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SHIFTS IN POPULATION AND HOUSING AFFORDABILITY AFTER LOUISIANA'S 2016 FLOODS

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Abstract. *The floods of 2016 in Louisiana were catastrophic, causing widespread damage and displacement. This event was particularly troublesome because many of the areas affected were not classified as "high-risk" flood zones, which meant that most homeowners in those areas did not carry flood insurance. The proposed study examines housing affordability and the demographic and socioeconomic characteristics of populations impacted by disasters such as this one, offering valuable insights for local parishes regarding potential fluctuations in tax revenue and broader economic stability. By analyzing shifts in population trends and property value before and after the 2016 floods, the research aims to help policymakers and community planners better understand how recurrent flood events reshape local communities. A key priority of this study is to support the long-term sustainability and resilience of communities; therefore, a secondary goal is to identify areas that showed extreme changes in terms of people moving in or moving out. Recognizing these areas is essential for planning resilient infrastructure and ensuring the appropriate allocation of resources in future disasters.*

1 INTRODUCTION

As climate change intensifies, extreme weather events such as floods increasingly force people to relocate either temporarily or permanently[1]. Many researchers consider migration and displacement to be the most extreme adaptation strategies to climate change[2-8] although they are not preferable to survivors [9]. Other studies suggest that flooding acts as a catalyst rather than a sole cause of migration [10-12]. The scale of climate-related displacement reveals concerns concerning vulnerability trends. The recent Household Pulse Survey data indicates that about 1.1% of U.S. households have been displaced by natural disasters since 2021 [3], and approximately 1% of internal migrants between 1999 and 2018 cited climate change or natural disasters as their primary reason for relocating[13].

These population shifts create significant socioeconomic challenges. Large-scale migration puts pressure on urban infrastructure as destination cities struggle to accommodate additional residents, often leading to negative environmental impacts [14]. The decision to migrate or displacement due to extreme weather events is influenced by complex factors, including personal and family characteristics such as age, sex, education level, wealth, marital status, and preferences. Also, financial vulnerability, loss of physical services, security concerns, and unavailability of food are other major causes of migration [15-18]. Various barriers also affect these decisions, including moving costs and legal or administrative obstacles[19]. However, there is a notable gap in research examining how demographic factors, particularly race and ethnicity, influence migration patterns and housing affordability following natural disasters. This study addresses this gap by analyzing population movements across different racial and ethnic groups in response to the August 2016 Louisiana Floods, a catastrophic event that caused $13.3 billion in damage and claimed at least 13 lives [20].

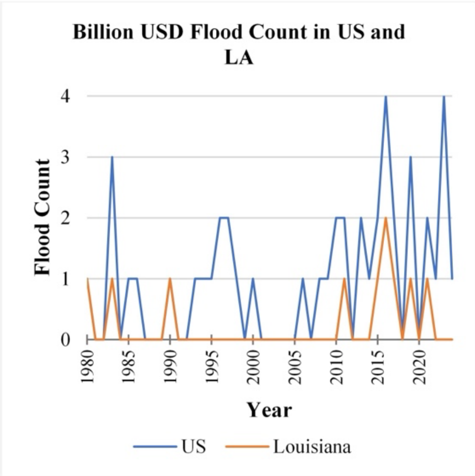
The August 2016 Louisiana Flood has been the exclusive subject of several studies. Multiple studies have been conducted focused the impact on roadway [21-23], private well [24], flood modeling [25], agricultural flood mapping [26], temporal accessibility on urban road network [27], health system [28], economic benefit flood related policy along with the changes the policy after the flood happened [29, 30], the probable frequency of the event [31], and how climate change has increased the likelihood and intensity of extreme weather related events in the US Gulf Coast [32-34]. Although studies on the analysis of social vulnerability in relation to the August 2016 Louisiana Flood have been done [35, 36], no attention has been given to the consequences of such disasters, such as population migration and housing affordability. Specifically, this research examines (a) the extent of population changes across racial and ethnic groups following the 2016 flood; (b) changes in household income that occurred in conjunction with population shifts; and (c) changes in property values from 2016 to 2017 that is associated with the housing affordability of different racial groups. By addressing these research questions through the analysis of available secondary data, this study provides empirical evidence to policymakers regarding the differential vulnerabilities and resilience capacities across demographic groups, contributing to strategies for reducing disaster risk and promoting equitable recovery following extreme weather events.

