

**EVALUATING CERTS' SPATIAL RELATIONSHIP TO MARGINALIZED
AND UNMAPPED COMMUNITIES**

A Thesis

by

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ABSTRACT

Freedom colonies are historic African American communities founded after the Civil War, in the post Reconstruction Era. These communities are in hazard prone areas, without spatially delineating boundaries and vanishing spatial patterns. The National Community Emergency Response Team (CERT) program, designed to train community members in basic emergency and response procedures, has gained traction since its development in 1993. This paper explores the relationship between the CERTs and these communities by spatial analysis using Geographic Information Systems (GIS). The results show that Freedom colonies have limited access to these programs and supporting response agencies although they are disproportionately more vulnerable. Implicit in the place preservation of these historic communities are emergency management and disaster response capabilities. The paper recommends that the CERT program, with its multi-scalar approach and ability to integrate, can assist these communities in their predisaster recovery efforts as well as protection of cultural and heritage resources. This can be advanced through integrating the CERT program in current place preservation programs such as homecomings and homestead maintenance in closer proximity to Freedom Colonies.

DEDICATION

To my precious nuclear family, caffeinated beverages and my Nissan Versa. Without you all, it would not have been possible.

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All other work conducted for the thesis was completed by the student independently

NOMENCLATURE

CERT	Community Emergency Response Team
COG	Council of Government
EMS	Emergency Management Services
FC	Freedom Colonies
FEMA	Federal Emergency Management Agency
H-GA	Houston Galveston Area
H-GAC	Houston Galveston Area Council
GIS	Geographic Information Systems
TXFC	Texas Freedom Colonies Project
TXFC Atlas	Texas Freedom Colonies Atlas

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1 INTRODUCTION

The National Community Emergency Response Team (CERT) program is intended to prepare citizens to respond safely to an emergency or disaster. (Flint & Brennan, 2006; Flint & Stevenson, 2010; FEMA, 2019). Capacity building in communities is employed as a preparedness tool to supplement more expensive and costly hard mitigation efforts. These teams are developed, trained, and sustained at a local level and coordinated by a first responder organization or office of emergency management (Simpson, 2001). They are designed to be the first point of localized response in a disaster in the communities which they serve.

Freedom colonies are historic African American communities founded after the Civil War, in the post Reconstruction Era (A. Roberts & Biazar, 2019). From 1865- 1920, African Americans founded at least five hundred fifty-seven (557) self-sustaining freedom colonies (FCs) (Roberts & Biazar, 2019). They were located on marginal lands in flood prone areas “in places where whites were not looking,” claiming spaces in rural areas, on the edge of former plantations, and near the outskirts of cities (Roberts, 2017). These communities, mostly agrarian based, are particularly vulnerable because of the origins of their spatial development and are located predominantly in East Texas. They were often without delineated and recognized boundaries vanishing settlement patterns, and wide-ranging levels of population. (Roberts, 2017). Biases in public planning and preservation affects, especially in rural and/or unincorporated spaces, exacerbate the challenges involved in the protection cultural resources located in these communities. Migration, displacement and heir property land loss are also some

of these reasons these communities and their residents are not easily identified. (Roberts, 2017: Roberts, 2018).

This study examines, using spatial analysis, how the Community Emergency Response Team (CERT) model, touted as a community based program designed to facilitate citizen response and preparedness (C. G. Flint & Stevenson, 2010), works in Freedom Colonies. The first section of the study provides a detailed literature review on disaster response and preparedness, the impact of race and ethnicity on disasters; and disaster response capabilities in rural areas. This will ground the discussion that details why Freedom Colonies are more vulnerable and require nuanced understanding of historical and socio-economic realities to advance community resilience in communities that remain visible and to protect those that are not. The literature review then provides background on the CERT model, how it is being currently used to support community capacity needs in predominantly black rural and/or unmapped spaces like Freedom colonies.

From the literature review and research questions, spatial analysis was used to evaluate the accessibility of CERTs in FCs. This methodology chiefly used Geographic Information Systems (GIS) to understand the spatial dimensions of accessibility and vulnerability and how this affects FCs response to disasters in Brazoria County and the Houston Galveston Area. The results are a series of maps that show the relationship and patterns between accessibility, vulnerability and visibility of FCs to CERTs in Brazoria County and the counties in the HGAC. This reveals that there are specific spatial patterns of development and socio-economic vulnerabilities that limit the capacity of these communities to respond with the presence of CERTs.

Lastly, the paper uses the results of the spatial analysis to frame the discussion, recommendations and future research of how CERTs can be utilized to increase capabilities for disaster response, pre-disaster recovery planning and community resilience in historically marginalized and at-risk communities like FCs in Texas.

1.1 Research Goal and Questions

The purpose of this thesis is to perform a qualitative review of the distribution and accessibility of CERTs using spatial analysis in Brazoria County. This spatial analysis is used to explore possible patterns and access in marginalized communities such FCs. Specifically, it seeks to understand the spatiality of Community Emergency Response Teams (CERTs) in disaster preparedness and response in black rural and/or unmapped communities like FCs. This will be done by exploring the following research questions:

- a) What is the spatial distribution of CERT teams in Brazoria County and the Houston Galveston Area in relation to Freedom Colonies, in Texas?
- b) How does presence, location, proximity to critical facilities, demographic characteristics and hazard vulnerability add to the locational relationship between CERT programs and Freedom Colonies in Brazoria County?
- c) How can spatial patterns in vulnerability and the presence/absence of CERTs in these communities from spatial analysis, inform future research for recommendations of integrating the model in the community resilience agenda for marginalized communities?

1.2 Research Hypothesis

The hypothesis of this study is the spatial distribution and accessibility of CERTs in Brazoria County is limited in Freedom colonies because of spatial realities that affect these communities including municipal status, exclusion from official city boundaries and hazard vulnerability.

1.3 Relevance of Study

This research is relevant because there is a knowledge gap that exists on how CERTs can be used as an entry point for building resilience in historically marginalized rural communities of color like freedom colonies. There were no studies found that spatially examined the effectiveness of CERTs in these communities. Although academic literature exists related to CERTs and their functions in rural communities, these communities are predominantly white (Flint & Stevenson, 2010; Flint & Brennan, 2006). The analysis of the spatial dimensions of accessibility and vulnerability that can better aid practitioners in planning for and responding in minority communities. This can inform future research on more explicit, expanded and beneficial integration of the CERT model into the community-based disaster resilience research agenda especially areas in which it integrates with heritage and place preservation.

