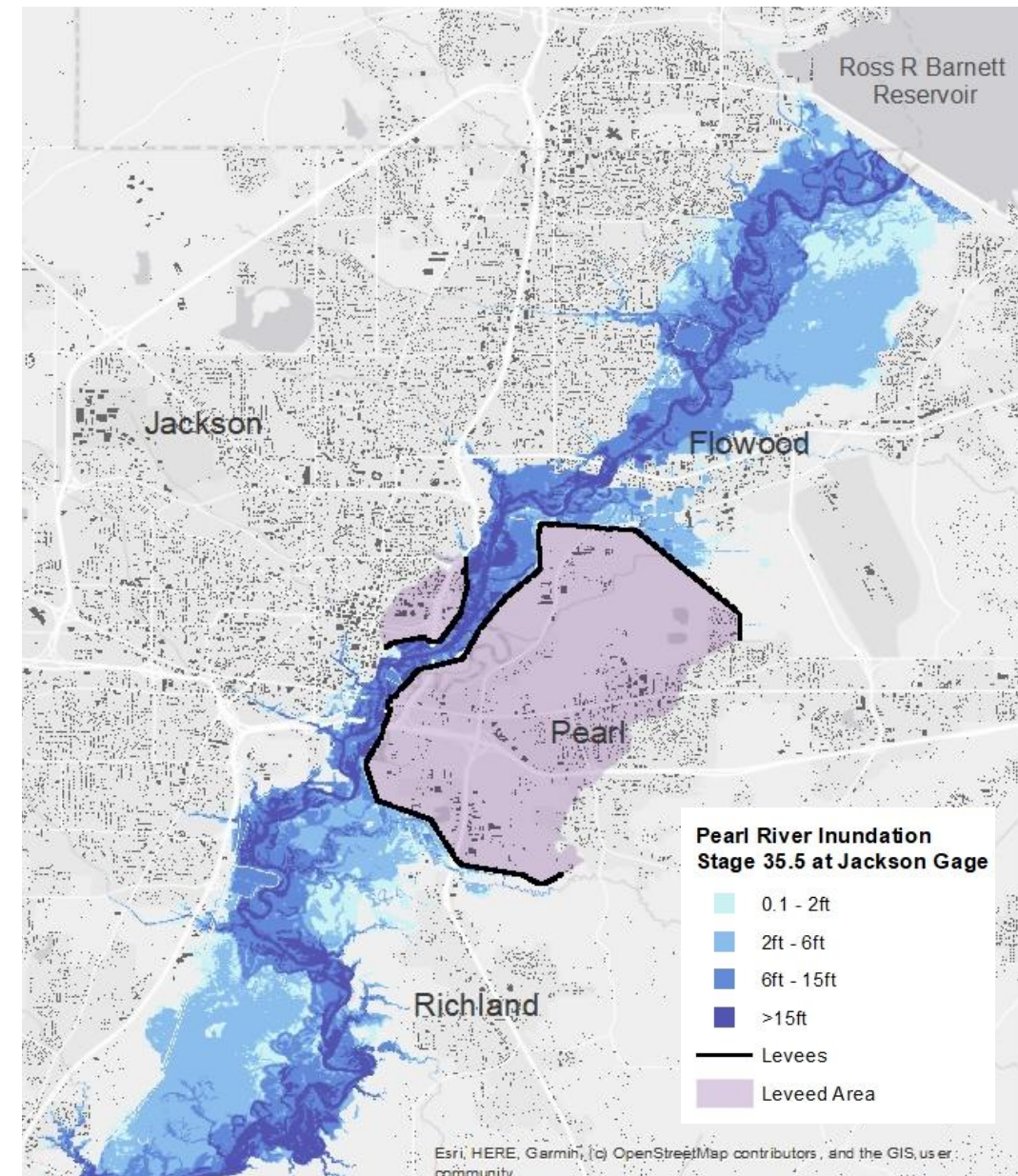
Mitigation

Jackson's levees

Many developed areas across the United States depend on levees for flood protection.

But, the creation of levees can lead to the “Levee Effect”, where there is furthered development in the floodplain after a levee is built due to a false sense of security, increasing exposure in the case of a levee failure (Hutton et al., 2019; Ludy & Kondolf, 2012).

This is also true for Jackson. After the levees were built in 1964-67, land in the floodplain was rezoned for residential, commercial, and industrial development (Platt, 1982).



History

Distribution of Risk

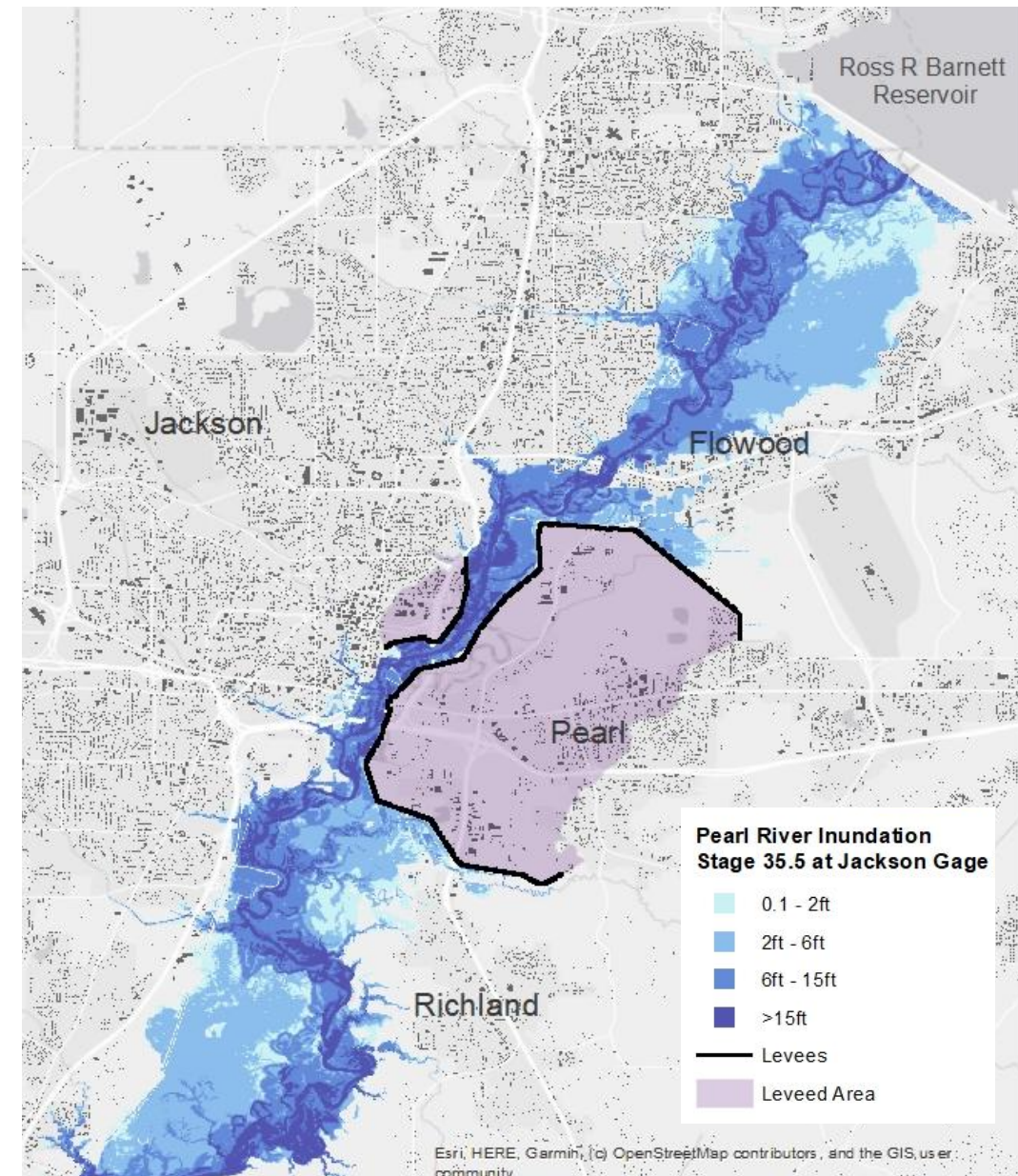
Interviews

Mitigation

Rankin-Hinds Urban Flood and Drainage Control District

Established after the 1961 floods as a local sponsor for federal projects.

- Required to provide land and easements for flood management projects.
- Has been in charge of maintaining the levees since 1967



History

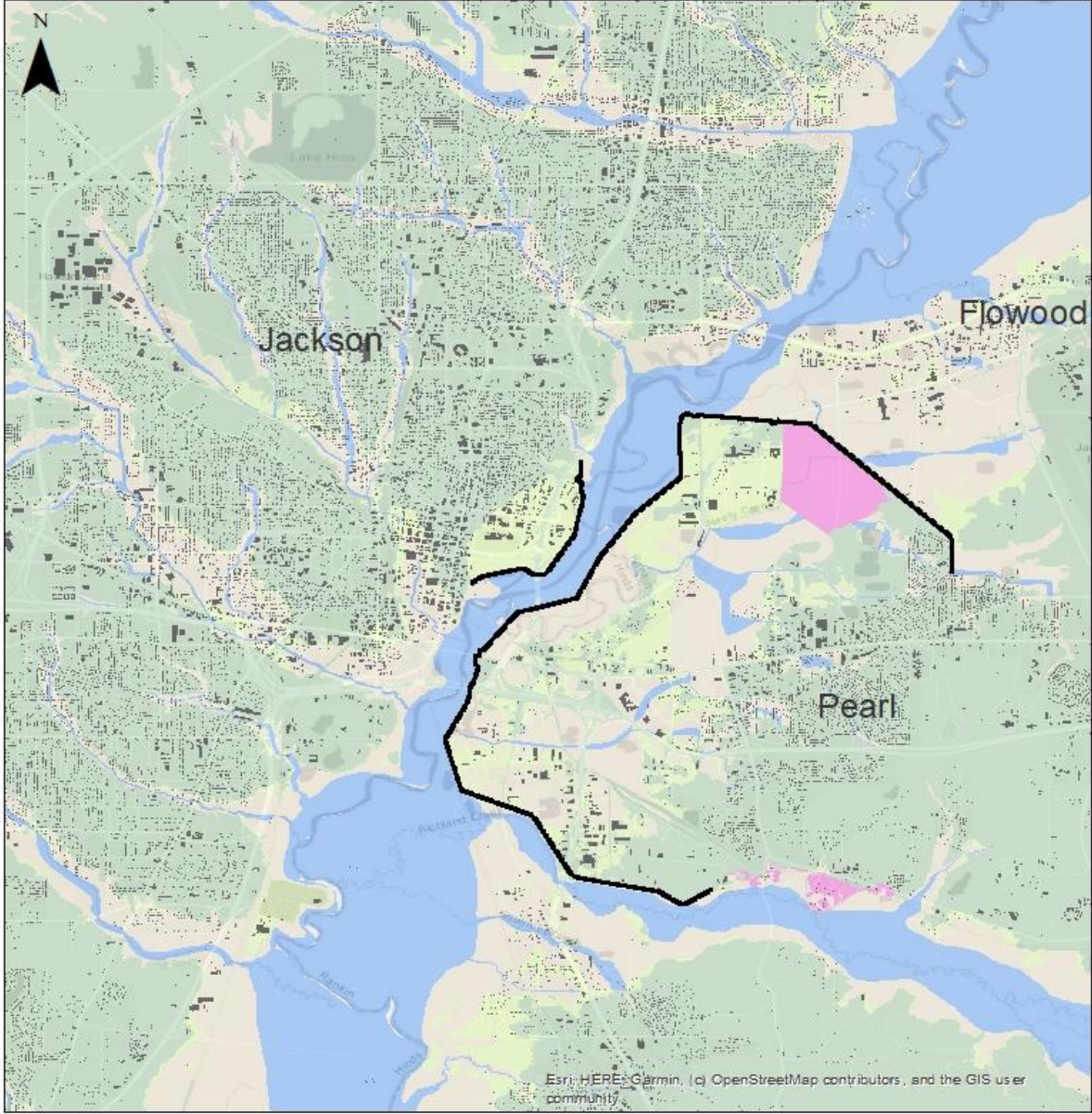
Distribution of Risk

Interviews

Mitigation

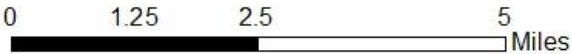
Flood Rate Insurance Map (FIRM) 2019

After Jackson joined the National Flood Insurance Program, areas within the FLOODWAY are required to have National Flood Insurance. The AE zone shows areas that will flood during a 100-year rain event. A rain event determined by historical data to have a 1 percent chance of occurring in any given year.



FIRM 2019

- AE: 100-year flood zone
- X shaded: 500 year flood zone
- X unshaded: Minimal Flood Hazard
- Reduced Flood Risk due to Levee
- FLOODWAY
- Levees
- Building Footprint



History

Distribution of Risk

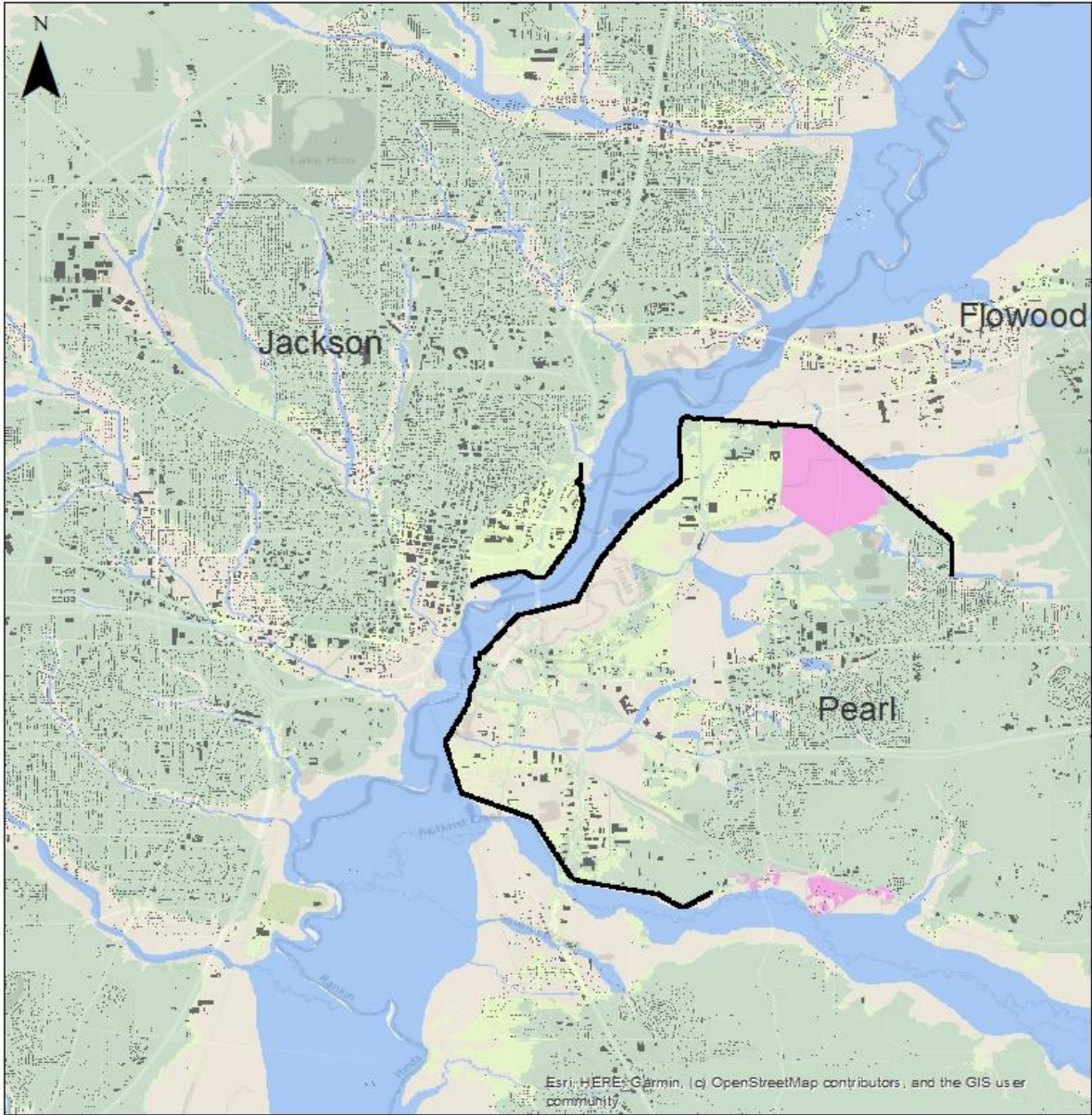
Interviews

Mitigation

Flood Rate Insurance Map (FIRM) 2019

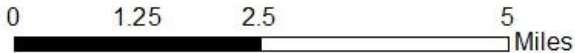
The National Flood Insurance Program was created to: 1. Reduce risk of flooding by regulating the floodplain, and 2. Provide financial support to people after a flood.