2 STUDY AREA: LOUISIANA

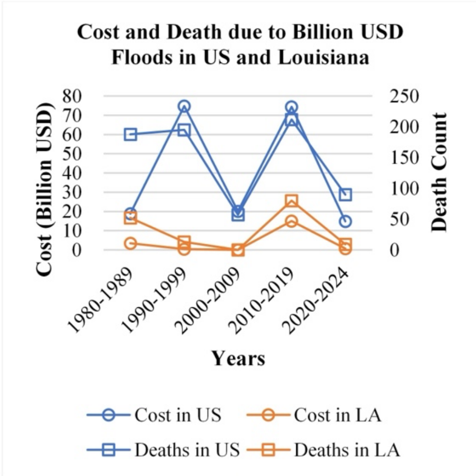
2.1 Floods in Louisiana

The state of Louisiana is one of the most flood-prone states in the US. Flooding is occurring more frequently and causing more damage in Louisiana. Louisiana is naturally susceptible to both riverine and coastal flooding because it is positioned at the mouth of the Mississippi River, one of the world's major river systems, and is bordered by extensive wetlands and the Gulf of Mexico.

Figure 1 show the historical billion USD flood count and their aftermath. The total cost of damage reported since 1980 is $203.0 billion in the US, including $20.0B-$50.0B in Louisiana[20], and Louisiana accounted for approximately 21% of the national death toll with 154 fatalities, experiencing 22% of the total flood events although comprising only about 1.35% of the nation's population.



(a)



(b)

Figure 1: Billion USD flood-related financial losses in the United States and Louisiana. (a) depicts the frequency of flooding, whereas (b) delineates the financial impact and fatalities resulting from the floods.

2.2 Racial and Ethnic Composition of Population in 2016

Louisiana's population is predominantly comprised of non-Hispanic or Latino White and non-Hispanic or Latino Black or African American populations. In 2016, Non-Hispanic or Latino White individuals made up most of Louisiana's population, accounting for 58.84% of the total population (2,754,601), and the second-largest group was Black or African Americans (non-Hispanic or Latino), making up 32.10% (1,502,898 people). All other non-Hispanic or Latino groups make up a small proportion of the total population. On the other hand, Hispanic or Latino residents, regardless of race, formed a smaller segment, 4.94% of the population (231,168 people), and 63.54% of the population of that group are White, followed by 26.19% of the population of Some Other Race[37] .

2.3 Racial and Ethnic Distribution of Household Income

The household income data shows that throughout the years (2005–2019), White (non-Hispanic or Latino) households had the highest median income in most of the years, and in some years, Asian households maintained the highest. In contrast, Black or African American households experienced the lowest median income levels, approximately 40–50% lower than White households. The Hispanic or Latino population maintained a middle position, with income fluctuating more than the other groups. Figure 2 illustrates the median household income from 2005 to 2019 by race in Louisiana.