1.4 Limitations

The following limitations were found during this study. The limitations are chiefly related to the timeframe for study as well as data availability. There are as follows:

- i. The availability of pertinent data to further validate spatial analysis results. This includes county level land use and parcel data. This may exist as Texas counties do not have the planning power to undertake land use planning. Land use data would have to be obtained from each city and merged which would take more time and create data integrity and validation issues.
- ii. The census block is the smallest geographical unit at which census data can be obtained. Some demographic information was not available at the census block level beyond 2010 Decennial Census. Census block data was not available for some areas of American Community Survey (ACS) for 2015- 2017. This ten-year-old data may not reflect more recent demographic changes.
- iii. The use of larger spatial extents of data at the census tract level may not have provided enough detail for the spatial analysis but was the spatial extent available for that dataset. This may limit the amount of detail that could be added to the spatial analysis.
- iv. The study of the CERTs and black rural communities, to substantiate the results of the spatial analysis in a more robust manner, required extensive field work.
- v. The operating capacity of CERTS and any other teams on the ground would also need to be analyzed through qualitative data collection such as interviews to provide more information.
- vi. Using only officially registered CERTs as baseline may have inadvertently left other unregistered community groups involved in response and preparedness outside the lens of research.

2 LITERATURE REVIEW

2.1 Overview

The cost of natural disasters in 2017 in the US was a historic record breaking \$306 billion (Irfan, 2017). There has been 549 major disaster declarations across the United States since 2010 (FEMA, 2019b). The frequency and intensity of hazards are expected to increase and will require local governments to effectively manage risks and vulnerabilities more efficiently and effectively. The involvement of individuals in managing their own risks in the advent of hazards have become a central part of the disaster management cycle. CERTs are designed to be the first point of response in communities, however access to these CERTs, the extent of their service area, jurisdictional restrictions and distance to critical facilities and much needed resources may impact their roles. The goal of this literature review is to explore the interaction between community typology and the accessibility of Community Emergency Response Teams (CERTs) in the disaster response and preparedness in marginalized and/or unmapped communities.

2.2 Disaster Preparedness and Response

The International Federation of Red Cross defines disaster preparedness as “measures taken to prepare for and reduce the effects of disasters”. This includes to predict, where possible, prevent disasters, mitigate their impact on vulnerable populations, and respond to and effectively cope with their consequences (IFRC, 2020). Within the National Response Framework (NRF), disaster preparedness of communities is seen as critical to the advancing effective disaster response in communities. The NRF describes ways to improve coordination and response

structures to build preparedness for catastrophic incidents to reach the National Preparedness Goal. The goal is succinctly defined as “ a secure and resilient nation with the capabilities required across the whole community to prevent, protect against, mitigate, respond to, and recover from the threats and hazards that pose the greatest risk” (FEMA, 2019c). This includes effective and realistic coordinated planning, efficiency of response agencies and volunteer organizations, community and household preparedness and response efforts (IFRC, 2020). Effective disaster preparedness and response can limit the impact on communities and livelihoods especially in the most vulnerable communities.

2.3 Vulnerability to Disasters in Rural Communities

Rurality is primarily defined regarding spatial and demographic characteristics. This includes distance from metropolitan areas, population density and administrative boundaries. A “rural area” is defined by the Texas Department of Housing and Community Affairs economic development programs as an area that:

“A) outside the boundaries of a primary metropolitan statistical area or a metropolitan statistical area; or (B) within the boundaries of a primary metropolitan statistical area or a metropolitan statistical area, if the statistical area has a population of 25,000 or less and does not share a boundary with an urban area.” (Texas Legislative Council, 2018)¹

These communities are vulnerable based on explicit realities. Community vulnerability, in its broadest sense, describes the susceptibility of a community or, importantly, its constituent parts to the harmful impacts of disasters (Van Zandt et al., 2012). When considering natural

¹ Texas Legislative Council- Research Division, (2018). *Definitions of “Rural” in Texas Statutes and the Texas Administrative Code as of April 2018*. Available at <http://www.tlc.texas.gov/policy> .

hazards, vulnerability generally refers to susceptibility or potential for experiencing the harmful impacts of a hazard event (Cutter et al., 2003). The risk to disasters in communities can be evaluated using three areas hazard exposure, physical vulnerability and social vulnerability (Kapucu et al., 2013).

Physical vulnerability is the spatial characteristics of infrastructure and exposure of community assets such as critical infrastructure to various hazards. Kapucu et al. (2013) states that rural areas are more likely to be vulnerable to lax mitigation measures because of a lack of local capacity and limited financial resources from an un-diversified tax base. A review of the Texas Statutes is evidence that certain federal and state grant programs that are based on population size may be biased towards rural areas and communities (Caruson & MacManus, 2008). This perpetuates limited infrastructure and resource development in these areas. This is linked to physical vulnerability of community assets and critical infrastructure as well as housing stock, due to age, existing damage or complete absence (Kapucu et al., 2013). These conditions are exacerbated if these rural communities are in hazard prone areas.

Social vulnerability (SV) is defined by Wisner et al. (2004) as “people's capacity to anticipate, cope with, resist and recover from the impacts of a natural hazard” (p. 11). The socioeconomic features of social vulnerability are highly complex. One feature of vulnerability often covered in rural disaster literature is the political ramifications of disasters in rural communities. Research also suggests that disasters can have significant political implications that are spurred by individuals who share a common grievance, to challenge their government about the handling of the recovery or the lack of mitigating action prior the disaster (Cutter, Mitchell, & Scott, 2000; Elliott & Macpherson, 2010; Norris, Stevens, Pfefferbaum, Wyche, &

Pfefferbaum, 2008; Waugh, 2013). Many rural areas are often characterized by poverty, out-migration of younger skilled residents, and declining educational attainment.