But, since its implementation, development in the floodplain has continued to expand, thereby increasing exposure and risk of flooding.



FIRM 2019

- AE: 100-year flood zone
- X shaded: 500 year flood zone
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History

Distribution of Risk

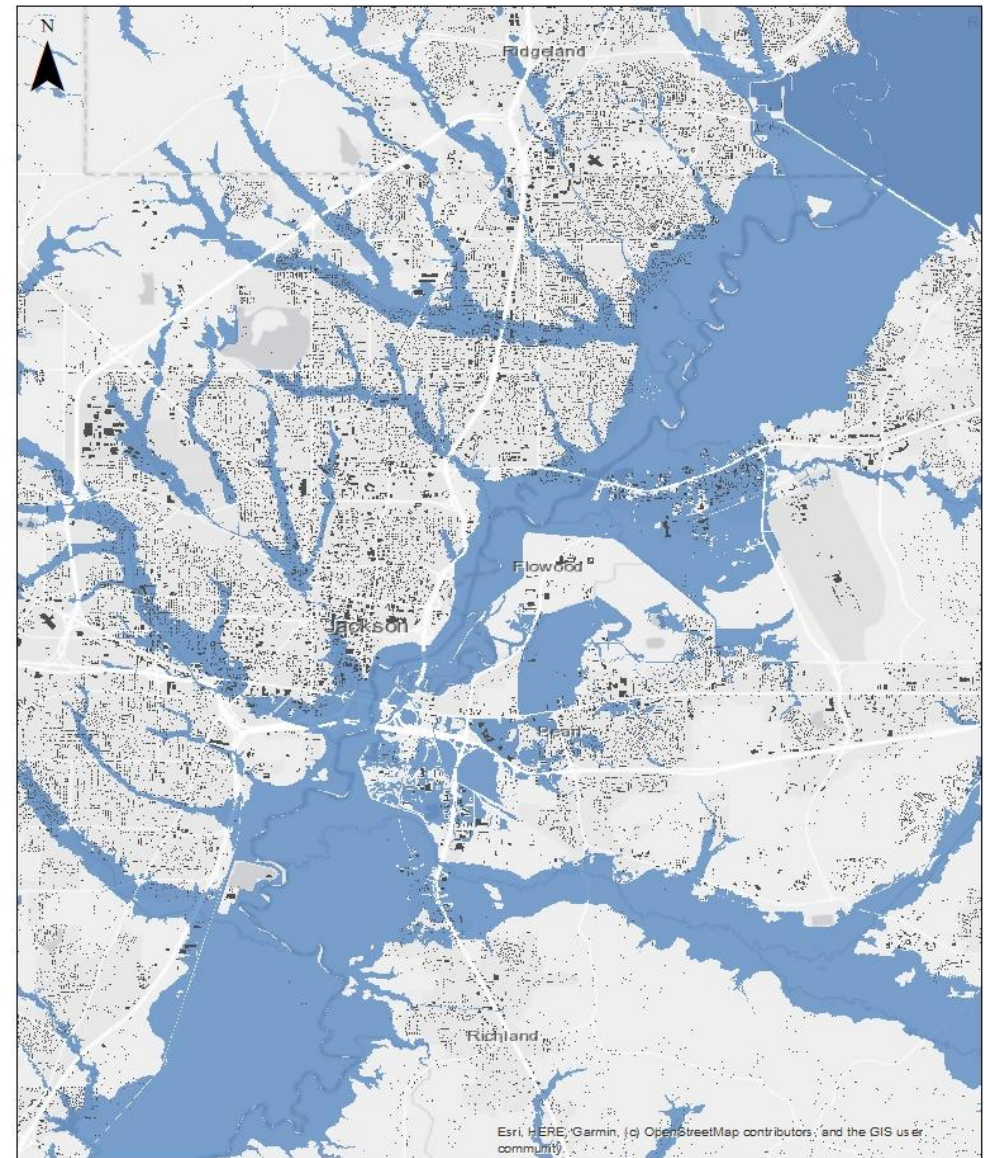
Interviews

Mitigation

Flooding In Jackson

Flooding in Jackson is creek based. As the Pearl River water level rises, the tributaries start to get backed up, overflowing into their floodplain and inundating neighborhoods.

When looking at risk and mitigation of hazards, it is especially important to research racial inequity in the distribution of flood risk and flood mitigation, ask why distribution is that way, and how it can be addressed (Chakraborty et al., 2014; Lieberman-Cribbin et al., 2021).



■ 100-year flood zone (FIRM: AE) 0 0.5 1 2 3 4 Miles
■ Building Footprint

History

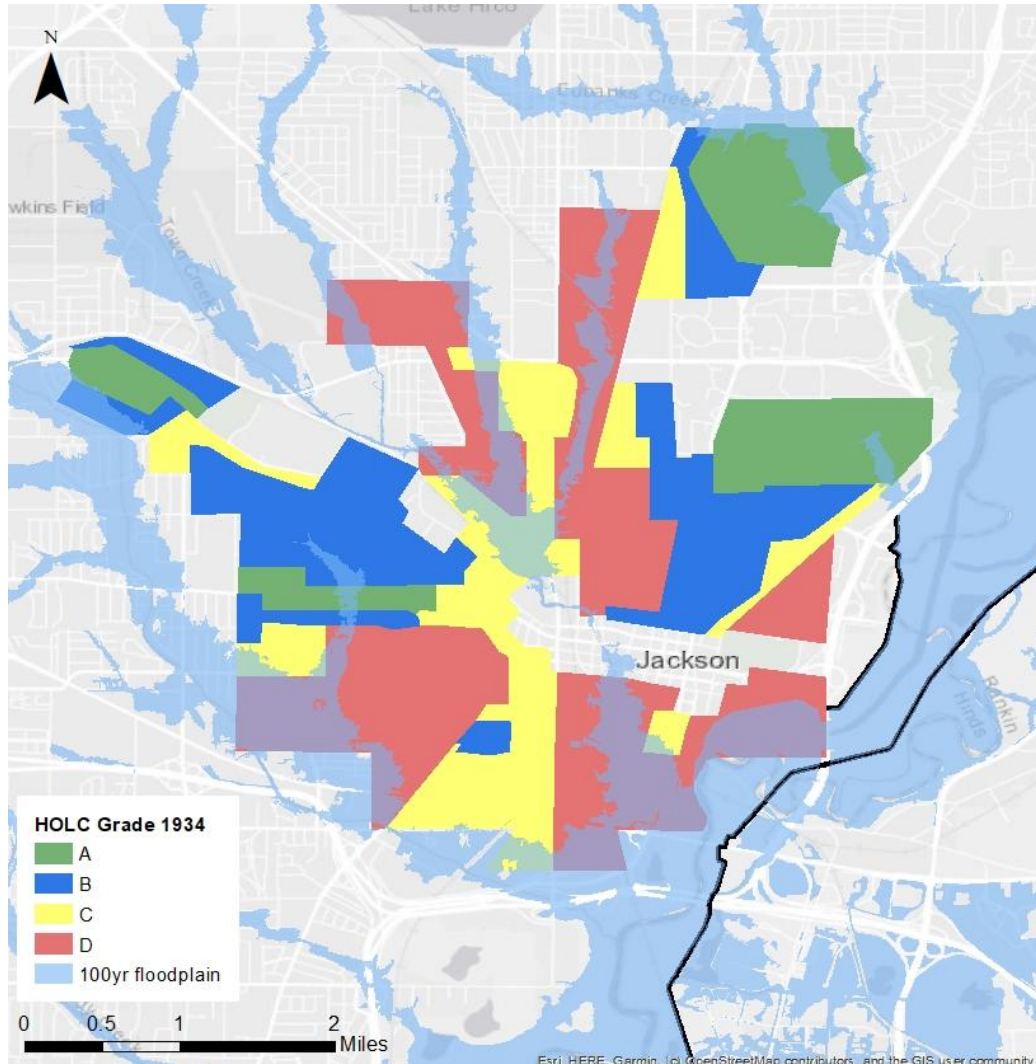
Distribution of Risk

Interviews

Mitigation

Redlining and Flood Risk

100-year floodplain overlain on 1934 HOLC redlining map



An important element of how institutionalized racism impacts urban planning and flood risk is the history of redlining.

The Home Owners Loan Corporation (HOLC), and the Federal Housing Authority (FHA) were temporary emergency programs that existed in response to the Great Depression. HOLC was a temporary emergency program that existed between 1933 and 1936, created to refinance existing homeownership loans that were struggling. The FHA, established in 1935, helped insure new loans written by private lenders for mortgages with lower interest rates.

Both HOLC and FHA were explicitly racist in deciding who to assist, identifying any neighborhoods with people of color as unsafe to lend to. They conducted assessments of “neighborhood quality” which had a large focus on racial composition, perpetuating existing segregationist and discriminatory views of the time. These maps are the source of the term “redlining”, as the lowest ranked neighborhoods were shaded red, and included essentially all Black neighborhoods (Fishback et al., 2022; Marisco, 2017).