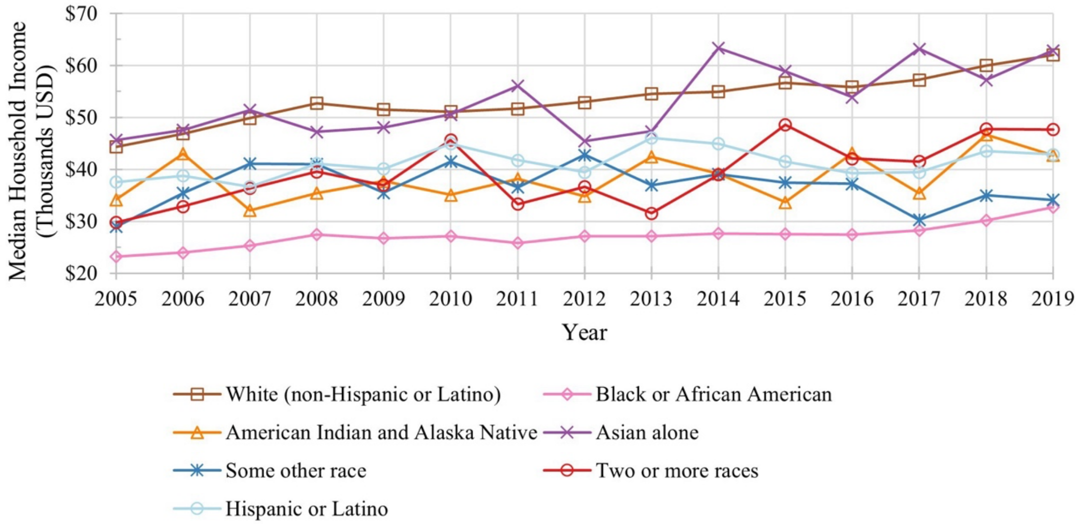


Figure 2: Median household income by race and ethnicity in Louisiana

3 METHODOLOGY

3.1 Data Source

We used 1-year pooled population data and their characteristics from the American Community Survey's (ACS) 1-year Supplement Estimate. The Census Bureau publishes the ACS 1-Year Estimate each year, which provides single-year estimate data but is available only for the geographic areas with a population of at least 65,000. In addition, the Census Bureau has been publishing a simplified version and subset of the ACS 1-year estimate, called the ACS 1-year Supplement Estimate, in each year since 2014 for geographic areas with a population of 20,000 or more. Although the ACS 1-year estimate is more descriptive and provides a lot of information about the population and their characteristics, we had to use the ACS 1-year Supplement Estimate because most of the parishes in Louisiana had less than 65,000 people in those years. It is worth noting that ACS 1-year Supplement Estimate data is also not available for all parishes because of its ceiling of the minimum population number 20,000. For instance, the dataset has population data for Hispanic or Latino origin based on 46 parishes in 2017 [38] and for the racial category (White, Black, or African American, etc.) for only 26 parishes in 2017 [39]. Therefore, we have limited our study area in Louisiana to parishes with a population of 20,000 or more.

3.2 Parish Category

The parishes were categorized into 5 groups: (1) 12 Major Federal Disaster (12 MFD) parishes, (2) Other Federal Disaster parishes (21 Federal Disaster -21 FD- parishes excluding the 12 MFD), (3) adjacent parishes of the 21 FD areas, (4) Non-Flooded parishes- areas where no flooding occurred and FEMA paid no flood claims, assumed to be completely unaffected, and (5) Other parishes- excludes the adjacent parishes of the 21 FD areas but includes parishes where small flooding occurred and FEMA paid claims, see Figure 3.

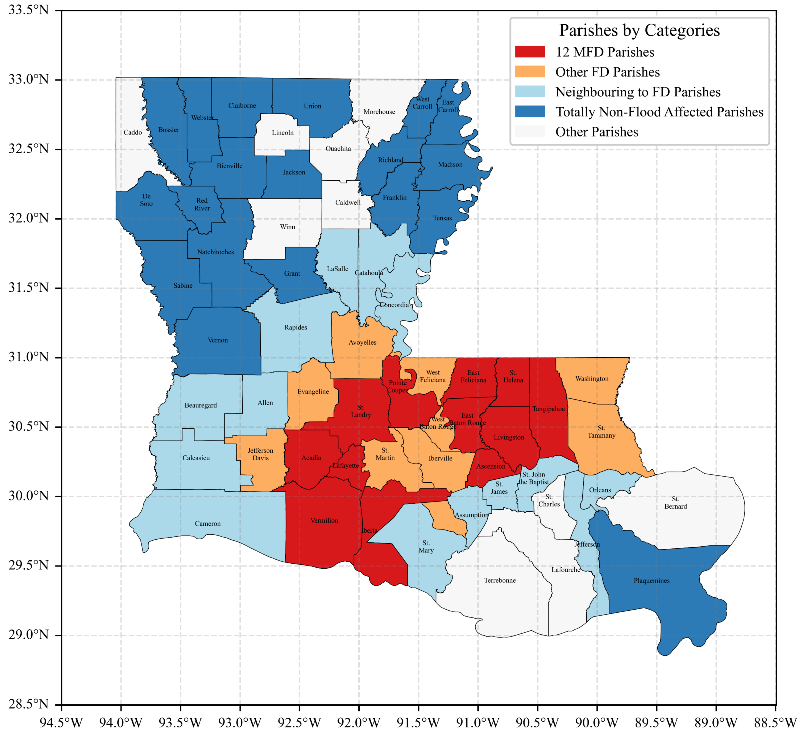


Figure 3: Louisiana parishes by categories

3.3 Targeted Race and Ethnicity

This study examines migration and socioeconomic changes among three groups: White residents, Black or African American residents, and a combined "Minority" category, which includes all other racial groups. Due to small sample sizes (each less than 2% of the state's population), individual minority groups were combined to allow meaningful statistical analysis. Hispanic or Latino individuals, who make up about 5% of Louisiana’s population, are analyzed separately, given their size and the potential for distinct migration patterns following disasters.