A study conducted through the Department of Homeland Security revealed that there is a disparity between emergency response services' (EMS) arrival time in rural, suburban and urban areas. Emergency medical service units average 7 minutes from the time of a 911 call to arrival on scene. That median time increases to more than 14 minutes in rural settings, with nearly 1 of 10 encounters waiting almost a half hour for the arrival of EMS personnel. (Mell et al., 2017). Various literature regarding the citing of emergency services in rural areas, critical to disaster response and emergency management have confirmed that there are glaring disparities between rural and urban areas (Mell et al., 2017; Chanta et al., 2014). Chanta et al. states that this disparity exists even while emergency services in rural areas are supplemented by volunteer corps and air ambulances. Among the literature reviewed on this topic, one reason was that the location model used to assist in the siting of emergency services and health care facilities. These models favor locating ambulances in more densely populated areas, resulting in longer response times for patients in more rural areas. (Chanta et al., 2014).

Within this acknowledgement of social vulnerability indicators such as gender, income levels, level of education attained, age and poverty, is also the difference in the typology of the communities and how both combine to impact the speed and quality of disaster preparedness and response. This allowed for focus to be placed on "the characteristics and diversity of populations in terms of broader social, cultural, and economic factors that shape abilities to anticipate future events, respond to warnings, and to cope with and recover from disaster impacts." (Van Zandt et al., 2012).

2.3.1 Race in Disaster Preparedness and Response

Marginalized populations are not only more likely to be vulnerable to disasters due to apparent problems of geography and resources but are also considerably disadvantaged by less obvious social and cultural phenomena (Seidenberg, 2005, p. 1). This is where the link between place, social vulnerability and the pace and quality of disaster preparedness efforts becomes most apparent. Communities of color and minority ethnicities have shown to experience disproportionate losses from disasters than non-minority communities. There are specific vulnerabilities related to race and ethnic groups in addition to the frequently examined socio-economic factors and access to resources. These include cultural and language barriers, distrust of warning messengers (e.g., government authority), lower perceived risk from emergencies, preference for particular information sources (e.g., friends and family), and lack of preparation (Bethel et al., 2013; Fothergill et al., 1999). The combination of various demographic factors influenced by systemic racism and prejudice affects the ability of some communities to mount comprehensive preparedness and mitigation efforts in the face of disaster. Although there have been case studies in rural communities, these communities were still predominantly white and therefore would not experience the impacts of the disasters as minority communities would. These impacts are made worse in the case of rural communities of color and areas of unmapped and undefined geographic status.

2.4 Disaster Response and Preparedness in Rural Communities

There has been a contribution to academic literature focused on disaster mitigation, capacity building and disaster response in rural communities and how that may differ from other communities. This research primarily resides in the fields of geography and rural sociology. The

local community, especially in rural areas, serves a variety of functions that directly contribute to social and economic well-being. Rural communities often find themselves doing more with less (Flint & Brennan, 2006), especially against the shift in disaster policy towards local participation in disaster recovery response (Brennan & Flint, 2007).

Rural communities are often at the periphery of media attention and large scale emergency response (Brennan & Flint, 2007). More and more rural communities find themselves shouldering more responsibility in emergency response, disaster mitigation and post-disaster recovery than their urban counterparts. Herbert (2005) describes this a growing trend of devolution of responsibility for meeting the emergency needs of residents under the guise of “community policing”. This puts the chief responsibility of safety and analysis of risk mostly on the members of that community. Herbert (2005) continues to explain that this devolution shifts responsibility from federal to state and state to local jurisdictions, eventually trickling down to community members themselves. The capacity of these communities to respond to local events is highly dependent on antecedent conditions within the community.

2.5 Marginalized: The Case of Texas Freedom Colonies

Freedom Colonies embody these realities and are faced with varying degrees of the challenges found in mapped rural spaces. Freedom settlements or colonies were/are independent rural communities of African American landowners (and land squatters) that formed in the South years after Emancipation (Sitton & Conrad, 2005). African Americans settled in places “where whites were not looking” (Roberts, 2017) because of limited competition for these spaces. Blacks obtained land through cash purchases, squatter rights or preemption which made homestead available for African Americans (Roberts, 2017). As a result of these conditions,

African Americans were able to obtain acreage to create self-sufficient agrarian based communities at faster rates than other Black Belt States (Roberts, 2017). These settlements were mostly concentrated in East Texas. These spaces were often hazard prone, on the fringes of major cities and existed with no to limited documentation regarding tenure and ownership. Systemic oppression and Jim Crow laws prompted the dispersion and displacement of these families giving rise to varying degrees of vulnerability and invisibility of place making and place preservation processes these communities.

The Texas Freedom Colonies Atlas is a crowdsourcing application and comprehensive database of Freedom Colony “place data” for use in grassroots preservation and to bring visibility to these spaces (Roberts, 2018; Lennox, 2020). There are five hundred and fifty seven place names of which three hundred and fifty seven (357) have been located, eighty six (86) located but requires additional research and one hundred and fourteen (114) FCs are yet to be spatially located (A. Roberts, 2018). In addition to these areas being physical and socially vulnerable and located hazard prone areas, studies have shown that biases in public planning and preservation practice further puts these communities at risk.

Roberts & Matos (2020) identifies that there is “A growing body of literature bridging urban planning and Black geographies creates discursive space for research on the relationship between place identity, cultural practices (social capital), and place preservation. Although less prevalent than studies and literature centered on white rural communities, there is growing research in many of these areas. Sociologists Marcus Anthony Hunter and Zandria F. Robinson, write about the southern “continuities and connections” among “chocolate cities,” places which are “windows into Black migration, urbanization, rural and suburban life and racial inequality” (Hunter & Robinson, 2018). This research positions emergency response and pre disaster

recovery planning as critical to place preservation in these communities that are already facing specialized and nuanced challenges in heritage preservation.

Roberts (2020) describes the challenges faced by Freedom colonies as a tripartite relationship between accessibility, visibility and vulnerability. These experiences bring to the fore the importance of understanding the role and sense of “place” of various communities. When compared to research on social vulnerability, there is less clarity on how place – more specifically, a community’s locality and governance structure – matters in emergency management and disaster preparedness.

2.5.1 Accessibility

The epistemology of "whiteness" has created boundaries and maintained homogenous space by putting distance between different groups of people and creating "Others" (Dwyer & Jones III, 2000). This is tangibly done by the creation of boundaries, management of public and private space, zoning ordinances, validation of the presence of some communities and not others in planning records and chronicling of these communities/people in planning historiographies. This epistemological influence in how spaces are recognized, categorized and hierarchized is linked to how and why different communities may fare better than other in the event of a disaster. This spatialization also created the differences in the typology of communities: rural versus urban.