History

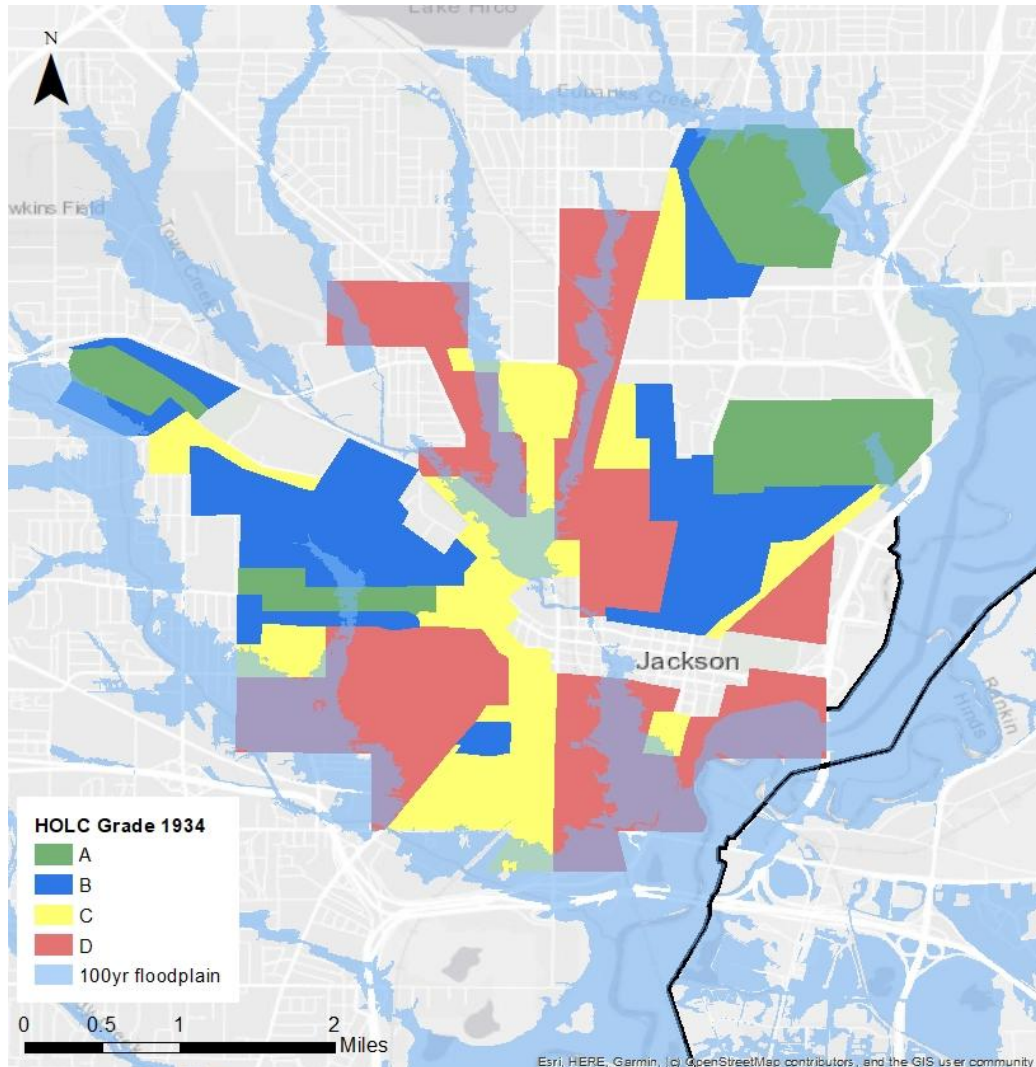
Distribution of Risk

Interviews

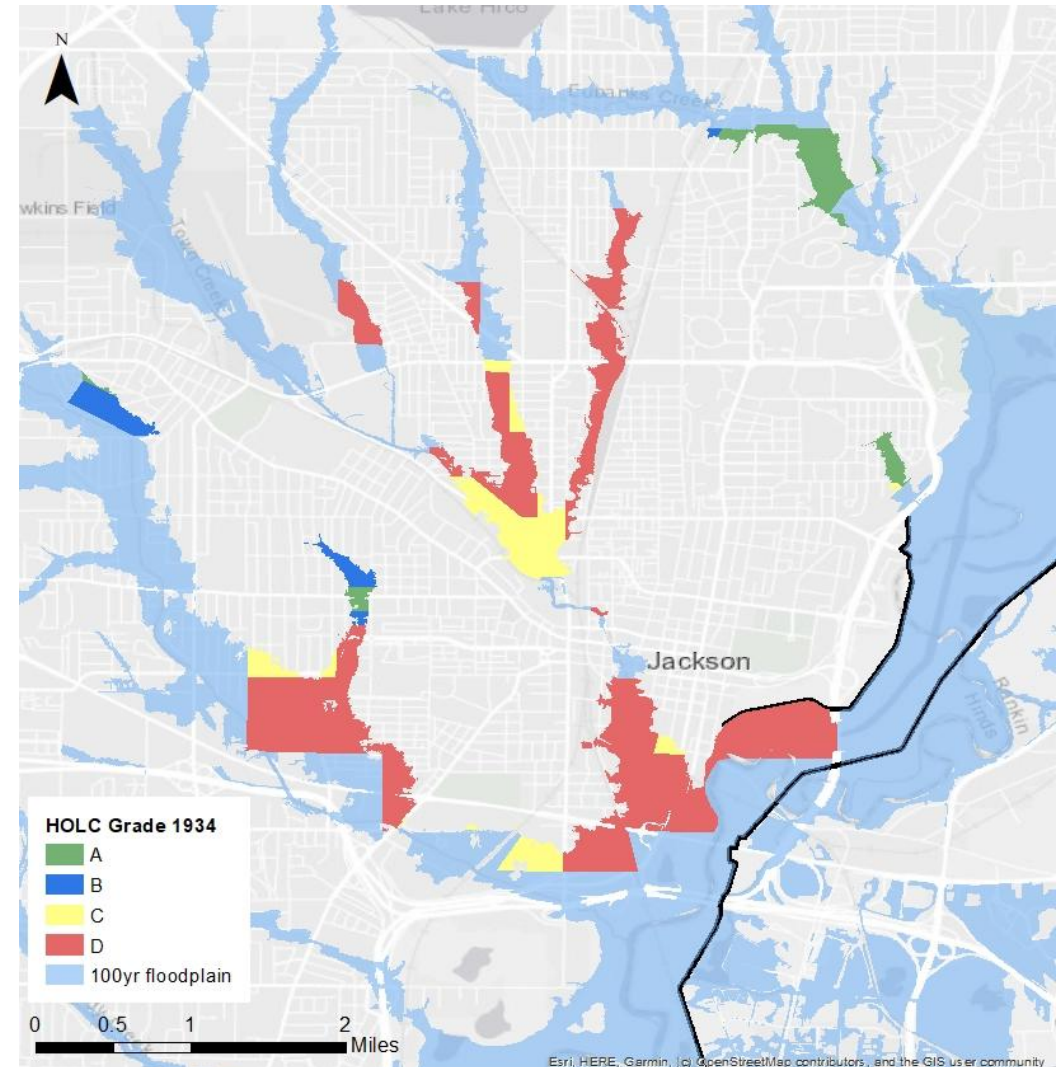
Mitigation

Redlining and Flood Risk

100-year floodplain overlain on 1934 HOLC redlining map



1934 HOLC zones within the 2019 100-year floodplain



History

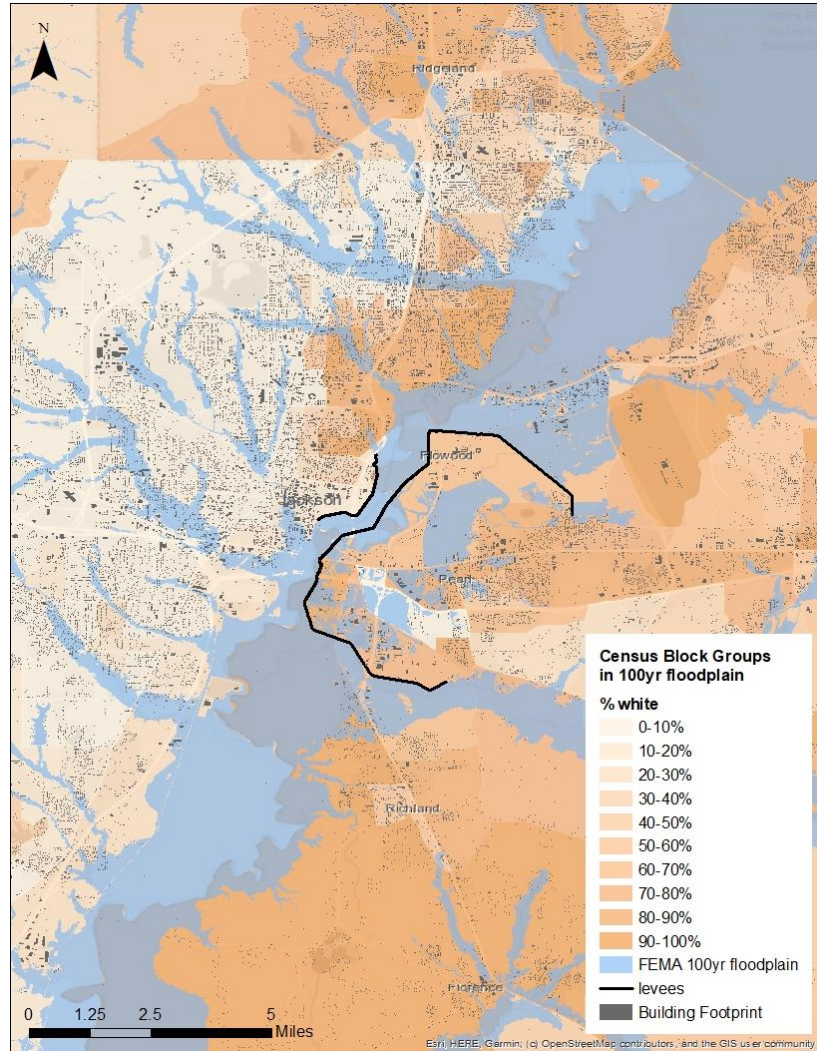
Distribution of Risk

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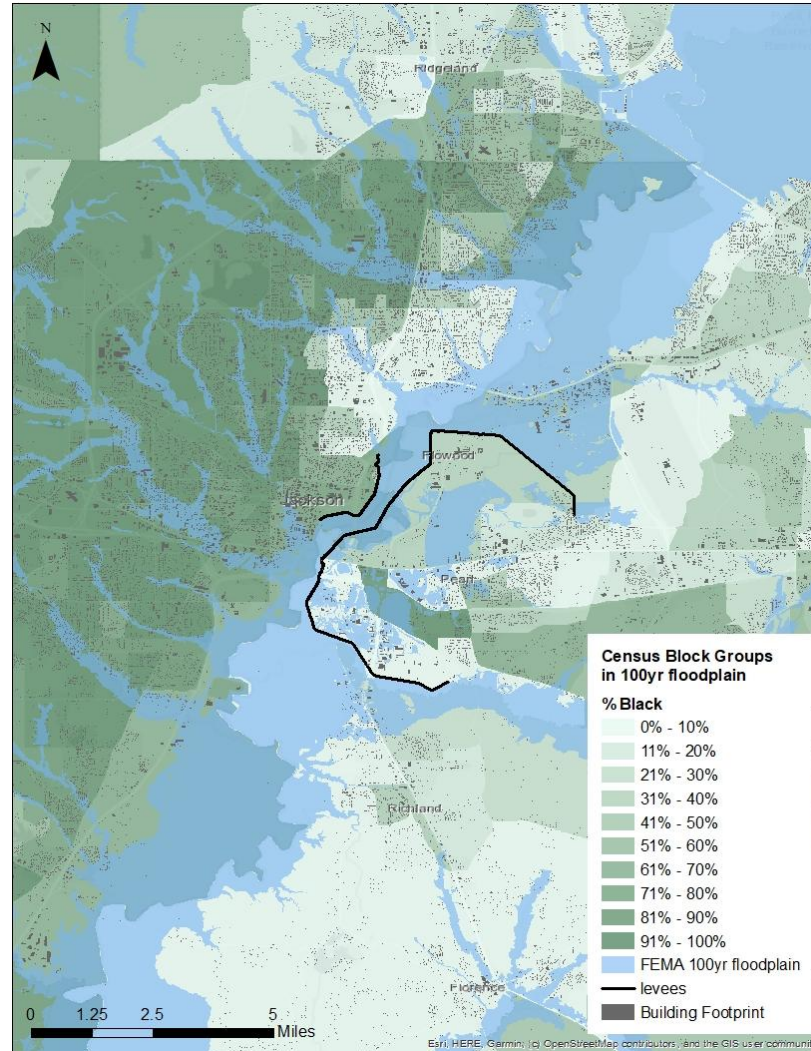
Mitigation

Distribution of Risk across the population

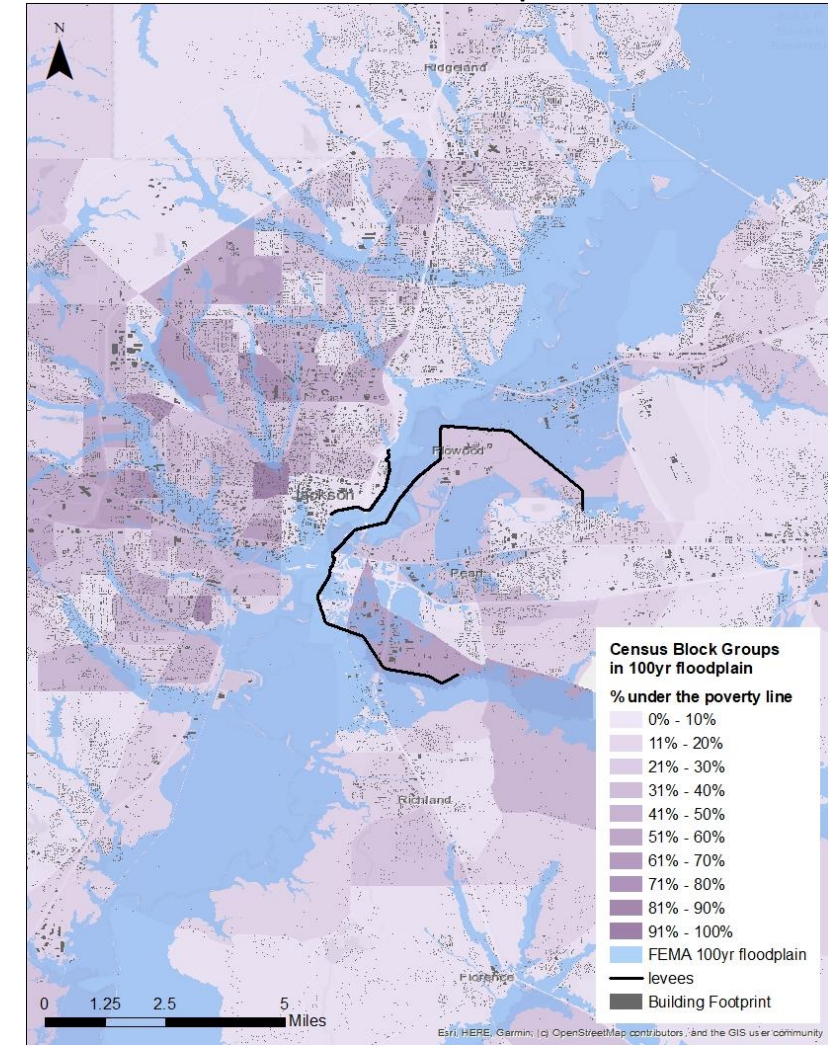
Percent white by Block Group



Percent Black by Block Group



Percent under the Poverty line by Block Group



History

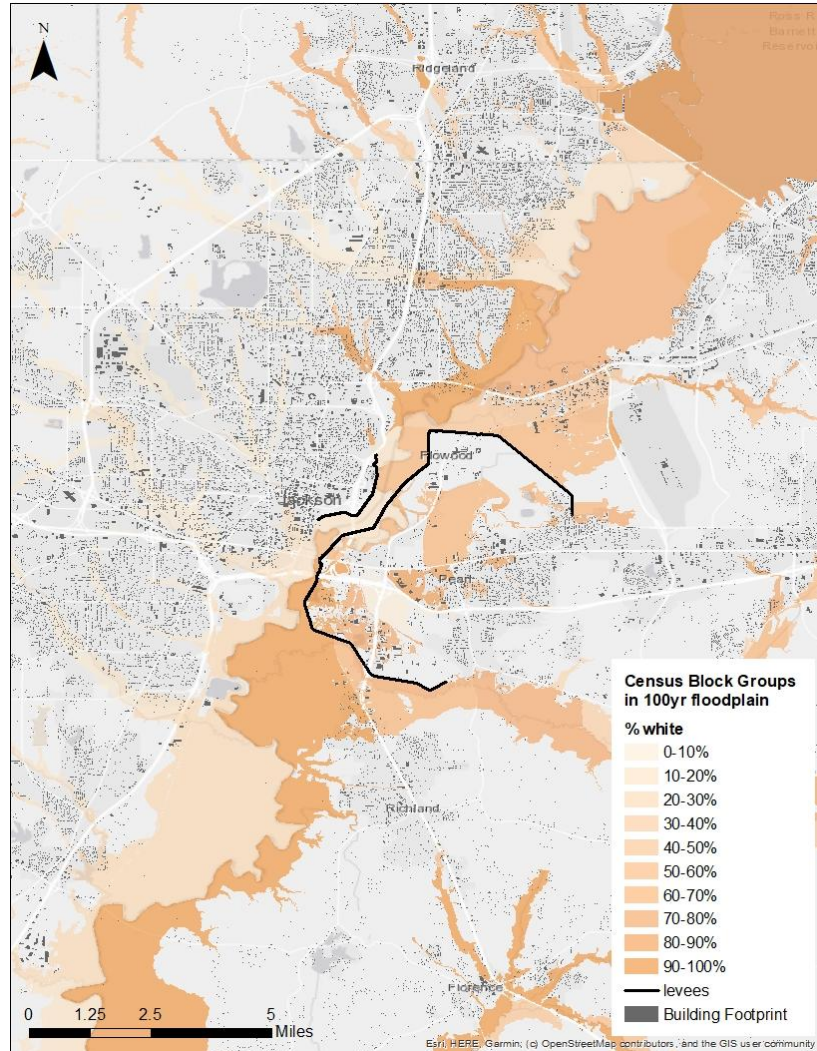
Distribution of Risk

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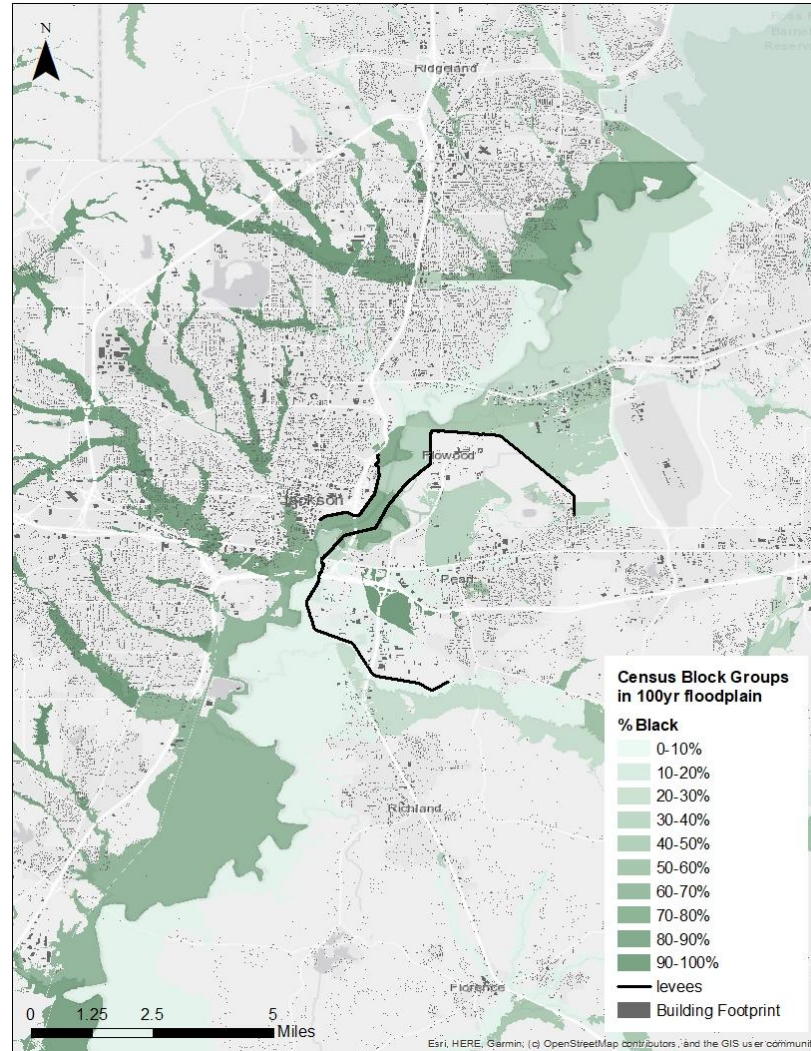
Mitigation