3.4 Data Analysis

We analyzed the change in population number over time up to 2017 for each racial group in every parish depending on the availability of ACS 1-year Supplement Estimate Data [39-42]. The population percentage change for the current year is calculated as it follows:

$$Population\ \%\ change = \frac{P_i - P_{i-1}}{P_{i-1}} \times 100 \quad (1)$$

where P_i is the current-year population estimate for a specific racial group and P_{i-1} is the earlier-year population estimate.

First, we calculated the percentage change in population for each targeted racial group for the year immediately following the flood, 2017. We determined the summary statistics, see Table 1, of the percentage change in population for the previously determined parish categories mentioned beforehand, which we calculated using Equation (1) for each racial group.

Then, similar to the population change analysis for different parish categories, we determined the percentage change for the median household income. The difference here is that the analysis the whole population, regardless of the racial and ethnical distribution, as the ACS 1-year Supplement Estimate data has only the median household income data set for the total population [43, 44]. The percentage change in median household income is calculated as follows:

$$\% \, change \, in \, Median \, Household \, Income = \frac{I_j - I_{j-1}}{I_{j-1}} \times 100 \tag{2}$$

where I_j is the current year median household income and I_{j-1} is the earlier year median household income.

Both the inundated and neighboring parishes are expected to experience changes in the property values due to the flood. Property encompasses a broad spectrum of categories, including real property elements such as land, buildings, access roads, electrical systems, plumbing, and HVAC, as well as personal property components like appliances, furniture, and vehicles. We lack data regarding the valuation of each property type. The ACS 1-year Supplement Estimate exclusively provides the number of housing properties with values [45, 46]. Therefore, we computed the variation in the number of houses for each housing value range. The percentage change in the number of houses within a specific housing value range is computed using the following formula:

$$\% \, change \, in \, number \, of \, house = \frac{N_k - N_{k-1}}{N_{k-1}} \times 100 \tag{3}$$

where N_k represents the number of houses in the current year, and N_{k-1} represents the number of houses in the previous year within the same value range.

The total number of houses in 2016 and 2017 along with the median value of the percentage change in house number are presented in Table 3.

4 RESULTS

4.1 Change in Population

The results presented in Table 1 reveals opposing trends in population movement among White and Black or African American. While white population generally declines or remained stable, Black or African American and especially Hispanic or Latino populations showed widespread growth, with the latter experiencing the most significant increases.

In the FD parishes, trends show either sharp increase for the Hispanic or Latino population and Black or African American population or slight increase for the White population. Unfortunately, overall, the White and Black or African American populations have a very small number of population data available (18 parishes each), while the Hispanic or Latino population has a relatively higher amount of data available (40 parishes).

In the flood-affected areas, the demographic trends of the White population contrasted with other population groups. The White population declined by 0.537% in the 21 FD parishes and more in the 12 MFD parishes. Conversely, the Black or African American and Hispanic or Latino populations in the 21 FD increased by 3.812% and 5.913% respectively, which are more pronounced than in the 12 MFD parishes.

Interestingly, in the neighboring parishes to the 21 FD, the white population slightly increased by 0.217% while the Black or African American population slightly decrease by 0.551%. The increase in the Hispanic or Latino population by 3.871% in this parish group is consistent to the overall increasing rate for the group in the state.

It is also noteworthy that the increasing rate of the Black or African American population and Hispanic or Latino population is lowest in the non-flooded parishes.

Table 1: Median population % change / IQR of population % change in 2017 by parish group

	Total Population	White	Black or African American	Minorities (All races other than White)	Hispanic or Latino
12 MFD Parishes	-0.101	0.636	3.466	0.569	5.246
	0.869	0.514	2.92	3.28	52.362
21 FD Parishes	0.254	0.537	3.812	2.147	5.913
	0.804	0.723	2.949	3.838	30.716
Neighbor to 21 Parishes	-0.271	0.217	-0.551	0.297	3.871
	0.896	2.019	2.669	2.81	17.496
Non-Flooded Parishes	0.171	0.463	1.996	3.895	2.158
	0.975	0.102	2.636	2.798	45.928
All Parishes	-0.003	0.421	0.772	0.795	3.883
	0.938	1.631	4.91	3.915	24.225

4.2 Change in Median Income

Table 2 representspresents the summary statistics of the percentage change in median household income for all populations across parish groups. The percentage change value here is also skewed. The skewness values indicate a distribution with an asymmetrical tail extending towards a more positive value. So, like the population data, here the median and IQR are also robust compared to the mean and standard deviation.