Unincorporated communities of color, and more so, areas of unmapped, undefined geographic status and/or will be even more disadvantaged. These discrete geographical areas, like Freedom colonies, that cannot be conventionally categorized based on physical boundaries or a growing population are advertently or inadvertently left out of the planning scope. Counties do not have the legislative planning power and as a result these areas are lacking capital

investment and infrastructure improvements. County governments are not the oversized versions of municipal governments: they are significantly distinct in ways that affect land values, material conditions and political accountability. (Anderson, 2008, p. 1099). Durst (2014) also agrees with this in saying that while municipalities are self-determining and dynamic, counties are “fixed and immovable” (Anderson, 2008, p. 1141; Durst, 2014, p. 1704).

The spatiality involved in the affirmation and/or acceptance of “spaces” are biased towards black places of heritage like Freedom Colonies that have high incidences of diasporic citizenship and are sometimes unmapped. This in turn limits access to funds, expertise and technical cooperation for preservation in these communities (Roberts, 2018)

2.5.2 Vulnerability

This increases their vulnerability to disasters while simultaneously making them ineligible or less likely to benefit from mitigation measures than urban areas. Durst (2014) describes municipal underbounding as the “systematic failure of cities to annex surrounding minority communities”. Anderson (2008) posits a thorough analysis into the connection of similarities and differences existing between colonias and areas of “black rural poverty”, like freedom colonies. Both development patterns were previously seen as racially compartmentalized and regionally specific. Each community has historic origins based on laws and norms that entrenched racial segregation.

Anderson also details how underbounding affects the quality of local governance and provision of services. Anderson (2008, p. 1134) describes what constitutes “suitable and adequate” quality of local governance—namely, housing mobility and choice, habitability, and political access and representation. Consistently, unincorporated and unmapped areas fall into

one or both of the following categories. In one, the area lacks one or more vital infrastructure such as piped potable water, sewerage network, floodwater and storm water management systems and streetlights. In the second scenario, which often overlaps with the first, the area faces health risks and depressed land values due to a disproportionate concentration of the nearby metropolitan's locally unwanted land uses (LULUs) like landfills and sewage treatment plants; contamination from past industrial land uses and/or an uncontrolled vulnerability to natural hazards (Anderson, 2008, p. 1102). The focus of the contribution by Anderson espouses that there is limited understanding of how this spatial dimension of marginalization creates distinct social and environmental justice issues. FCs are also particularly vulnerable to natural disasters, absent from public planning records, and lack access to the funding and technical assistance afforded incorporated, urbanized, mapped places (Roberts & Biazar, 2019)

Rumbach (2016) and Aldrich (2012) theorize that place affect preparedness and recovery in chiefly four ways. Firstly, it impacts the exposure of that community and its existing households to different environmental hazards. Where communities are located is directly linked to the disasters they face. For example, communities located along floodplains are likely be susceptible to flooding. Secondly, place is directly associated with the governance mechanism that supports a community. This will in turn affect the relationship of constituents and how they interact with these structures as well. Importantly, a third way in which place affects pre and post disaster recovery efforts, is by its influence on the planning culture and approach to public participation and hazard mitigation. Finally, place is directly linked to the strength of social networks, community organizations and the reach of social capital, both of which are important for recovery in communities affected by disaster (Nakagawa & Shaw, 2004 and Aldrich, 2012)

2.5.3 Visibility

Freedom colonies are also affected by more of a temporal vulnerability and invisibility that is unlike colonias. While population in colonias continue to increase in many locations, many Freedom Colonies are yet to be located and/or mapped because racial oppression displaced many of these settlements. In contrast to colonias that have specific legislation around their movement and/or development, FCs were often never officially incorporated, have small populations, and no official representation concerning land use issues decided in Texas on the city level. (Roberts & Biazar, 2019). These communities were often unified by a one or two anchor institutions such as a church or school and a “collective belief that a community existed”². The lack of documentation of these places in planning records defy the conventional requirements of society’s definition of space making them less likely to be protected or designated as critical heritage resources. (Roberts, 2017; Roberts & Biazar, 2019).

The location of these communities in areas with increased exposure to natural hazards because of their location in hazard-prone areas; the limited likelihood of these communities to benefit from federal funding because of unincorporated status and the consequent ineligibility from participation in the planning and hazard mitigation processes, severely increase the likelihood of these communities being negatively impacted by disasters.

2.6 Social Capital in Rural Communities

Rural areas are often viewed as having more social capital than urban areas. This view is held by many common citizens, researchers and policymakers. The common perception is that in

² Sitton and Conrad, *Freedom Colonies*, p. 18

terms of city size ‘smaller is better from a social capital point of view’ (Sørensen, 2016). This view was developed based on early sociologists such as Durkheim and Tönnies. There have been various rural development policies that have encouraged rural areas to focus on their community based assets inclusive of location and natural and cultural resources. (Sørensen, 2016). The influence of social capital in rural areas have been focused on as the complexity and frequency of disasters increase. However, in various literature on rural areas, social capital is linked to wider resilience inclusive of economic development , community preparedness and recovery (Jerolleman, 2020; (Kapucu et al., 2013; Nakagawa & Shaw, 2004). An alternative approach to predisaster mitigation, which also influences the recovery process, rests on strengthening social infrastructure, like social capital, that affects community resilience (D. P. Aldrich & Meyer, 2015).

Sorensen (2014) found that specifically, rural areas significantly outperform urban areas with regards to localized trust, rate of passive and active participation in local civic associations, and various measures of local reciprocity. Second, bridging social capital was found to be marginally higher in urban areas. Specifically, urban areas tend to outperform rural areas with regards to trust towards people in general and with regards to the rate of membership in non-local civic associations. The presence strong bonding social capital in rural areas has been chronicled in various areas of scholarship including rural sociology. While there are various case studies and research papers which chronicle the adaptive capacity, importance of public participation, use of social capital and influence of community groups in disaster preparedness and response in rural communities such as Flint & Brennan, (2006), Brennan & Flint, (2007) and Cox & Perry (2011), there is limited literature that provides insight planning and disaster recovery within rural or unmapped communities of color in Texas .