Distribution of Risk across the population

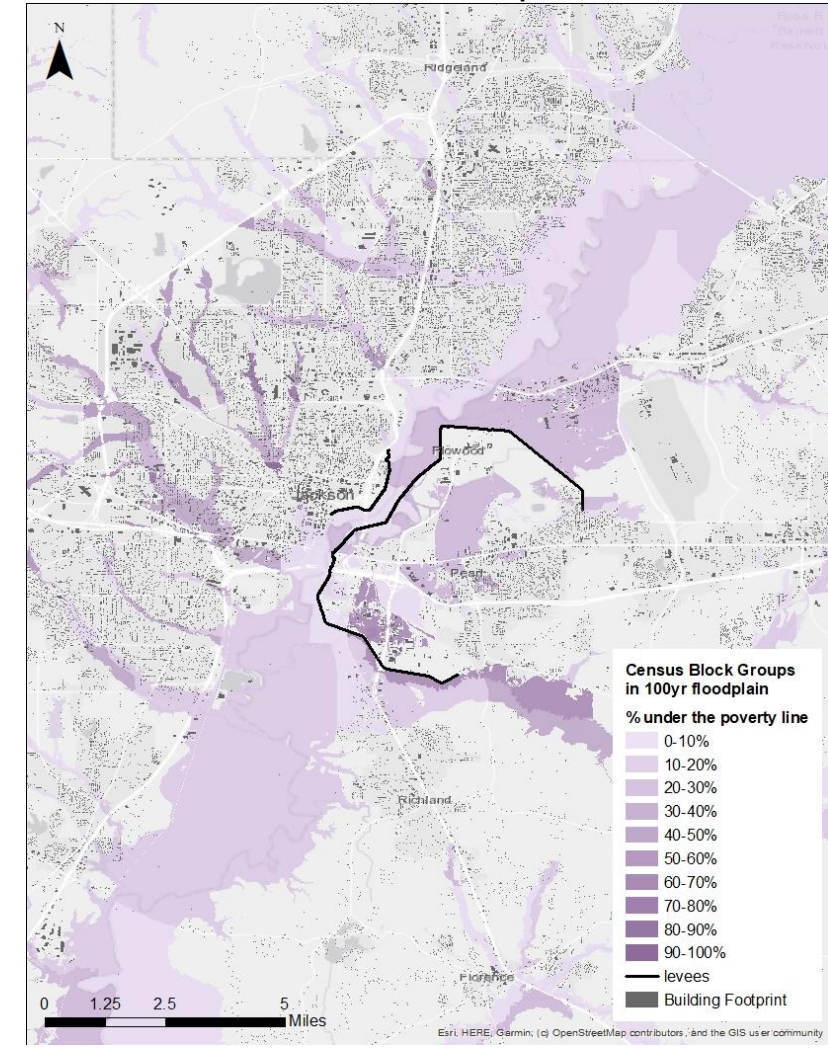
Percent white by Block Group



Percent Black by Block Group



Percent under the Poverty line by Block Group



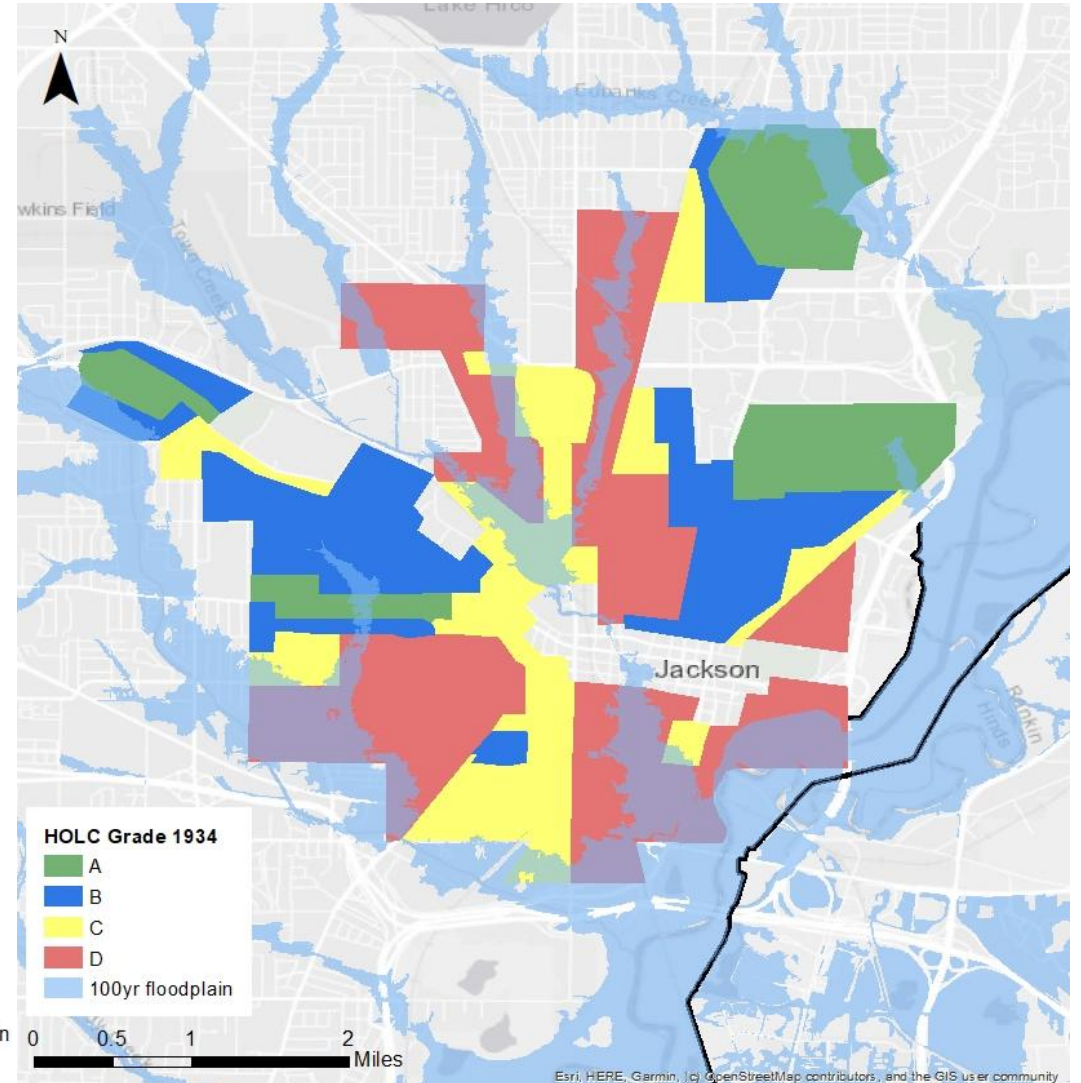
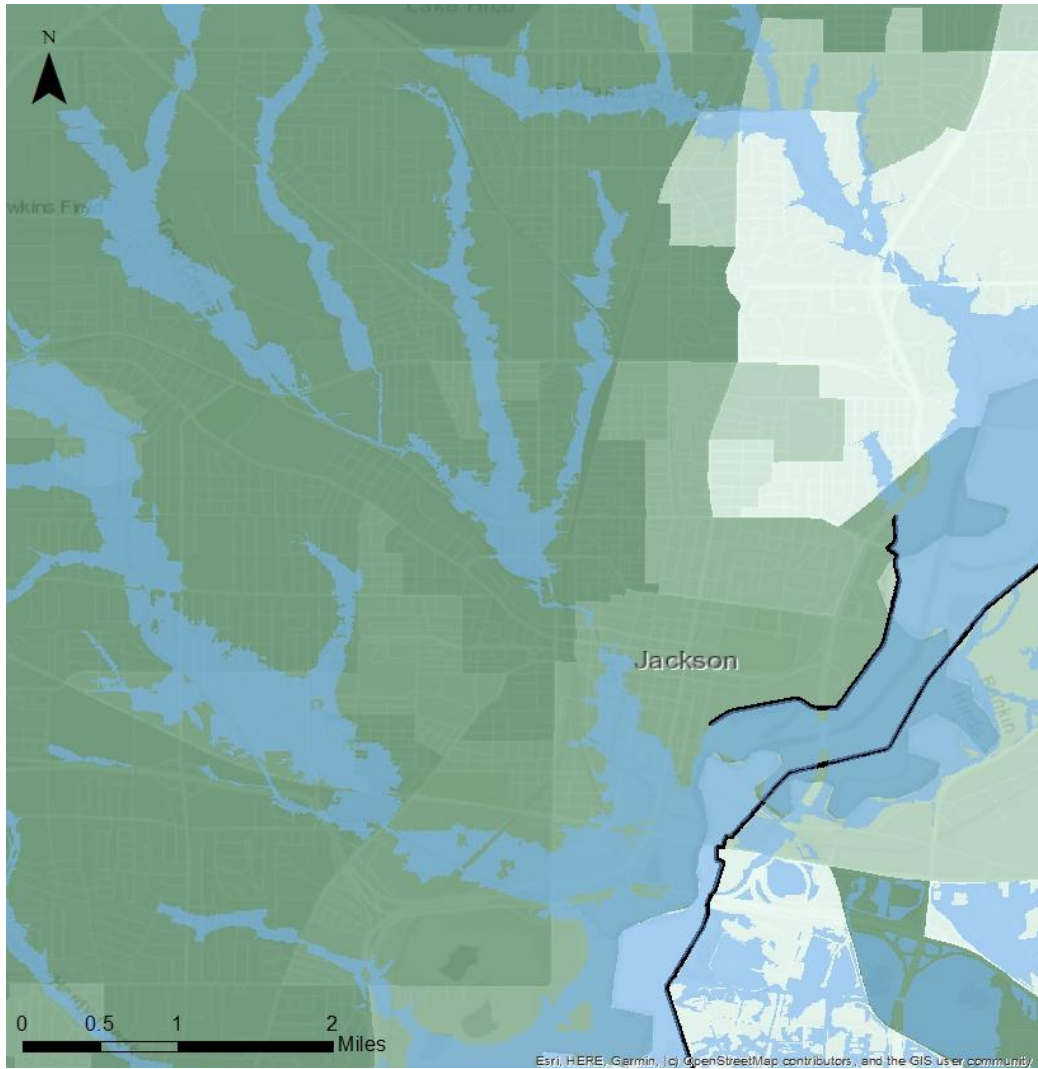
History

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Redlining and Flood Risk Distribution Today



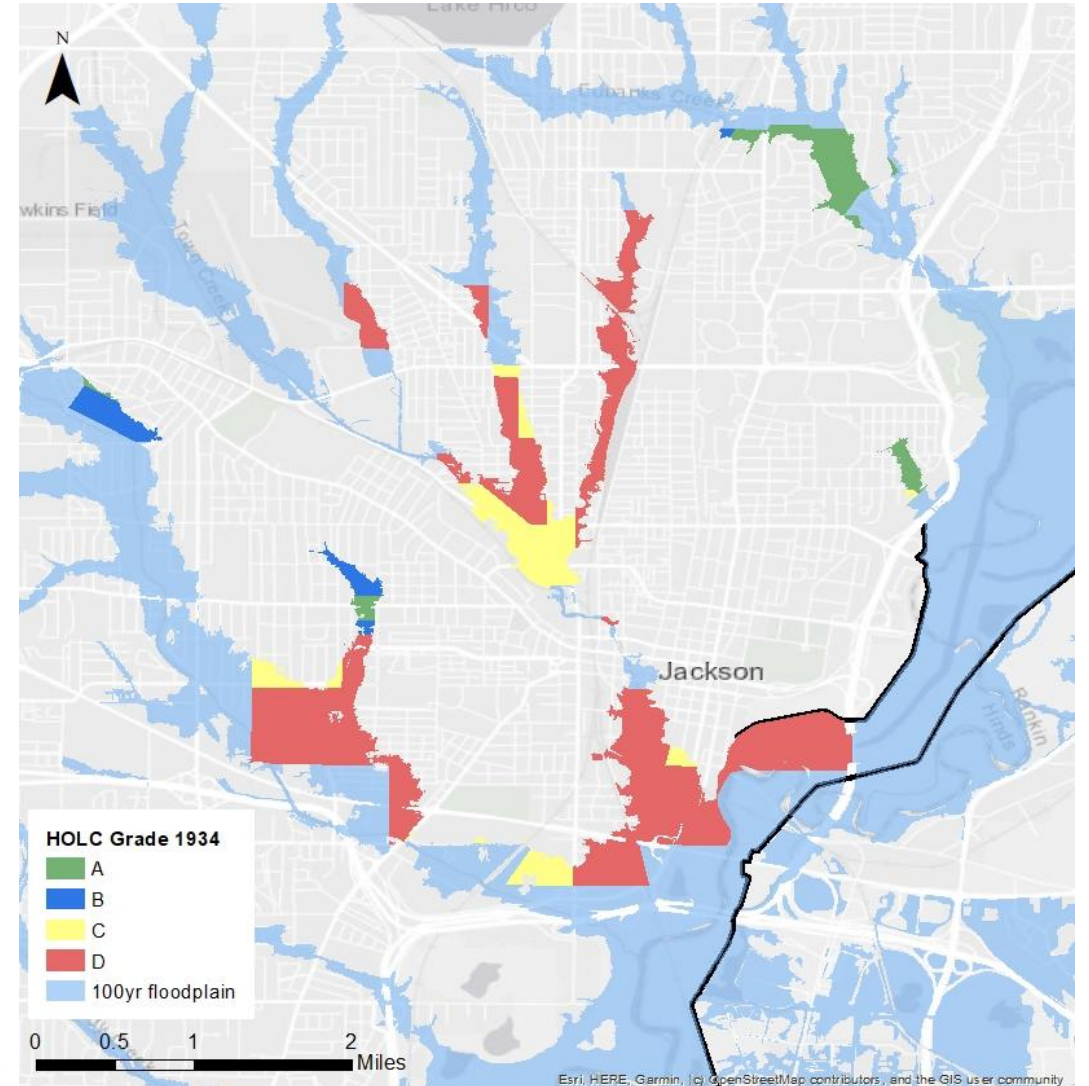
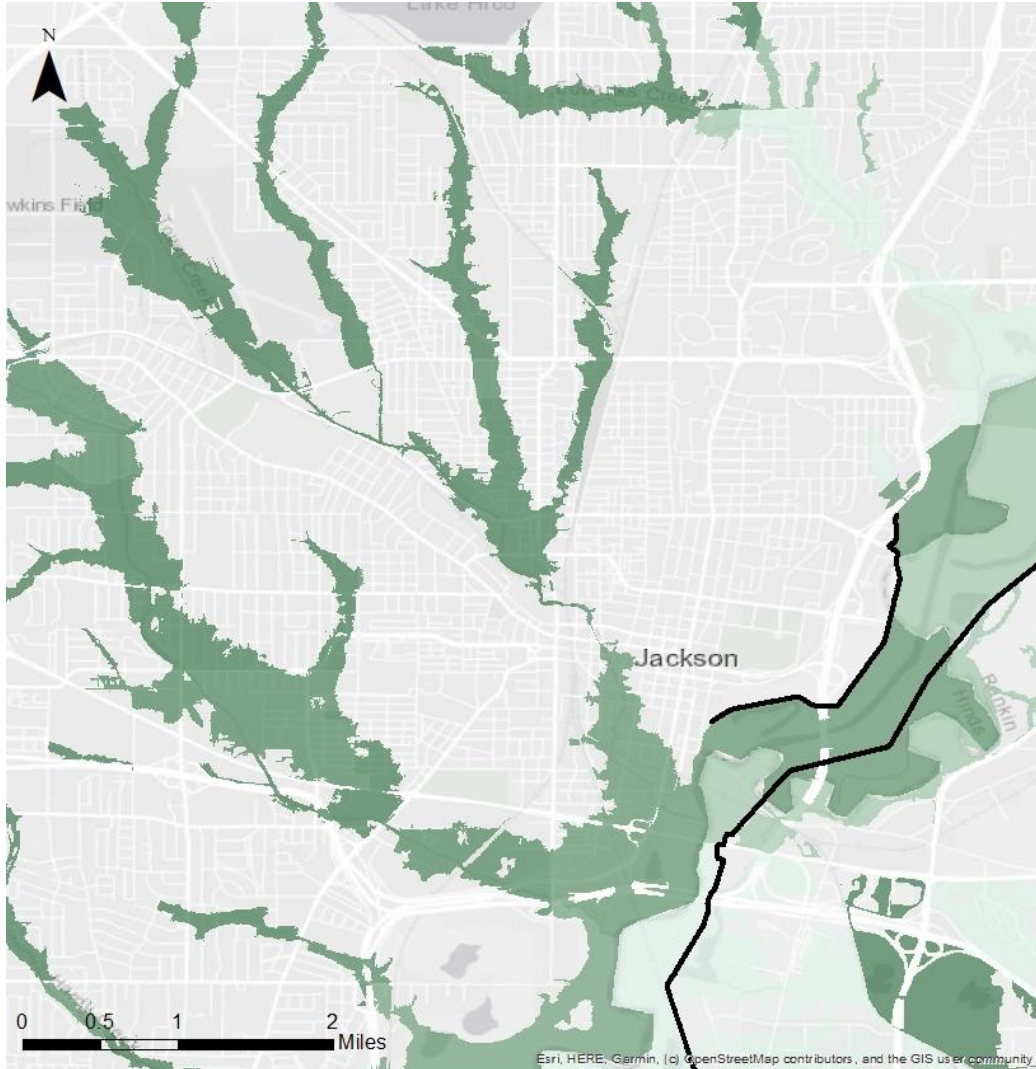
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Redlining and Flood Risk Distribution Today