Table 2: Summary statistics for % change in median household income by parish group

	12 MFD Declared Parishes	21 FD Declared Parishes	Neighboring to 21 FD Declared Parishes	Non-Flooded Parishes	All Parishes
	12	21	14	21	64
N	10	18	11	15	48
mean	5.48	5.84	5.77	-0.4	3.06
std	12.02	14.03	11.47	17.84	14.28
min	-7.86	-12.05	-7.84	-26.51	-26.51
25%	-5.59	-5.67	-2.67	-12.06	-5.76
median	5.78	4.43	3.66	-4	-0.7
75%	10.21	14.42	12.28	7.36	10.73
max	27.81	39.46	31.72	37.31	39.46
skewness	0.62	0.83	1.09	0.8	0.72
IQR	15.80	20.09	14.95	19.42	16.49

Here, considering all parishes, the median income has slightly decreased (0.70%). However, the median household income has significantly increased by 4.43% in the 21 FD parishes, and it is significantly higher in the 12 FD (5.78%). The median household income also increased in the areas neighboring the federal disaster-declared areas. Interestingly, the median income has decreased by 4.00% in the non-flooded area. The range of changes is large in all categories, particularly in FD-declared parishes, which saw a maximum increase of 39.46%. The interquartile range (IQR) indicates considerable disparity within each category, notably in the 21 FD declared parishes with an IQR of 20.09%.

4.3 Impact on Housing Value

The analysis presented in Table 3, indicates that flooding and disaster declarations have mixed impacts on housing numbers across different price ranges.

Table 3: Total number of houses in 2016 / 2017 / Median value of % change in houses number by parish group

	Any	Less than $50,000	$50,000 to $99,999	$100,000 to $149,999	$150,000 to $199,999	$200,000 to $299,999	$300,000 to $499,999	$500,000 to $999,999	$1,000,000 or more
12 Major FD Declared Parishes	382,908	36,380	48,742	60,469	80,658	88,149	48,805	15,373	4,332
	391,736	36,866	48,769	57,941	79,242	98,118	49,861	17,863	3,076
	3.99	3.58	1.4	11.17	-7.83	14.12	0.95	17.26	-51.01
21 FD Declared Parishes	471,934	53,903	71,266	77,361	93,363	99,606	54,659	17,147	4,629
	483,776	52,741	73,862	75,170	91,407	112,263	55,742	19,117	3,474
	2.53	-14.27	8.29	-5.41	-15.62	21.42	-3.07	-2.59	-45.26
Neighboring to 21 FD Declared Parishes	312,303	26,920	43,347	64,879	57,709	63,852	35,610	16,159	3,827
	324,999	24,821	45,484	58,016	64,688	67,319	42,824	17,127	4,720
	4.75	-6.63	-2.75	-15.15	28.93	6.89	2.33	16.91	25.29
Non-Flooded Parishes	106,713	18,827	24,298	17,600	15,955	19,714	8,012	1,758	549
	106,378	19,711	22,150	16,554	17,552	18,699	9,117	2,055	540
	-0.19	0.18	-16.64	-3.12	-1.68	-7.77	69.29	-39.11	-53.07
All Parishes	1,058,862	121,806	170,545	187,356	202,562	211,305	114,720	40,286	10,282
	1,087,223	118,660	171,775	182,683	207,522	230,414	123,298	42,678	10,193
	2.68	-6.89	-1.66	0.71	3.00	10.06	5.62	-3.3	-20.18

In the 21 FD parishes, lower-value housing ($50,000–$149,999) showed an increase specifically in the $50,000–$99,999 range (+8.29%), but experienced declines in other lower-value brackets. In contrast, non-flooded parishes saw a significant decline in the $50,000–$99,999 range (-16.64%). Mid-value housing ($150,000–$299,999) demonstrated strong growth in the 21 FD parishes (+21.42%), particularly in the $150,000–$199,999 segment (+28.93%), while non-flooded areas recorded a decline (-7.77%). High-value housing ($300,000–$999,999) experienced slight declines in the 21 FD parishes, but the $500,000–$999,999 range grew sharply in the 12 major FD parishes (+17.26%) and in neighboring parishes (+16.91%). Highest-end housing ($1,000,000 and above) exhibited dramatic decreases in the 12 MFD and 21 FD parishes (-51.01% and -45.26%, respectively), while neighboring parishes showed a notable increase (+25.29%) in this category. These patterns suggest that flood impacts contributed to shifts in the housing market, with stronger growth in mid-value homes and sharp declines in luxury properties within flood-affected areas.