Roberts & Matos (202) provides on such article on how rural to urban social capital and “adaptive liminality” can benefit black rural spaces. The article theorizes that the success found in “black meccas” can benefit rural black spaces that are consequently less visible and have less opportunities that their urban counterparts. The article aptly looks at cultural preservation practices of these rural town and their needs to preserve these spaces of ephemeral connection through social capital.

One area in which historically black neighborhoods seem to fare better than non-minority communities is the impact of social capital on disasters. The paradigm shift from emergency management and response focused disaster mechanism to one that is intrinsically tied to community resilience has brought into focus the importance of centering community members in the planning, hazard mitigation and recovery processes. Where middle-class communities were well served by the government response mechanism, it was community-based organizations that met the needs of the most vulnerable population within the locality (Chamlee-Wright & Storr, 2011b). Literature on social capital in the United States as well as those on incorporating public participation in the disaster management process, has mostly been based in states that have state-level legislation authorizing the hazard mitigation and comprehensive planning process at the local level (Chamlee-Wright & Storr, 2011b). This is evidence of Rumbach’s (2016) point that planning culture and government mechanisms are directly related to how “place” affects community preparedness and inevitably recovery. Chamlee-Wright & Storr (2011b) successfully detail how social capital can affect positive recovery outcomes through collective narratives that build community vision in redevelopment and reconstruction in a historic black community, St. Bernard’s Parish, affected by flooding post Katrina in 2005. There is support

and a thrust from practitioners to advance public participation and support in the hazard mitigation planning process as well as in long term recovery and redevelopment efforts.

These realities of devolution of responsibility in rural areas, the predominant use of bonding social capital to solve local governance needs and the disparity in service between rural and urban areas, CERTS have become a critical part of the disaster mechanism in rural areas. This paper theorizes communities of Freedom Colonies as vulnerable communities with specific realities that will affect their ability to prepare and respond to disasters and inevitably recover from them if community-based conditions are not understood. The Community Emergency Response Team (CERT) model, with its community focus and options for scale and integration, is looked at in terms of its ability to serve these communities in disaster preparedness efforts.

2.7 Community Emergency Response Teams (CERTs)

The first CERT program appeared in California in 1985, and until 1992, there were just fourteen programs, all in California (Simpson, 2001). Since 1993, CERT has impacted communities across the country, building essential skills and capabilities to prepare for and respond to any disaster. (FEMA, 2019a). According to the Federal Emergency Management Agency (FEMA) CERT website, there are now CERT programs in all 50 states inclusive of tribal nations and U.S territories with the goal of fostering a Culture of Preparedness. There are currently more than 2,700 local CERT programs nationwide with over 600,000 persons trained since CERT became a national program. (FEMA, 2019a). Today, community emergency response teams (CERTs) facilitate citizen response and preparedness and community engagement throughout America. (Brennan & Flint, 2007; Flint & Brennan, 2006; Simpson, 2001). There has been scholarly research focused on the use and possible expansion of the

CERT structure to support rural resilience because of the greater risk that rural communities face that their urban counterparts. There has been limited study of CERT teams and the expansion of their planning capabilities in historically black and underserved communities in the United States.

There have been studies that have chronicled the variance in how these CERTs are used in the local disaster mechanism at the county and even state level (Carr, 2014 ;Adagba, 2018). This research has also been skewed to states that state legislative hazard mitigation polices and in areas where the CERT model is more entrenched such as California. Adagba (2018) found that CERT programs share the same program objectives (of community preparedness), irrespective of location but differ in approach to management style and level of integration. Themes found to affect the CERT program include the following: the effects of irrecoverable time and resources of training individuals who don't commit, liability issues related to working in disasters, program ambiguity, the role of the CERT framework in response and lack of resources (Adagba, 2018, p. 110).

A research gap exists in the areas of how CERTs function in historically African American communities coping with matters of disaster preparedness and place preservation, in states which do not legislate local hazard mitigation.

2.8 Conclusion

Literature supports the expansion of the capabilities of CERTs linking back to the paradigm shift of community of resilience ((Brennan & Flint, 2007). These communities while rural, are not historically African American communities and this proves that a gap exists in current research on the capability of these teams. This location and distribution of CERTs in areas with

high concentration of African American populations such as Eastern half of Texas, as a result of slavery has not been studied and or mapped spatially. While literature supports that African American communities located in marginal flood-prone areas that are rural and/or unincorporated may face disproportionate losses in the destructive events such as Hurricane Harvey, use of CERT teams have not been posited to aid in the reduction of losses. This paper will argue that CERTS can be equipped with the capabilities to expand their current roles of mainly disaster response and triage, to long term pre and post-disaster recovery planning and preparedness. This is even more important in communities that have been historically underserved such as freedom colonies, black rural communities in Texas.

3 METHODOLOGY

In this study, spatial analysis was used to explore the relationship between the spatial distribution of CERTs and effective, equitable disaster recovery and preparation planning in marginalized communities in the Houston Galveston Area. It utilized a mixed methods research design format, qualitative data research and spatial analysis to meet the research goal. The study examined whether the Community Emergency Response Team (CERTs) model in its current format can meet the needs of historically marginalized communities based on accessibility.

3.1 Study Area Selection and Data Sources

The Houston Galveston Area was chosen because of the large numbers of Freedom Colonies located in the area as well as the area historical exposure to flooding. The varying typologies of communities ranging from rural to urban also provided various opportunities for research. Brazoria County was selected as the case study area because of historical presence of Freedom colonies as well as the changes in the demographic characteristics of the county post 1920s. The primary data source used for this study was the current database of registered CERTs in the state of Texas from the Federal Emergency Management Agency (FEMA) which was obtained through a Freedom of Information Act (FOIA) request (See Appendix).

The addresses of these CERT teams were geocoded to determine their operating location and a feature dataset was then created with this information. The Texas Freedom Colonies Atlas 2.0 (Roberts, 2018) is a crowdsourcing application used to document unmapped historic Black settlements and grassroots heritage preservations practices. This was another primary source that provided the location of Freedom colonies as well as their current status. A full feature dataset

including demographic information, critical facilities and flood related data was then created using data from the Houston Galveston Area Council of Government, Brazoria County, The Texas Freedom Colonies Project and Atlas, United States Census Bureau and Federal Emergency Management (FEMA).