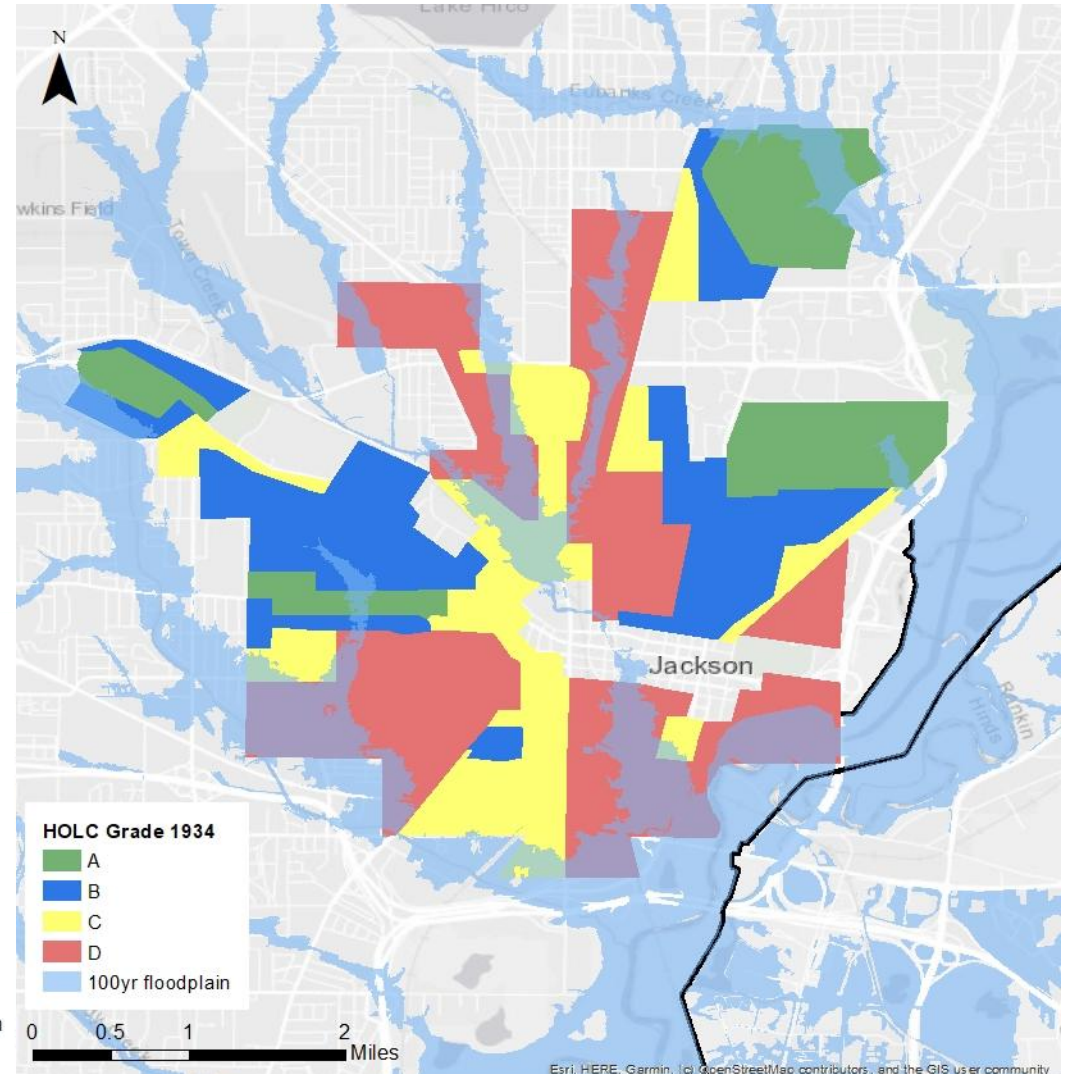
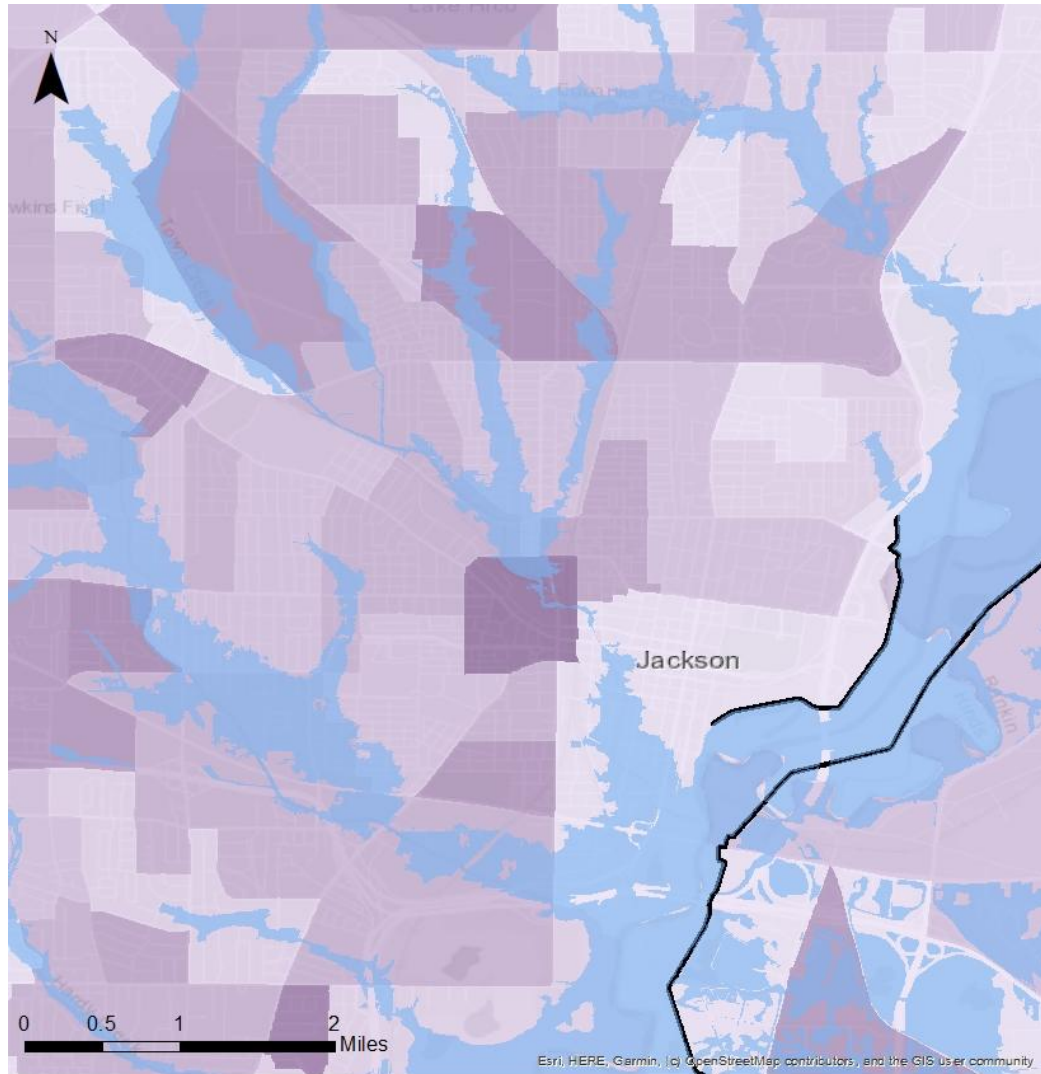
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Redlining and Flood Risk Distribution Today



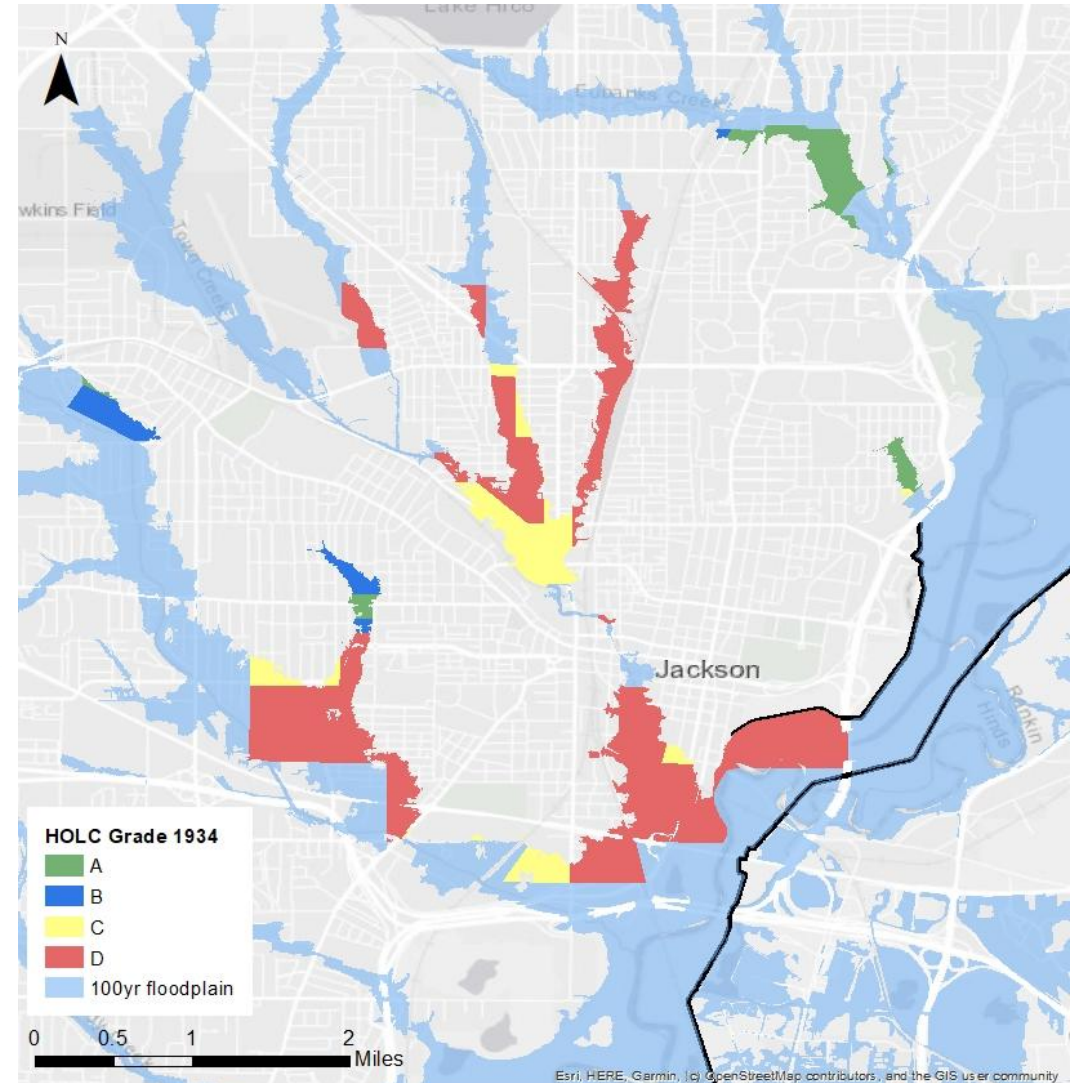
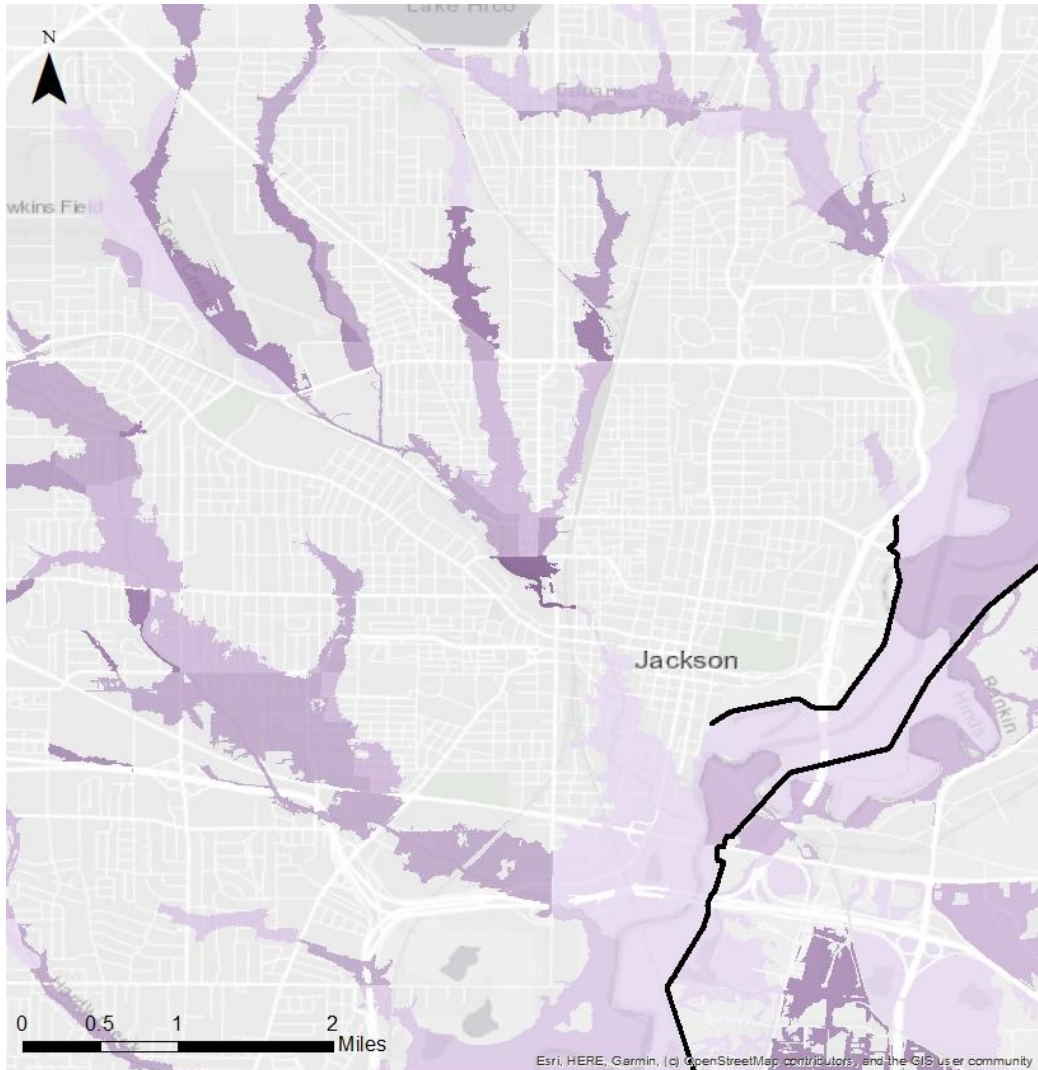
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Redlining and Flood Risk Distribution Today