4.4 Demographic Shifts with Income Changes and Housing Market Transformation

Population and income analyses reveal striking similarities. In heavily damaged parishes, White population declines coincided with the largest income growth (+4.43%).

Table 4: Relationship the change in population with the change in median household income

	White Population Change	Black or African American population Change	Hispanic or Latino population Change	Overall Median Income Change
21 FD parishes	Increase in 12%, decrease in 50%, and no change in 38% parishes	Increase in 88%, and no change in 12% parishes	Increase in 88%, and decrease in 12% parishes	+4.43 % (median)
Non FD parishes	Equal split	Equal split	Increase in 75%, and decrease in 25% parishes	-4.00% (median)

Remaining households in disaster-declared parishes likely benefited from recovery funding and rebuilding jobs. Minority populations (Black and Hispanic) grew significantly (88% of parishes), aligning with rising median incomes.

Table 5: Change in housing value categories

	Total Housing Change	\$50K-\$150K Range	\$200K-\$300K Range	\$1M+ Range
12 Major FD	+3.99%	Mixed/Declining	+14.12%	-51.01%
21 FD	+2.53%	Mixed/Declining	+21.42%	-45.26%
Neighboring	+4.75%	Declining	+6.89%	+25.29%
Non-Flooded	-0.19%	Declining	-7.77%	-53.07%

In contrast, non-FD parishes exhibited the weakest demographic and economic performance across all metrics, with minimal population growth and a decline in median income (-4.00%), as shown in Table 4. This suggests that economic activity and resources were diverted toward flood-affected areas during recovery efforts. The significant growth in mid-value housing (\$200K–\$300K) within flood-affected parishes, shown in Table 5, coincides with increases in Black or African American and Hispanic or Latino populations. This pattern likely reflects the replacement of damaged lower-value homes with newer, more expensive housing, making ownership accessible to upwardly mobile minority households benefiting from post-disaster economic opportunities. However, while flooding caused sharp declines in the number of \$1M+ properties (-45% to -51%) in disaster-declared areas, it also likely reduced overall property values temporarily, increasing affordability for new buyers. Although this greater affordability may have allowed more minority households to enter the housing market, it also exposed them to higher future risks associated with reinvestment in flood-prone areas. Meanwhile, the loss of luxury properties and concurrent growth of high-value housing (+25.29%) in neighboring parishes suggests that wealthier, predominantly White households relocated to less flood-exposed areas, taking advantage of new construction opportunities outside the disaster zones. Together, Tables 4 and 5 illustrate a clear pattern: disaster recovery processes reshaped both demographic and economic landscapes, promoting minority growth in recovering areas while accelerating wealth-based migration toward safer, higher-value housing markets.

5 DISCUSSION AND CONCLUSION

Our findings demonstrate the far-reaching impact of the 2016 floods on both demographics and housing affordability, though the latter also introduces increased risk and potential future challenges. Louisiana's disaster-declared parishes show increasing population among Black or African American and Hispanic or Latino populations compared to non-disaster areas, while the White population declined, a trend often expected after disasters. These shifts illustrate how disasters reshape communities in ways that persist long after immediate recovery and highlight that different demographic groups exhibit varying forms of vulnerability and resilience to flood events.

At the same time, the sharp decrease in high-value value houses ($1M+) in flood-affected parishes coincides with the decline of the higher-income White population, while the growth in mid-value housing ($200K-$300K) in flood-affected areas coincided with increases in Black or African American and Hispanic or Latino populations. These patterns suggest that White households may have permanently relocated from flood-affected areas to neighboring parishes, as the once higher value houses prices have fell significantly. Meanwhile, improved affordability, combined with rising incomes, may have enabled more Black or African American households to enter the housing market in flood-affected areas, where overall housing stock declined compared to non-flooded regions. Understanding these demographic shifts is essential for developing equitable flood management strategies that ensure all communities receive adequate support. Our findings underscore the importance of explicitly incorporating race, ethnicity, and socioeconomic status into disaster risk reduction planning, as traditional vulnerability assessments often fail to capture these complex and intersecting factors.

A key limitation of this study is the unavailability of ACS 1-Year Supplement Estimate data for smaller parishes (with populations under 20,000), particularly affecting analyses of White and Black populations. Future research would benefit from more granular data at the census tract or block group level to better capture neighborhood-level shifts. Additionally, survey-based research exploring how different demographic groups make relocation decisions would provide context to complement numerical findings. A statewide survey focused on displacement histories and motivations could further enhance disaster planning. The development of empirical models incorporating demographic characteristics to predict post-disaster migration would also be valuable for policymakers seeking to understand and prepare for population shifts after major events.