The primary tool used to achieve this was Geographical Information Systems (GIS). GIS was used to spatially analyze and determine patterns in accessibility and disaster preparedness capabilities of CERTs in Brazoria County versus those in Houston Galveston Area Council of Governments (H-GAC). The data overlays used in relationship to layers of the Texas Freedom Colonies Project Atlas include location of CERTs, poverty rate by census tract, social vulnerability, spatial extent of jurisdictions and location of critical facilities.

3.2 Research Design

The study examined the capabilities of CERTs to meet disaster preparedness capabilities in historically marginalized communities such as Freedom Colonies using layers from the Texas Freedom Colonies Project. A comprehensive geodatabase was created using Community Emergency Response Team registration database after using address data to geocode their locations to create a point shapefile. Table 3-1 shows the fields of the attribute data in geodatabase the description of the data in each field. The presence and the number of CERT programs in each county in the H-GAC was determined. Not included were state level CERT programs.

The geodatabase for the Freedom Colonies was obtained from the Texas Freedom Colonies Atlas 2.0 (Roberts, 2018). For the purpose of this study, only the three hundred and fifty-seven (357) of the five hundred and fifty-seven place names (557) in the TXFC Atlas that

are cross checked from various sources, and located, were used to obtain the sample size of colonies in the Houston Galveston Area.

Table 3-1- Geodatabase fields created for CERT program information

Field Name	Description
Name	Name of the CERT team
Address	Address of the CERT team. Use as operating base and source of location for geocoding
CERT Type	Type of CERT located in the area
City	City in which the CERT is located by virtue of address
Zip Code	Zip Code of the location of the CERT
State	Texas
Program Type	CERT.
Status	Approved. Status is determined as approved for CERTs operating within the year of data obtained which would be 2019.

Source: FEMA Freedom of Information Act Request 2020-FEFO-00019. Granted November 19, 2019

They were also used to substantiate spatial analysis. The remaining crowd sourced locations of Freedom colonies will be used to substantiate results found. A geodatabase was created from the initial list of Freedom Colonies by data overlay to obtain the colonies located within the HGAC and more specifically Brazoria County.

Census tract and census block data obtained from the US Census for Brazoria County was spatially joined to tables from American Community Survey (ACS) 2013-2017 five-year estimates related to median household income, race, educational attainment and poverty status. Various spatial analysis methods were used to analyze remaining datasets when overlaid by

demographic data. This includes proximity analysis using buffers and data overlay analysis to produce multiple map products.

3.3 Creation of CERT Typology

To better aid the analysis of the distribution and accessibility of CERT programs, a typology was created based on commonalities found in the initial list of CERT programs in the state of Texas. These different types of CERTs included in the typology are County, City/Municipal, Organizational, Faith Based, Tribal. Table 4-2 shows the CERT Typology created for this research study. The following assumptions were considered in developing the typology:

- i. The operating environment for each CERT was based on its location as well as sponsoring agency. CERT programs sponsored by the County and/or the Office of Emergency management were classified as “County”. This applied to CERTs classified as “City/Municipal” CERT programs based in cities within a county as well as CERT programs defined as “Neighborhood” programs.
- ii. There is a hierarchy present in the CERT program which affects their jurisdictional extent of service. County level CERT programs have the large jurisdictional extent, city/municipal CERTs operate within their administrative boundaries and so do the Neighborhood CERTs. County CERT program would be responsible for any unincorporated areas if present.
- iii. Organizational and “Faith Based” CERT programs determine their spatial jurisdictional extent pursuant to their own program capabilities.

3.4 Assessing Spatial Indicators

- i. Proximity Analysis - Distance to critical facilities are calculated using proximity analysis through the creation of buffers. A buffer with a 5-mile (8 km) radius was created around each Freedom Colony and overlaid with the critical facilities data set to arrive at the facilities within this area.
- ii. Overlay- Various dataset were overlaid to see where there were spatial relationship using geographic information systems (GIS).
- iii. Spatial Joins- The data from one feature layer attribute table was affixed to another layer from spatial perspective. This was carried out using demographic data from the American Community Survey (ACS) and the 2010 Decennial Census which was then matched to the geographic identifier of the spatial census block or census tract shapefile.

4 RESULTS

4.1 Locational Context of Brazoria County within the Houston Galveston Area

Brazoria County is in the south-eastern section of Texas and is located along the coast. The county seat is Angleton and is located within the Houston-Galveston Council of Governments. The northern most section of the county is close to the large metropolitan area of Houston. The county most populated cities include Clute, Pearland, Angleton, Freeport, Lake Jackson and Alvin as shown in Figure 4-1. Some of the other towns in the county are Brazoria, Surfside Beach, Richwood and Hillcrest. The area has many surface streams including creeks, lakes and reservoirs including the Brazos River that runs southeasterly towards the coast.