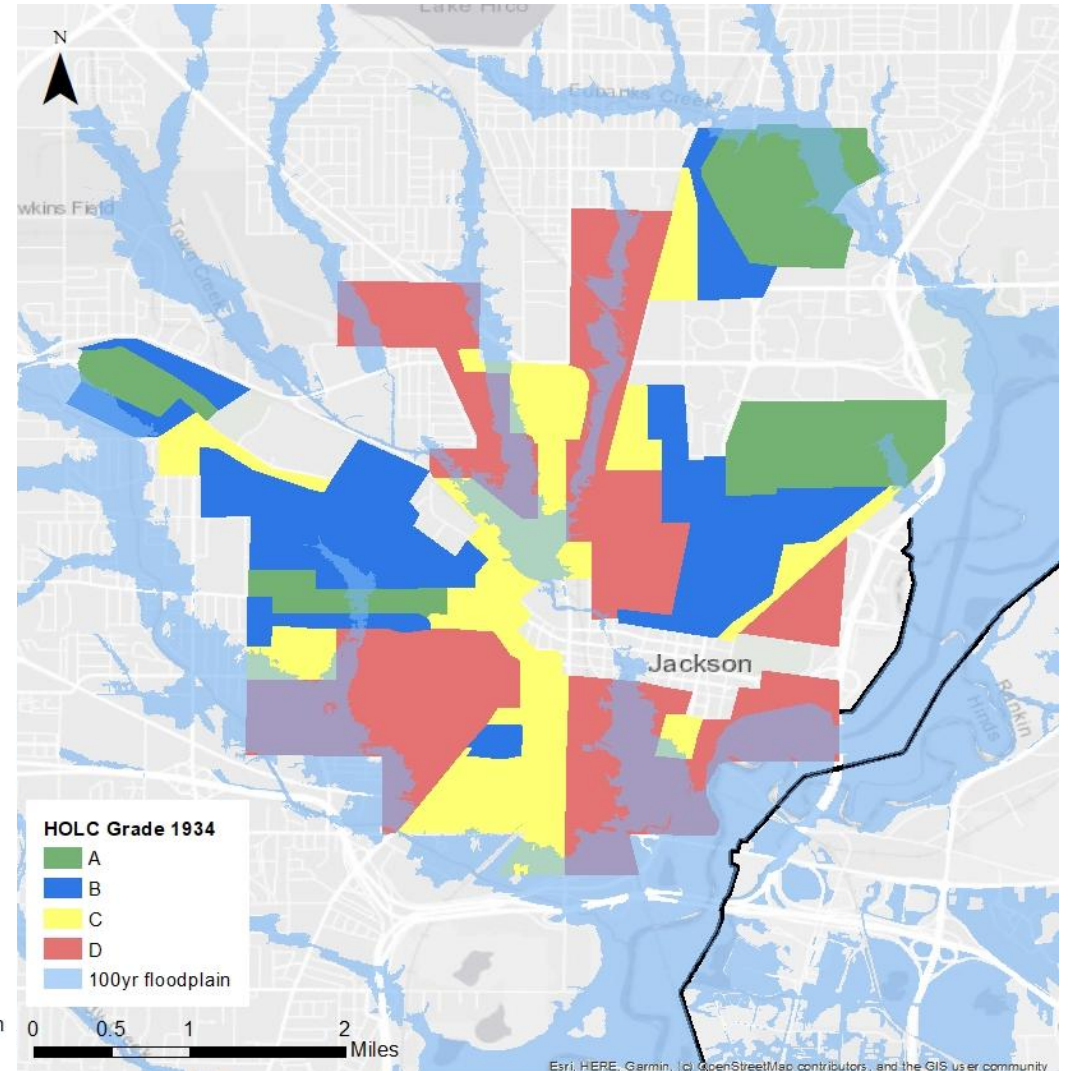
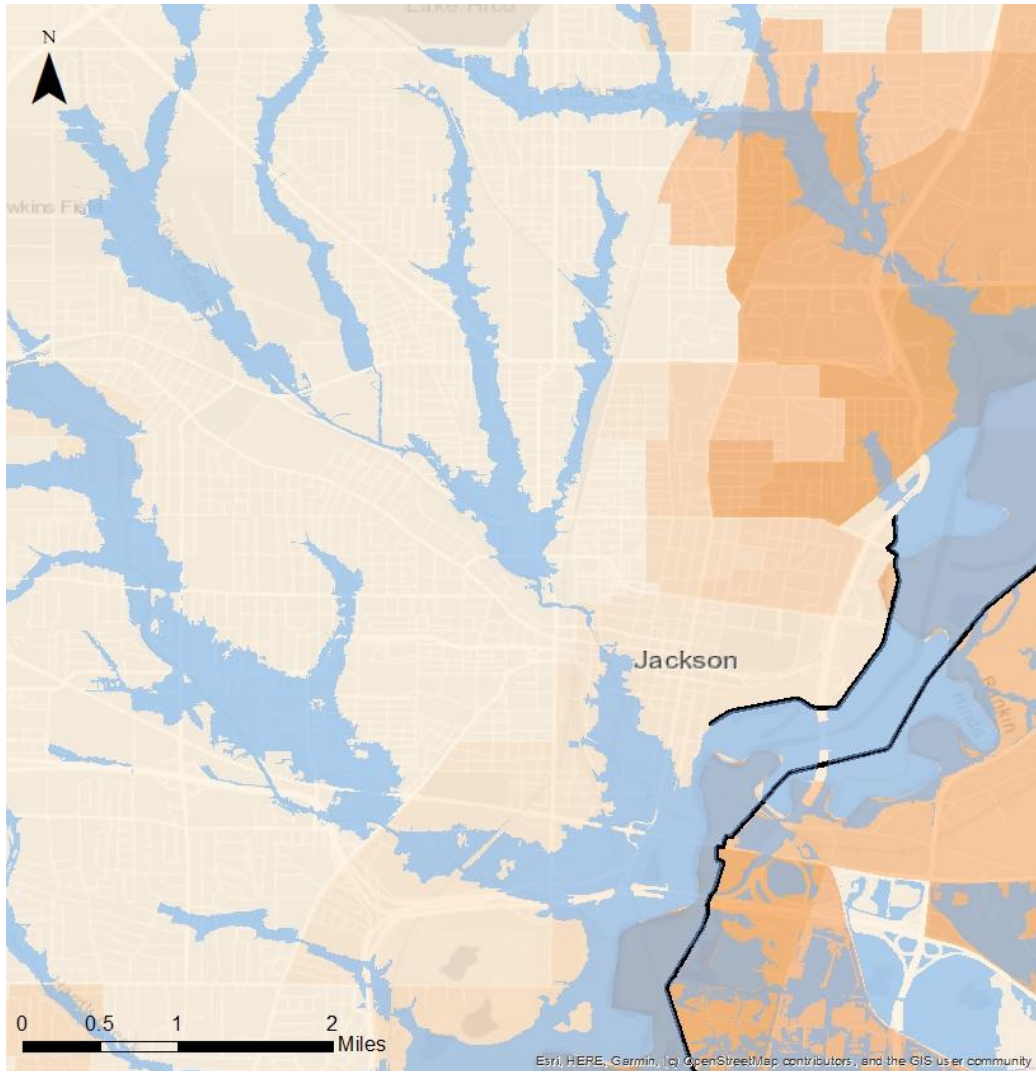
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Redlining and Flood Risk Distribution Today



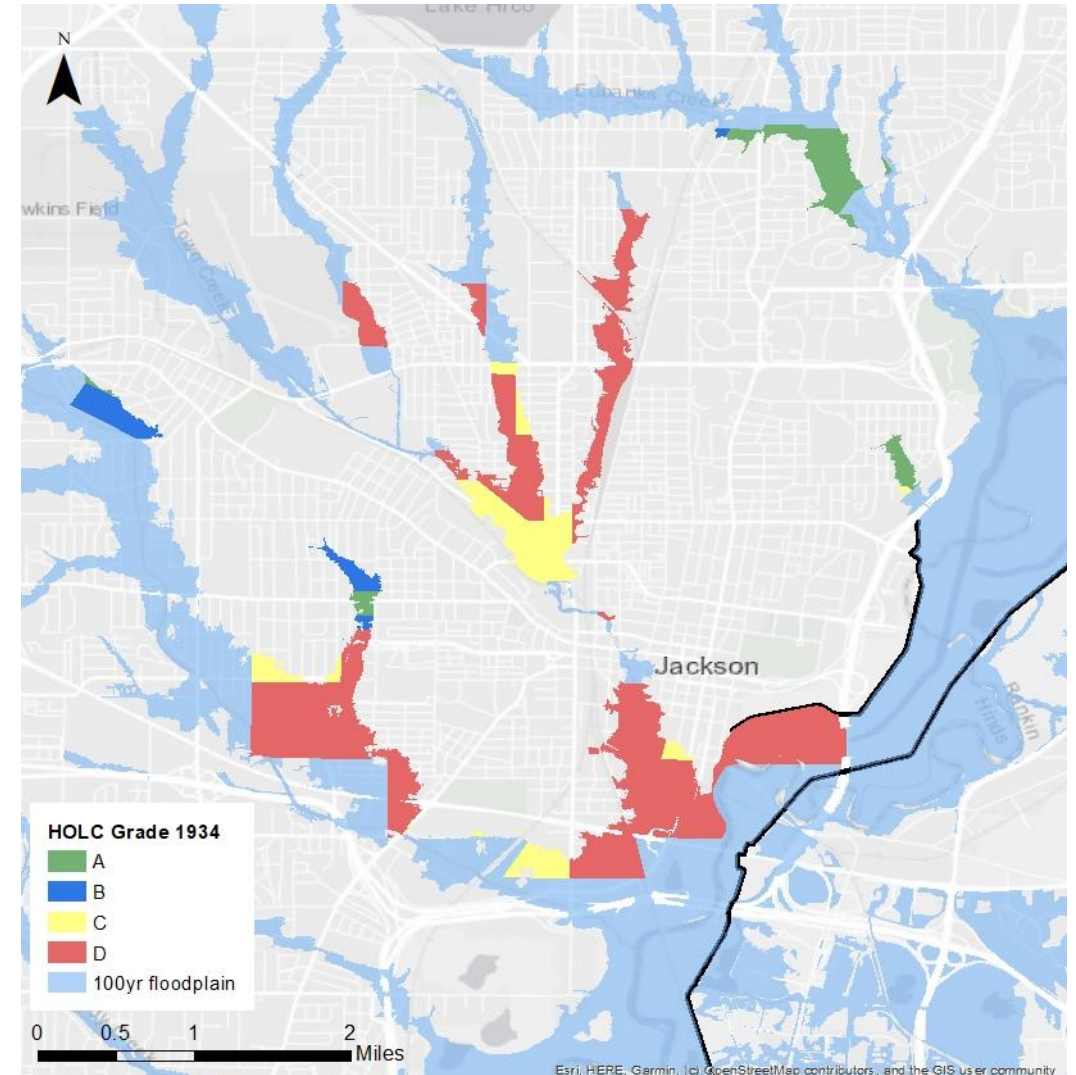
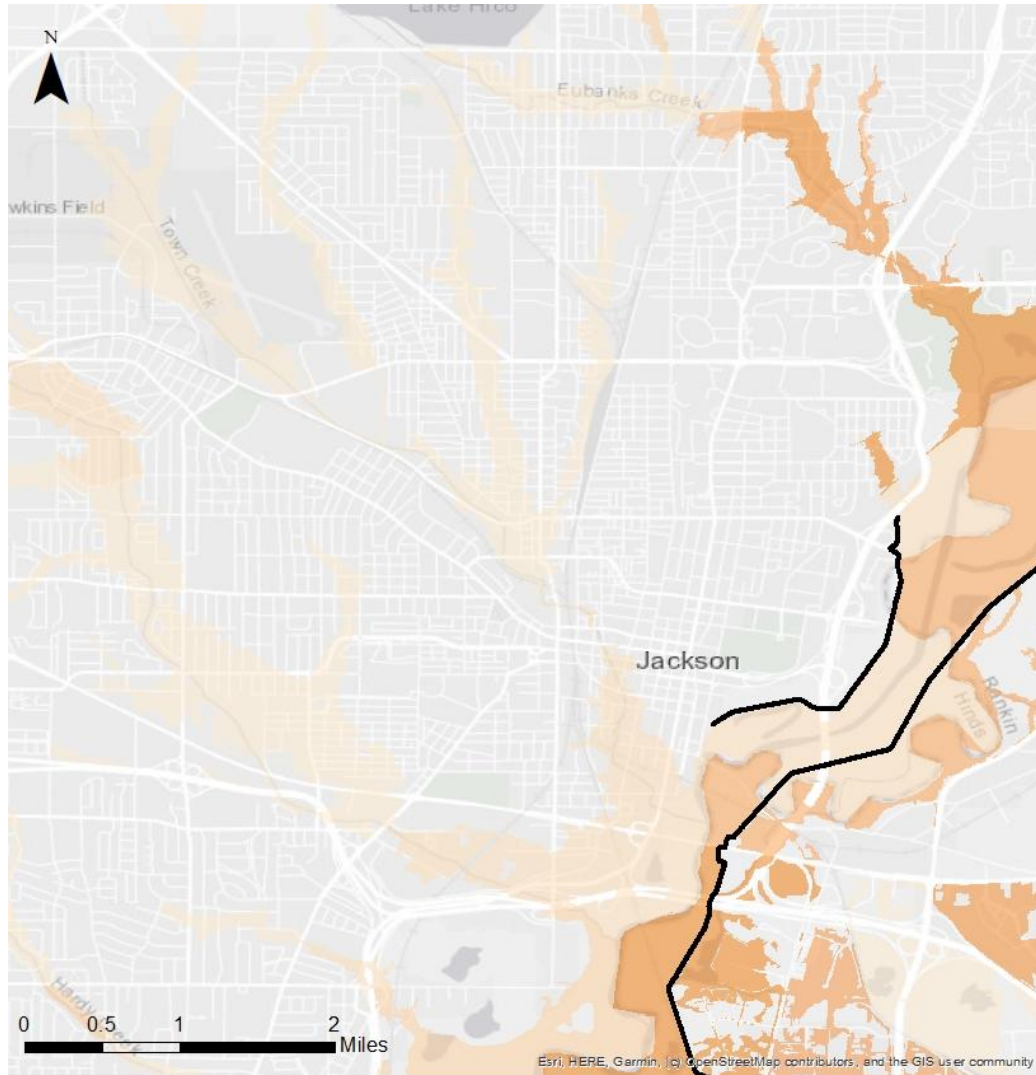
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Redlining and Flood Risk Distribution Today



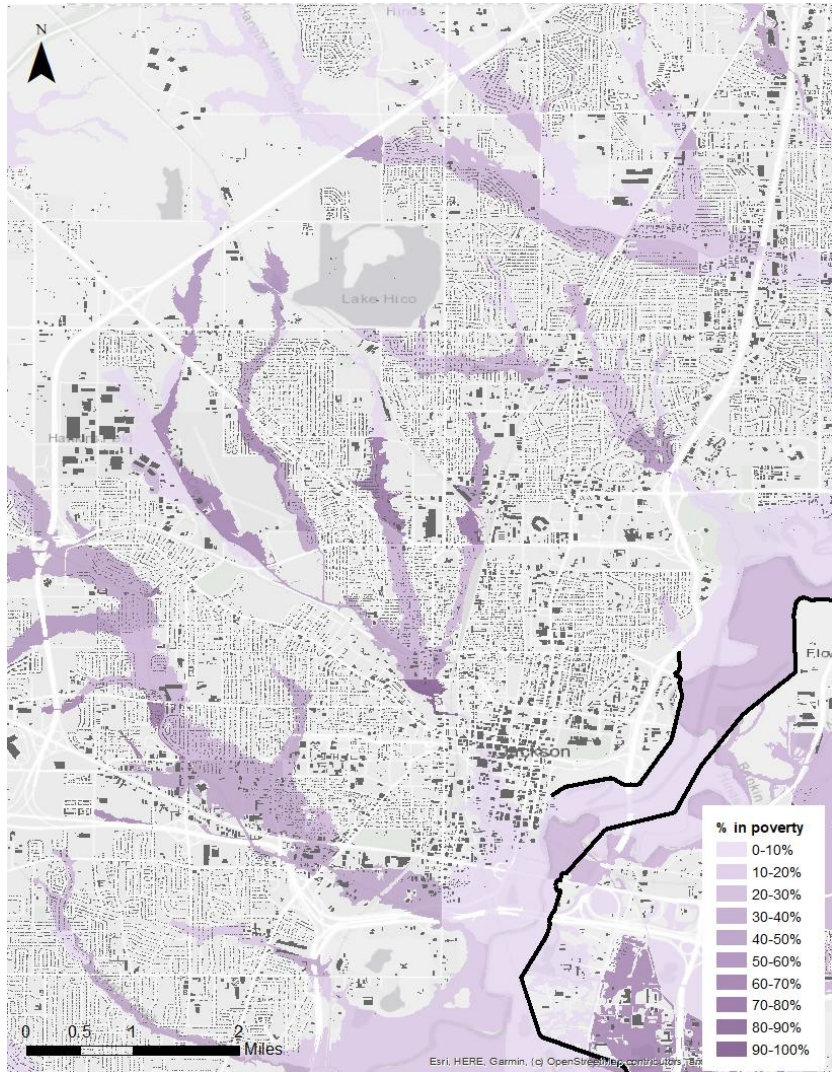
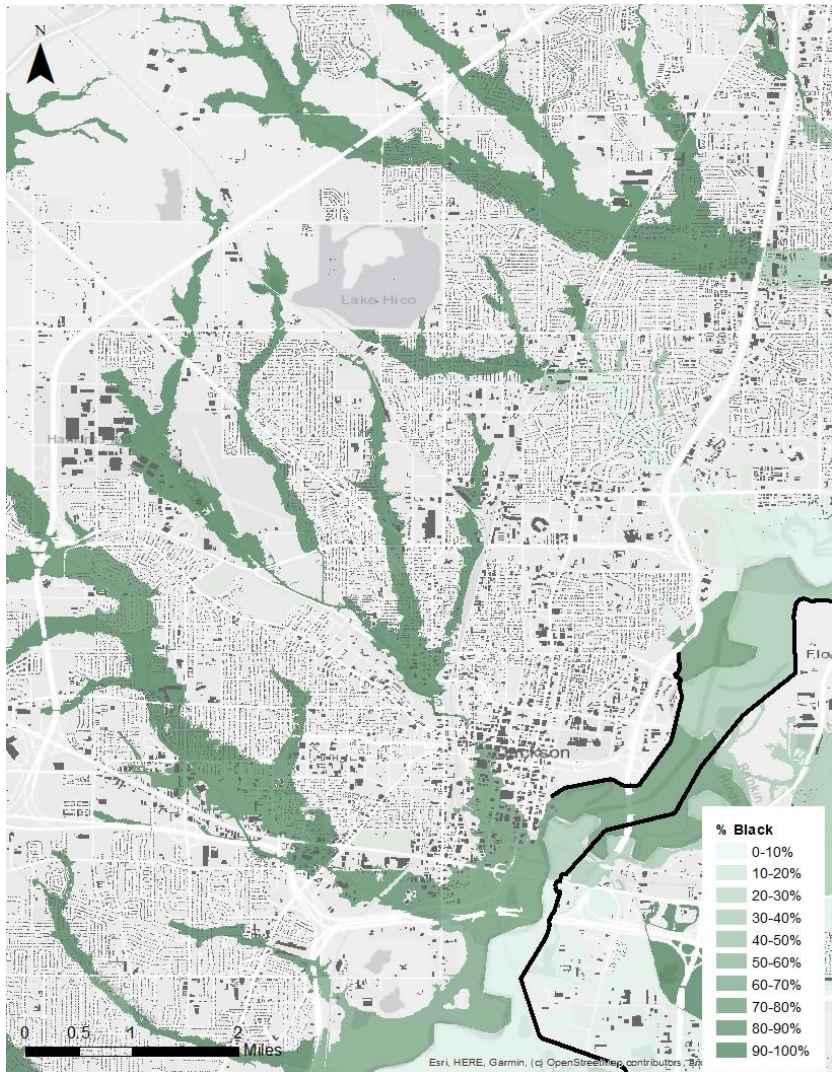
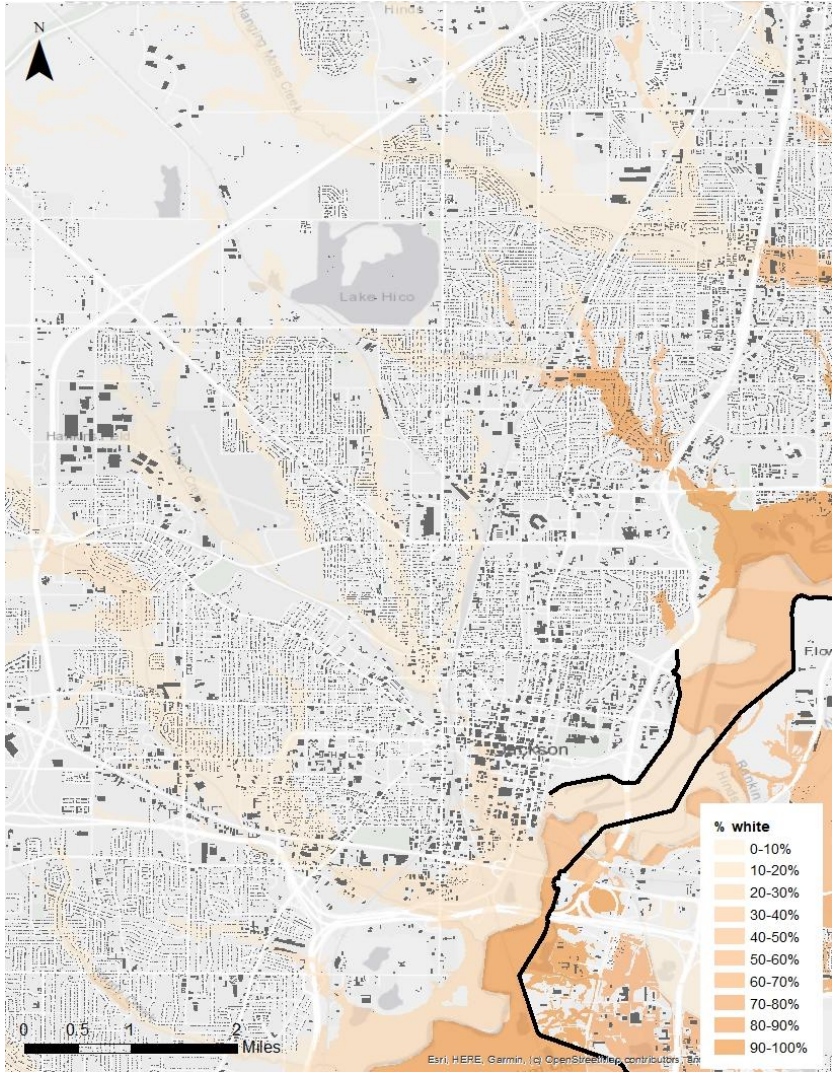
History