The August 2016 Louisiana flood provides important lessons for other coastal states. As extreme weather events become more frequent, the patterns of vulnerability, resilience, and adaptation revealed in this study can guide more effective and equitable approaches to disaster risk reduction, ultimately helping build stronger, more resilient communities.

6 REFERENCES

1. Kakinuma, K., et al., *Flood-induced population displacements in the world.* Environmental Research Letters, 2020. **15**(12): p. 124029.
2. United Nations High Commissioner for Refugees, *Global Trend- Forced Displacement in 2014*. 2015.
3. Paul, N., et al., *A predictive model for household displacement duration after disasters.* Risk Analysis, 2025.
4. El-Hinnawi, E., *Environmental Refugees*. 1985: United Nations Environment Programme.

5. Kumar, S. and S. Choudhury, *Migrant workers and human rights: A critical study on India's COVID-19 lockdown policy.* Social Sciences & Humanities Open, 2021. **3**(1): p. 100130.
6. Berlemann, M. and M.F. Steinhardt, *Climate Change, Natural Disasters, and Migration—a Survey of the Empirical Evidence.* CESifo Economic Studies, 2017. **63**(4): p. 353-385.
7. Asian Development Bank, *Addressing Climate Change and Migration in Asia and the Pacific*. 2012.
8. Reid, H., *Climate Change and Human Development*. 2014: Bloomsbury Publishing.
9. Arlikatti, S., et al., *Should I stay or should I go? Mitigation strategies for flash flooding in India.* International journal of disaster risk reduction, 2018. **27**: p. 48-56.
10. L. Perch-Nielsen, S., M. B. Bättig, and D. Imboden, *Exploring the link between climate change and migration.* Climatic Change, 2008. **91**(3-4): p. 375-393.
11. Hauer, M.E., et al., *Sea-level rise and human migration.* Nature Reviews Earth & Environment, 2020. **1**(1): p. 28-39.
12. Dun, O., *Migration and Displacement Triggered by Floods in the Mekong Delta.* International Migration, 2011. **49**(s1): p. e200-e223.
13. Sheldon, T.L. and C. Zhan, *The impact of hurricanes and floods on domestic migration.* Journal of Environmental Economics and Management, 2022. **115**: p. 102726.
14. Chumky, T., et al., *The current research landscape of disaster-induced migration: A systematic review and bibliometric analysis.* International Journal of Disaster Risk Reduction, 2022. **74**: p. 102931.
15. Islam, M.R. and M. Hasan, *Climate-induced human displacement: A case study of Cyclone Aila in the south-west coastal region of Bangladesh.* Natural hazards, 2016. **81**: p. 1051-1071.
16. Islam, M.R. and M. Shamsuddoha, *Socioeconomic consequences of climate induced human displacement and migration in Bangladesh.* International Sociology, 2017. **32**(3): p. 277-298.
17. Salauddin, M. and M. Ashikuzzaman, *Nature and extent of population displacement due to climate change-triggered disasters in the south-western coastal region of Bangladesh.* Management of Environmental Quality: An International Journal, 2011. **22**(5): p. 620-631.
18. Ahmad, D. and M. Afzal, *Flood hazards, human displacement and food insecurity in rural riverine areas of Punjab, Pakistan: policy implications.* Environmental science and pollution research, 2021. **28**(8): p. 10125-10139.
19. Black, R., et al., *The effect of environmental change on human migration.* Global Environmental Change, 2011. **21**: p. S3-S11.
20. NOAA National Centers for Environmental Information. *U.S. Billion-Dollar Weather and Climate Disasters*. 2025 [cited 2025 04/01/2025]; Available from: https://www.ncei.noaa.gov/access/billions/.
21. Elseifi, M.A., M.R. Mousa, and K. Gaspard, *Impact of the great flood of 2016 on the asphaltic concrete road infrastructure in Louisiana.* Transportation research record, 2022. **2676**(8): p. 463-474.
22. Gaspard, K., Z. Zhang, and M. Martinez, *Structural Assessment of Inundated Roadways in Livingston Parish, Louisiana With the Falling Weight Deflectometer*. 2020, Louisiana Transportation Research Center.
23. Shariatfar, M., et al., *Effects of flooding on pavement performance: a machine learning-based network-level assessment.* Sustainable and Resilient Infrastructure, 2022. **7**(6): p. 695-714.
24. Oduola, O., *Socioeconomic Vulnerability and Impact of Flooding on Urban Household Displacement and Relocation Decisions in the Gulf Coast Region of the United States: A Comparative Study of Houston, Texas and New Orleans, Louisiana*. 2020, Texas Southern University.
25. Cowles, A.G., *Effects of Historical Land-use Change on Surface Runoff and Flooding in the Amite River Basin, Louisiana, USA Using Coupled 1D/2D HEC-RAS–HEC-HMS Hydrological Modeling*. 2021: Louisiana State University and Agricultural & Mechanical College.
26. Rahman, M.S., et al. *Agriculture flood mapping with Soil Moisture Active Passive (SMAP) data: A case of 2016 Louisiana flood*. in *2017 6th International Conference on Agro-Geoinformatics*. 2017.
27. Miller, R.L., *Modeling Temporal Accessibility of an Urban Road Network during an Extreme Pluvial Flood Event.* Natural Hazards Review, 2022. **23**(4).
28. Phillippi, S.W., et al., *Medicaid utilization before and after a natural disaster in the 2016 Baton Rouge–area flood.* American journal of public health, 2019. **109**(S4): p. S316-S321.
29. Mukerji, R., *Changing Geographies of Flood Mitigation Policies: a Case Study of Central, Louisiana*. 2020, Louisiana State University and Agricultural & Mechanical College: United States -- Louisiana. p. 131.
30. Taghinezhad, A., C.J. Friedland, and R.V. Rohli, *Benefit-cost analysis of flood-mitigated residential buildings in Louisiana.* Housing and Society, 2021. **48**(2): p. 185-202.