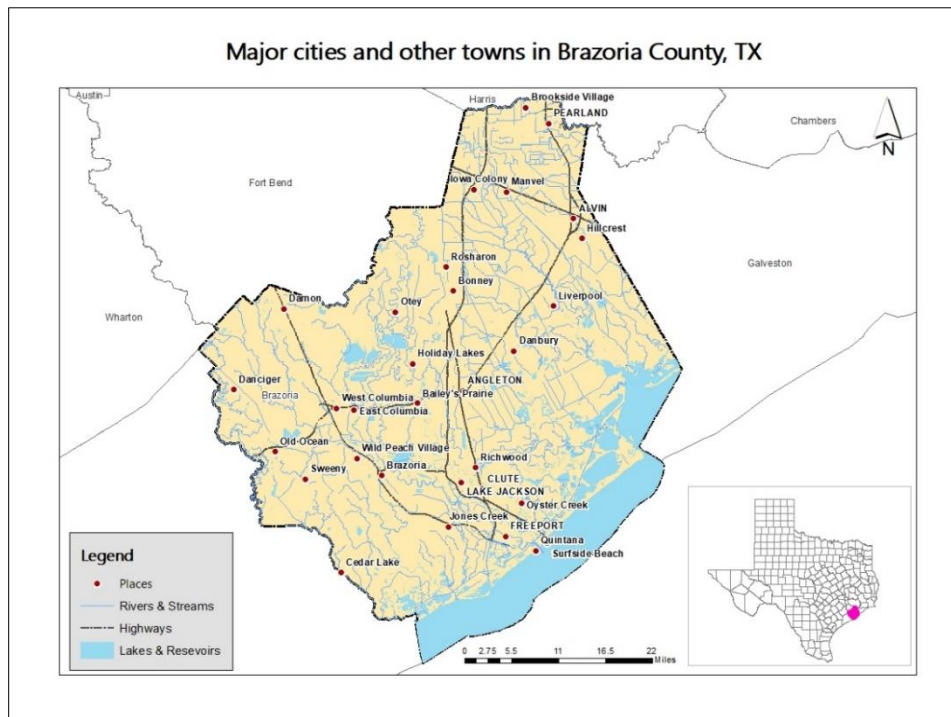


Figure 4-1- Location of towns and major cities in Brazoria County

The Houston Galveston Area Council is the voluntary local government organization that manages and cooperates across counties to address local issues related to planning and decision making for its thirteen-county membership. The counties included in this region are Austin Chambers, Colorado, Brazoria, Fort Bend, Galveston, Harris, Liberty, Montgomery, Matagorda, Walker, Waller and Wharton counties as shown in Figure 4-2. The service area is approximately 12, 500 square miles and serves more than 6 million people in South East Texas.

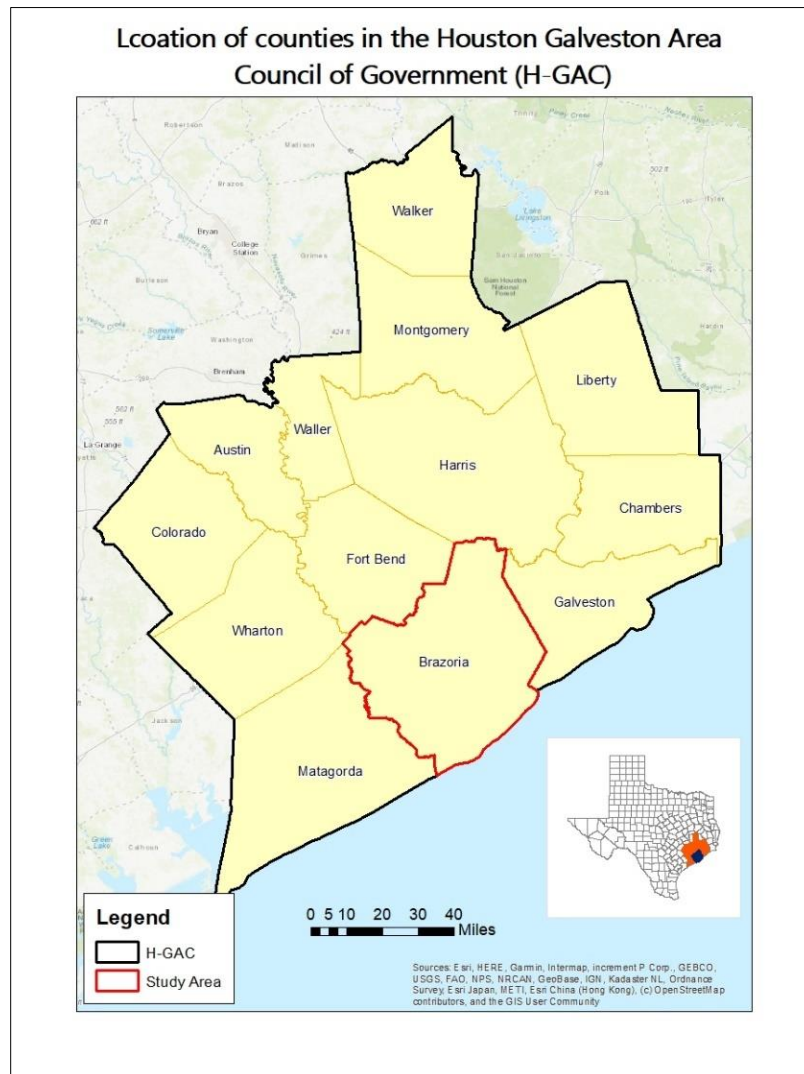


Figure 4-2- Spatial extent of Houston Galveston Area-Council (H-GAC)

4.2 Spatial Distribution of CERTs

4.1.1 Texas

The state of Texas, as of November 2019, has two hundred and twenty (220) active CERTs. FEMA defines active CERTs as CERT registered within the last year. The CERT programs are primarily concentrated in the East Texas with a few exceptions as shown in Figure 4-3.

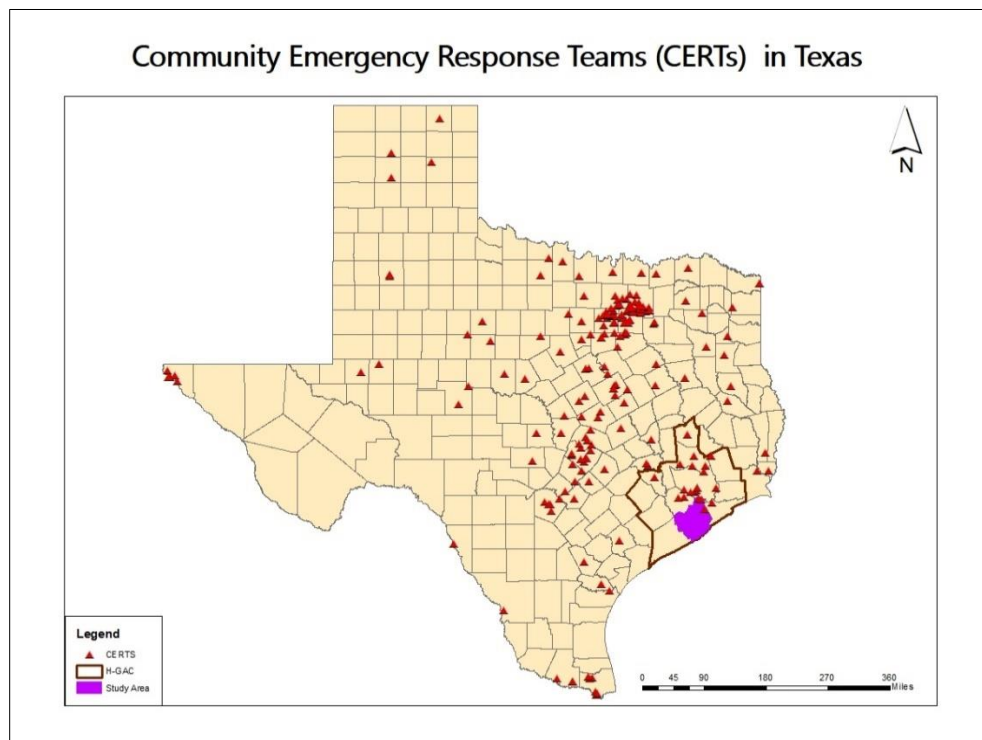


Figure 4-3- Spatial distribution of CERT programs in the state of Texas (2019)

Table 4-1 provides a typology of the various CERTs found throughout the state of Texas. This typology was created specifically for this research study and is detailed in the Methodology. It is based on raw source data captured from the Federal Emergency Management Agency (FEMA) that is collected through a web form when a CERT program is registered.