Distribution of Risk

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Mitigation

Exposure to 100-year floodplain in downtown Jackson



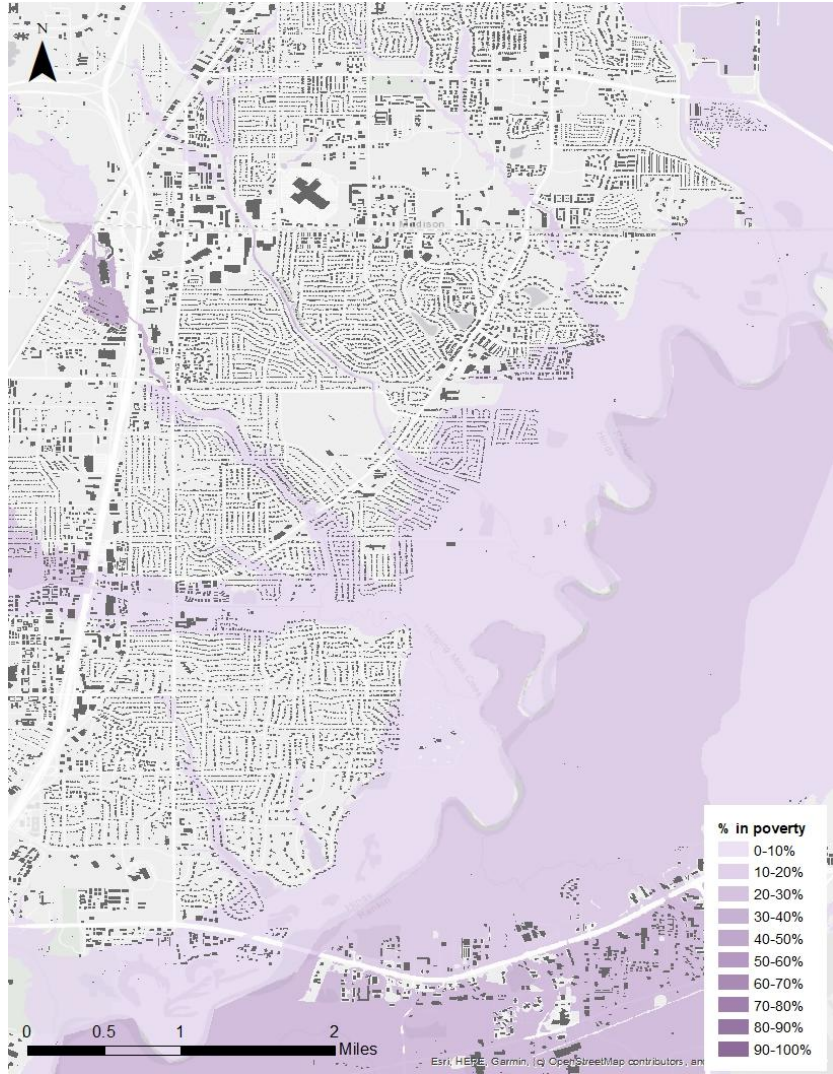
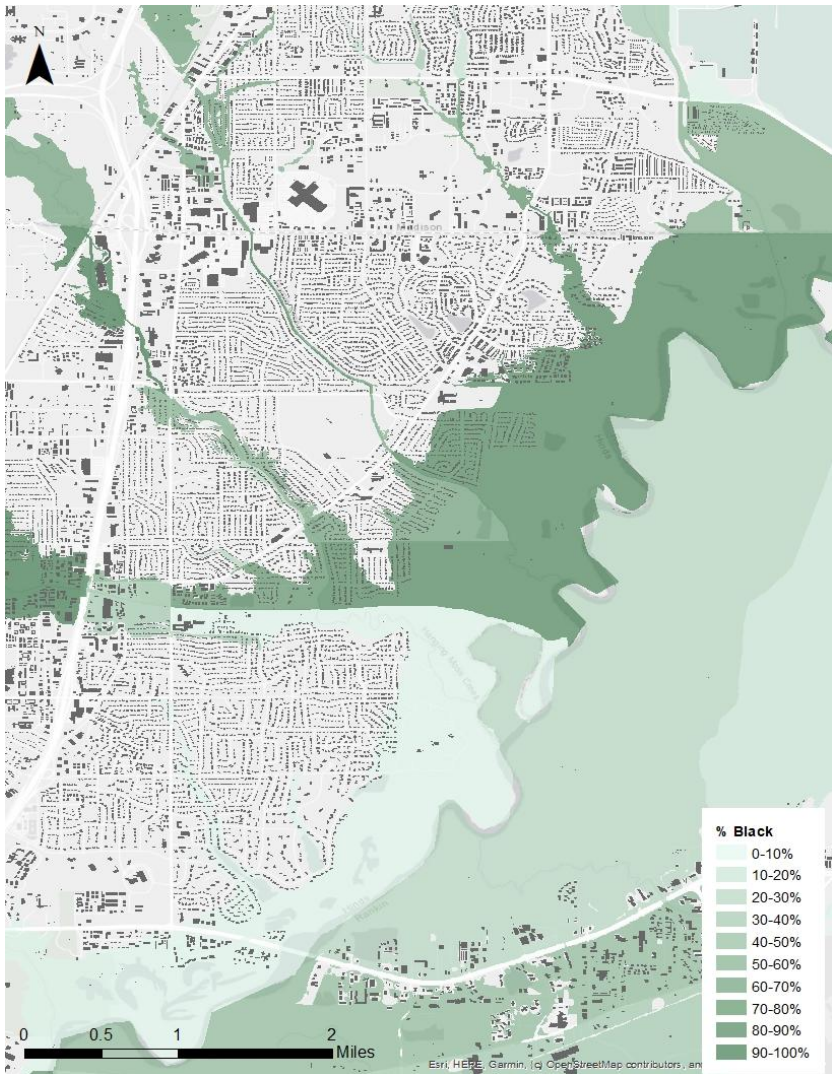
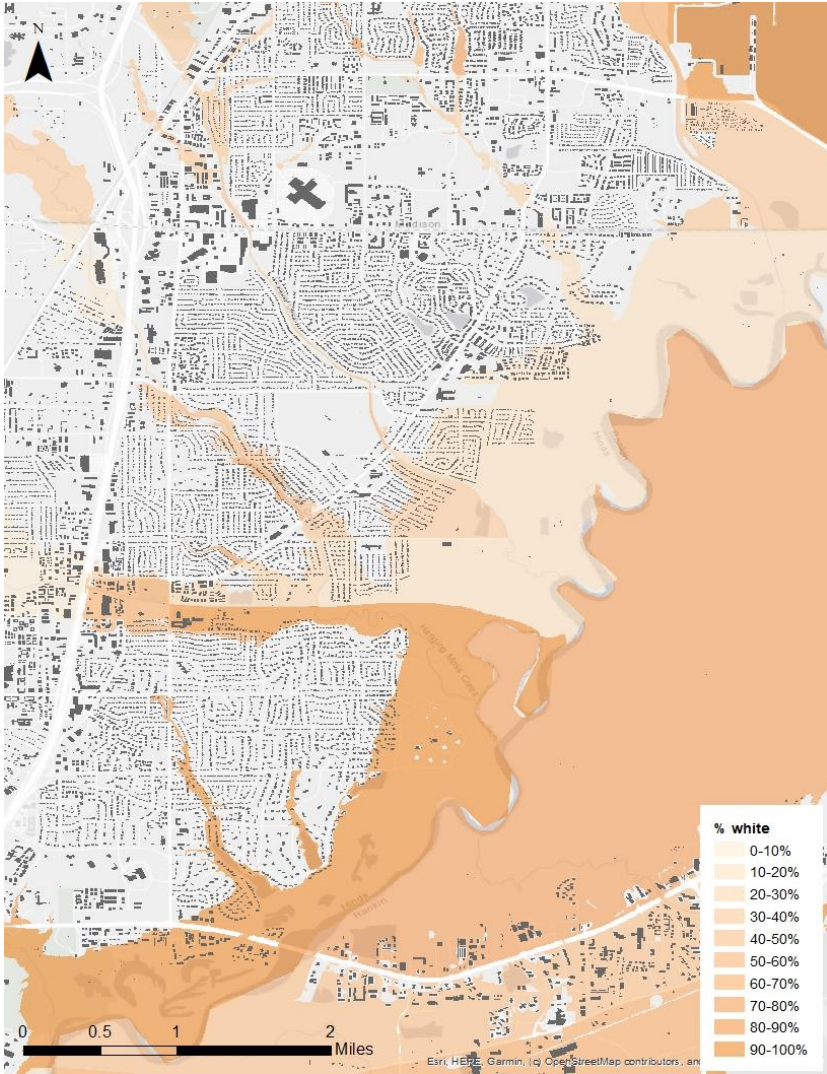
History

Distribution of Risk

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Exposure to 100-year floodplain in Northeast Jackson



History

Distribution of Risk

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Mitigation

Interview with Resident

- Bought property in an area he knew had a history of flooding because of a proposed flood management plan that was promised to stop flooding.
- The plan was never implemented, and his house floods regularly.
- He bought a canoe to go to the store, and help neighbors during flood events.
- He has experienced up to 7ft of flooding in his home.



History

Distribution of Risk

Interviews

Mitigation

Interview with Resident

- The resident was concerned about corruption and apathy on the part of local and state government to help with flood risk.
- the resident reports that flood Insurance has gone up from \$375/year in 2004 to \$2,700/year in 2022.
- Repeated flooding leads to high cost of repairs and hotel stays that many can't afford.



History

Distribution of Risk

Interviews

Mitigation

Interview with former Jackson Mayor: Harvey Johnson Jr.

Honorable Harvey Johnson Jr.

Terms: 1997-2005

2009-2013



Question: What barrier do you believe exist in updating the water supply system in Jackson?

“One of the challenges is poverty. Poverty provides a barrier to get the resources that are required to properly maintain the systems.”

History

Distribution of Risk

Interviews

Mitigation

Interview with former Jackson Mayor: Harvey Johnson Jr.

Infrastructure Risk

- **What critical infrastructure is at most risk to flooding?**

From recent events the water system and treatment plants are at risk because of the proximity to the water supply. One of our plants is on the pearl river and the other is close to the Ross R. Barnett Reservoir. The water from the Dam at the reservoir is discharged from the res to the pearl river. During periods of high rain episodes those facilities are at risk of flooding.

- **What barriers exist in updating the water system infrastructure in Jackson?**

Harvey wrote an article published by the ??? research center earlier this year. The challenges are Poverty- provides barriers to gain resources to maintain facilities. The population shift is also a challenge. People are moving out of Jackson due to crime. Jackson still must service the same area but with less people paying into the system. The decreased was from 200,000 people to 150,000 people. Another challenge is the intergovernmental policy in assisting with adequate and safe water, the federal government has funded mandates – i.e., safe drinking water act & clean drinking water act, that all local governments must comply with, but no grant resources are available. There are loan resources, but Jackson must compete for the resources. Some believe the State is not sharing resources equally or properly. The city of Byram use to be a part of the city of Jackson. This was brought on by the courts, the city was annexed by the supreme court in 97-98. Also, there is a 5 square mile area north of County Line Road that the Supreme Court Annexed, both areas being taken away took 10,000-12,000 people in the area. Access the article on at the Mississippi Urban Research Center @ JSU. Part of the Urban and Rural online Journal published in 2021-2022.

- **What opportunities exist for funding infrastructure updates, if any?**

The opportunity in the form of money come from the Federal Gov, comes in the form of the State revolving loan fund, where the federal government gives money to the state and the state allocates it to the counties. They also have the able to forgive loans to cities that are in poverty, such as Jackson, but hasn't. The city has taken out over 70 million in loans and only 1-2 million has been forgiven. A bill was passed to allow the city with ppl with high water bills, passed by the house and senate but vetoed by the current governor, Tate Reeves. "Jackson should get its residence to pay the water bill before asking anyone else to pony up." – Tate Reeves

History

Distribution of Risk

Interviews

Mitigation

Interview with former Jackson Mayor: Harvey Johnson Jr.

Human Risk

- **What communities are most at risk of flooding in Jackson?**

Communities that are half a mile to a mile on the Pearl River, Northeast Jackson, middle- and upper-income homes. Other communities that are on creeks are at risk as well, that are lower income. When the pearl river backs up, those creeks back up as well. When he was in offices they put stone, and concrete to make things flow easier. If these creeks can't empty into the pearl river, then there will be flooding in these areas. These areas are just south of downtown. Town Creek, the main tributary that flows into the pearl river. Dutyville area. Another area was state street and Meadowbrook.

- **What do you see as the biggest health and human impacts of flooding in Jackson?**

After the flood leaves, mold and other algins form. Rodents and other critters that run from the flooding flee flooding into human space. Certain diseases come as well. Untreated water can flood into the water system as well.