31. Brown, V.M., et al., *How Rare Was the August 2016 South-Central Louisiana Heavy Rainfall Event?* Journal of Hydrometeorology, 2020. **21**(4): p. 773-790.
32. Van Der Wiel, K., et al., *Rapid attribution of the August 2016 flood-inducing extreme precipitation in south Louisiana to climate change.* Hydrology and Earth System Sciences, 2017. **21**(2): p. 897-921.
33. Wang, S.-Y.S., L. Zhao, and R.R. Gillies, *Synoptic and quantitative attributions of the extreme precipitation leading to the August 2016 Louisiana flood.* Geophysical Research Letters, 2016. **43**(22): p. 11,805-11,814.
34. Loh, P., et al., *Analyzing the impact of sea level rise on coastal flooding and shoreline changes along the coast of louisiana using remote sensory imagery.* The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences, 2023. **48**: p. 139-145.
35. Lotfata, A. and S. Ambinakudige, *Natural disaster and vulnerability: An analysis of the 2016 flooding in Louisiana.* southeastern geographer, 2019. **59**(2): p. 130-151.
36. Garcia-Rosabel, S., D. Idowu, and W. Zhou, *At the Intersection of Flood Risk and Social Vulnerability: A Case Study of New Orleans, Louisiana, USA.* GeoHazards, 2024. **5**(3): p. 866-885.
37. U. S. Census Bureau, *ACS 1-Year Estimates Detailed Tables HISPANIC OR LATINO ORIGIN BY RACE*. 2016, American Community Survey.
38. U. S. Census Bureau, *ACS 1-Year Supplemental Estimates HISPANIC OR LATINO ORIGIN*. 2017, American Community Survey.
39. U. S. Census Bureau, *ACS 1-Year Supplemental Estimates RACE*. 2017, American Community Survey.
40. U. S. Census Bureau, *ACS 1-Year Supplemental Estimates RACE*. 2014, American Community Survey.
41. U. S. Census Bureau, *ACS 1-Year Supplemental Estimates RACE*. 2015, American Community Survey.
42. U. S. Census Bureau, *ACS 1-Year Supplemental Estimates RACE*. 2016, American Community Survey.
43. U. S. Census Bureau, *ACS 1-Year Supplemental Estimates MEDIAN HOUSEHOLD INCOME IN THE PAST 12 MONTHS (IN 2017 INFLATION-ADJUSTED DOLLARS)*. 2017, American Community Survey.
44. U. S. Census Bureau, *ACS 1-Year Supplemental Estimates MEDIAN HOUSEHOLD INCOME IN THE PAST 12 MONTHS (IN 2016 INFLATION-ADJUSTED DOLLARS)*. 2016, American Community Survey.
45. U. S. Census Bureau, *ACS 1-Year Supplemental Estimates HOUSING VALUE*. 2016, American Community Survey.
46. U. S. Census Bureau, *ACS 1-Year Supplemental Estimates HOUSING VALUE*. 2017, American Community Survey.