- **How do you see inequity influencing flood impacts and risk, if at all?**

"Unequal provision of municipal services is evident and is historic". Typically, less flood protection, smaller water lines, a lot of issues with wastewater- water lines broken- manholes that overflow. Communities in west Jackson near western plaza flood every time it rains just about, because of a creek right under western plaza.

- **Is housing supply at risk of flooding? Have you noticed displacement after flood events?**

Forced Displacement, when water comes in and people have to leave, and voluntary displacement to move somewhere that's not as flood prone. Building out in flood zones is an issue, and we keep building there and are paying the price. Federal Gov. gives grants for people to move out of flood zones.

History

Distribution of Risk

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Mitigation

Interview with former Jackson Mayor: Harvey Johnson Jr.

Mitigation and Response

- What mitigation and response measures have been effective in reducing impacts?

Channelization- clearing channels as mentioned earlier. The one lake project- creating a reservoir or lake downtown.

- How are decisions made about water diversion from the reservoir?

Decisions are made by 14 people on the board, 5 from the counties that border the res, (hinds county seat is vacant) and 9 others.

- What mitigation and response strategies do you wish could be implemented in Jackson but have not? What barriers exist to implementing them?

More strategy and coordination needs to be had between the board on the reservoir and communities that are affected.

History

Distribution of Risk

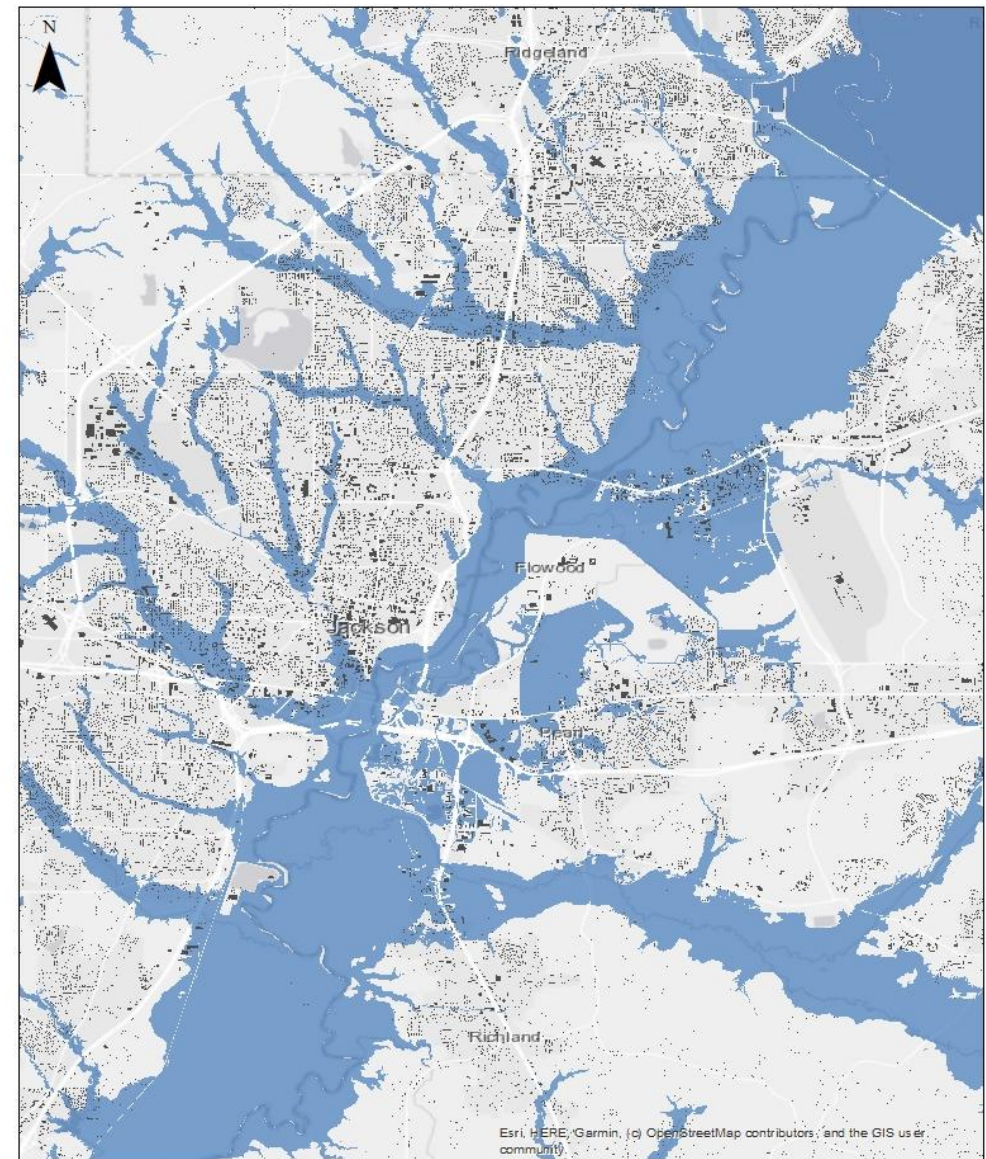
Interviews

Mitigation

Mitigation

The City of Jackson does not have a Local Hazard Mitigation Plan, or a plan focused on flood risk, mitigation, response, and recovery.

Plans that exist are regional and the City is not the major stakeholder or decision maker.



■ 100-year flood zone (FIRM: AE) 0 0.5 1 2 3 4 Miles
■ Building Footprint

History

Distribution of Risk

Interviews

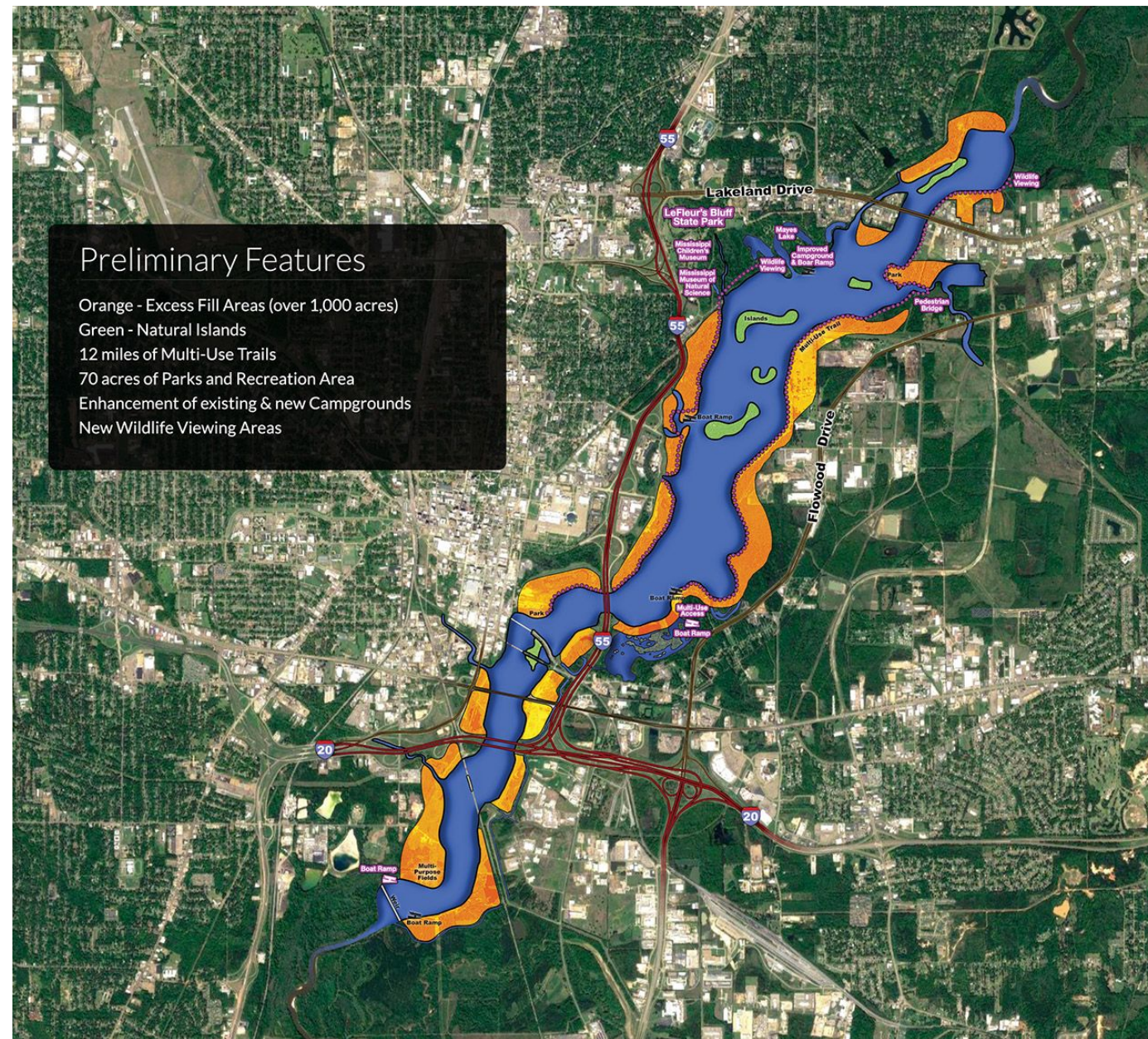
Mitigation

One Lake Project

A major flood control and economic development project that proposes the construction of a 1,500-acre lake on the Pearl River.

Widen the Pearl River along Jackson, as long as it meets environmental and other criteria.

The resurgence of the plan is in response to the 2020 Pearl River flood that damaged over 400 homes.



History

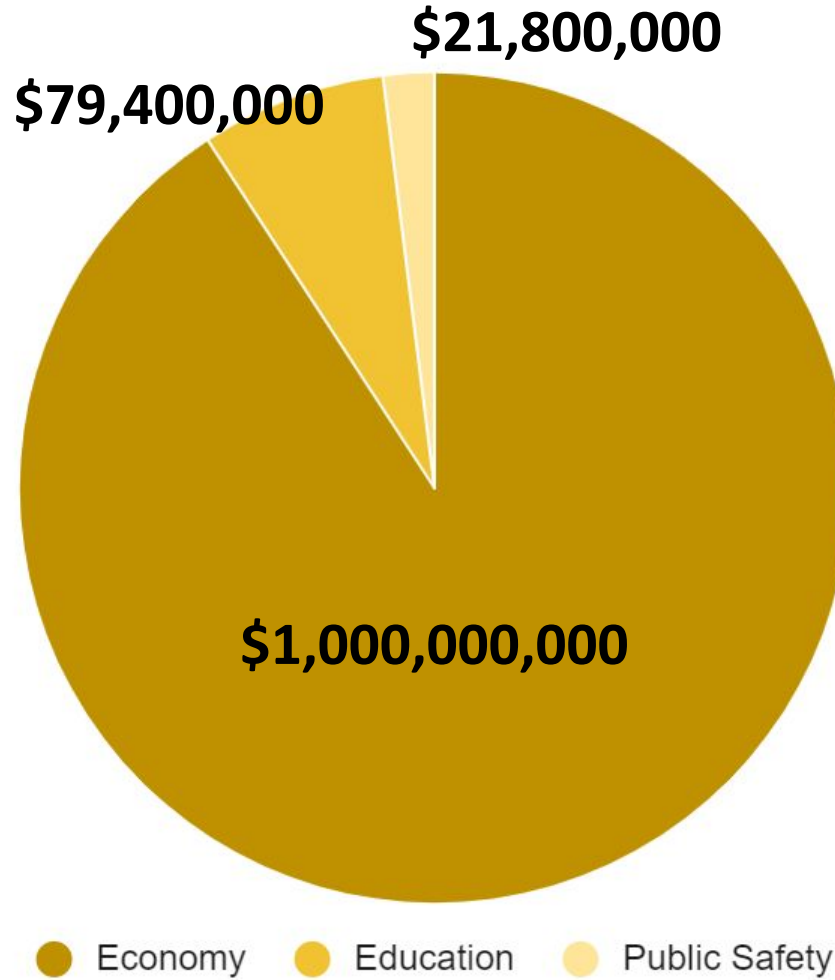
Distribution of Risk

Interviews

Mitigation

Mississippi State Funding Priorities

Little of the states funds go to maintaining infrastructure and reducing flood risk. Public Safety allocations are focused on policing.



There is little transparency in how state funds are allocated. More research is needed to investigate the inequity in allocation of money across the state.

History

Distribution of Risk

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American Rescue Plan Proposed Projects

- \$130 million to increase workforce training opportunities for in-demand career paths;
- \$200 million for broadband expansion efforts;
- **\$100 million towards implementation of a Water and Sewer Grant program;**
- \$50 million for downtown revitalization projects across the state;
- \$52 million over four years for additional tourism investment;
- \$300 million to upgrade the state's aging 911 infrastructure and implement Next Generation 911;
- \$200 million to refill the Unemployment Insurance (UI) Trust Fund to pre-pandemic levels; and
- \$200 million to strengthen the Mississippi State and School Employees' Life and Health Insurance Plan surplus.

History

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Legislation & Regulation

- **Water Resources Development Act of 1986** Authorization for construction of flood control for the Pearl River Basin is contained in Section 401(e)(3) of the Water Resources Development Act (WRDA) of 1986 (Public Law 99-662).
- **Water Resources Development Act of 2007** Section 3104 modifies the Pearl River Basin project authorization by section 4019(e)(3) of WRDA 1986 to authorize and construct the NED plan, the locally preferred plan (LLP) or some combination thereof, and non-federal interest may carry out the project under Section 211 WRDA 1996.

History

Distribution of Risk

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Mitigation

Alternative Mitigation Options

Reduce Exposure

- Stop new housing development in the floodplain
- Focus on creating new housing development in non-hazard areas

Reduce Housing Vulnerability

- Provide funding opportunities for residents to flood-proof existing housing

Make Room for Water

- Widen the Pearl River's active channel
- Install flood walls along creeks, paired with river restoration and river access projects as desired by community members
- Reduce the reservoir's normal operating water level

Future Work

Distributional Injustice

- Is there inequity in exposure to flood risk among different racial and income groups?
- Is there inequity in investment in flood mitigation features and resources?

Procedural Injustice

- Is there inequity in who is included in decision-making processes?
- Is there inequity in what individuals and communities gain access to aid?

Mitigation

- What are feasible ways to reduce risk of inundation and water backup in tributaries of the Pearl River?
- What funding pools can communities in Jackson access to reduce risk?

History

Distribution of Risk

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Mitigation

References

- Chakraborty, J., Collins, T. W., Montgomery, M. C., & Grineski, S. E. (2014). Social and Spatial Inequities in Exposure to Flood Risk in Miami, Florida. *Natural Hazards Review*, 15(3), 04014006. [https://doi.org/10.1061/\(ASCE\)NH.1527-6996.0000140](https://doi.org/10.1061/(ASCE)NH.1527-6996.0000140)
- Fishback, P., Rose, J., Snowden, K. A., & Storrs, T. (2022). New Evidence on Redlining by Federal Housing Programs in the 1930s. *Journal of Urban Economics*, 103462. <https://doi.org/10.1016/j.jue.2022.103462>
- Hutton, N. S., Tobin, G. A., & Montz, B. E. (2019). The levee effect revisited: Processes and policies enabling development in Yuba County, California. *Journal of Flood Risk Management*, 12(3), e12469. <https://doi.org/10.1111/jfr3.12469>
- Kondolf, G. M., & Pinto, P. J. (2017). The social connectivity of urban rivers. *Geomorphology*, 277, 182–196. <https://doi.org/10.1016/j.geomorph.2016.09.028>
- Lieberman-Cribbin, W., Gillezeau, C., Schwartz, R. M., & Taioli, E. (2021). Unequal social vulnerability to Hurricane Sandy flood exposure. *Journal of Exposure Science & Environmental Epidemiology*, 31(5), 804–809. <https://doi.org/10.1038/s41370-020-0230-6>
- Ludy, J., & Kondolf, G. M. (2012). Flood risk perception in lands “protected” by 100-year levees. *Natural Hazards*, 61(2), 829–842.
- Platt (1982) The Jackson Flood of 1979 A Public Policy Disaster, *Journal of the American Planning Association*, 48:2, 219-231, DOI: 10.1080/01944368208976542
- Marisco, R. (2017). The Harms of Race-Neutrality in Obama-Era Affordable Housing Policy. *Geo. JL & Mod. Critical Race Persp.*, 9.
- Zingraff-Hamed, A., Serra-Llobet, A., & Kondolf, G. M. (2022). The Social, Economic, and Ecological Drivers of Planning and Management of Urban River Parks. *Frontiers in Sustainable Cities*, 4, 907044. <https://doi.org/10.3389/frsc.2022.907044>