Table 4-1- Typology of Community Emergency Response Teams (CERTs)

Type of (CERTs)	Description
County	Created and/or supported by the county level Office of Emergency Management (OEM). Volunteers consist of response personnel primarily. Jurisdiction is county wide and determined legislatively.
City/Municipal	Created by city level personnel and operates through city hall or other city level organization. Volunteers consists of residents. Jurisdiction is city wide.
Organizational	Created, operated and supported by private organizations that are not affiliated with city or county level response personnel. This may include school-based and youth-oriented groups. Jurisdictions defined by organization and business processes.
Neighborhood	Created and operated by residents or a group of residents. Jurisdictions defined by neighborhood group.
Faith-Based	Created and operated by a faith-based organization and its volunteers. Jurisdiction defined by organization.
Tribal	Created and operated by a tribal nation within the jurisdiction of the of the 29 federally recognized tribes ³

Source: *FEMA Freedom of Information Act Request 2020-FEFO-00019. Granted November 19, 2019*

4.1.2 Houston- Galveston Area

The H-GAC has 10% of the total number of CERTs in the State. There are twenty-two (22) Community Emergency Response Teams (CERTs) located in the Houston-Galveston Area. Of the twenty-two (22) CERTs, nine (9) are county based, five (5) are city based, five (5) are organizational or private, two (2) neighborhood level and one (1) faith based. Figure 4-4 shows that more than 50% of the CERTs are densely located in the Greater Houston Area in Harris County. There are CERTs located in Galveston, Fort Bend, Austin, Montgomery, Liberty and the study area, Brazoria County. The location of the CERTs in most counties correspond to the location of urban built up areas, shown in pink, in the H-GAC.

³ Federal Emergency Management Agency (FEMA) Region 8 Tribal Affairs. Available at <https://www.fema.gov/fema-region-8-tribal-affairs>

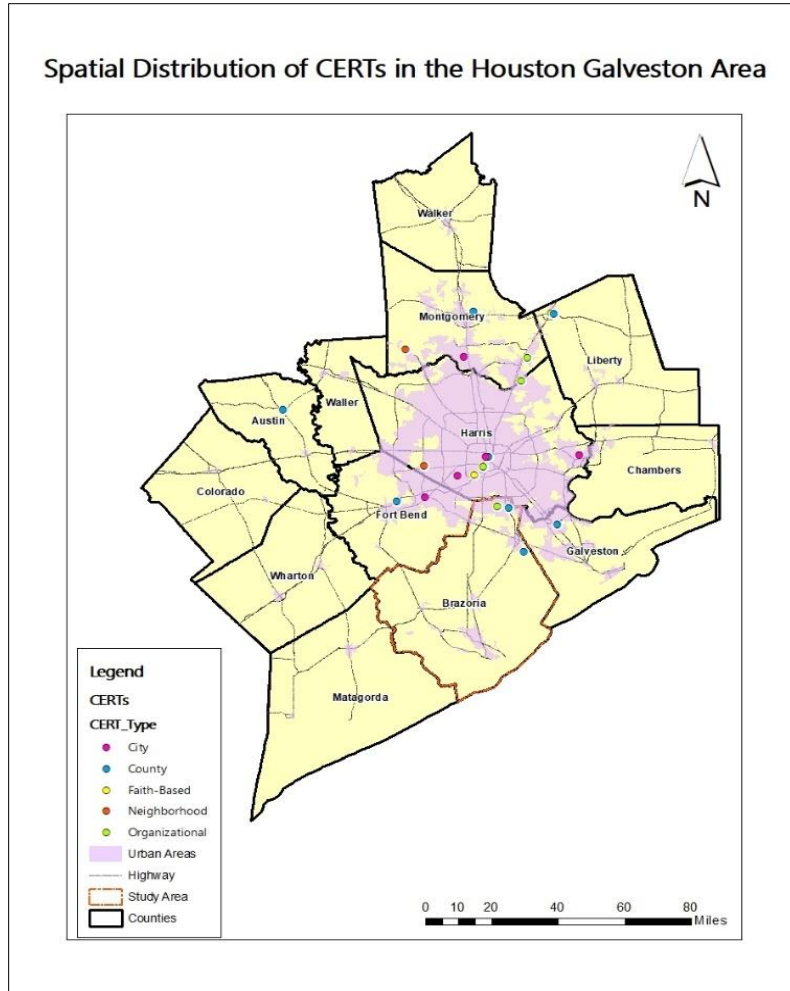


Figure 4-4- Spatial distribution of CERTs in the H-GAC

4.3 Spatial Relationship between Freedom Colonies and CERTs- H-GAC

Spatial analysis conducted using the geospatial layers from the Texas Freedom Colonies Atlas (Roberts, 2018) shows that there are fifty-four (54) Freedom Colonies located within the Houston Galveston Area. Of these fifty-four Freedom Colonies, fifty have been located and four have been located but needs more research (Roberts, 2018).

Figure 4-5 shows that the location of these settlements is mostly along floodplains of major rivers like the San Bernard River, Caney Creek and Colorado River. Their proximity to urban areas differs based on the county. Harris County, a predominantly urban county has Freedom

Colonies located within the Houston area. This is true for settlements concentrated in the western sections of the area in the counties of Waller, Wharton, Matagorda and Brazoria. The counties with the largest number of Freedom Colonies present are Harris County and Matagorda with twelve (12) and eleven (11) settlements respectively.

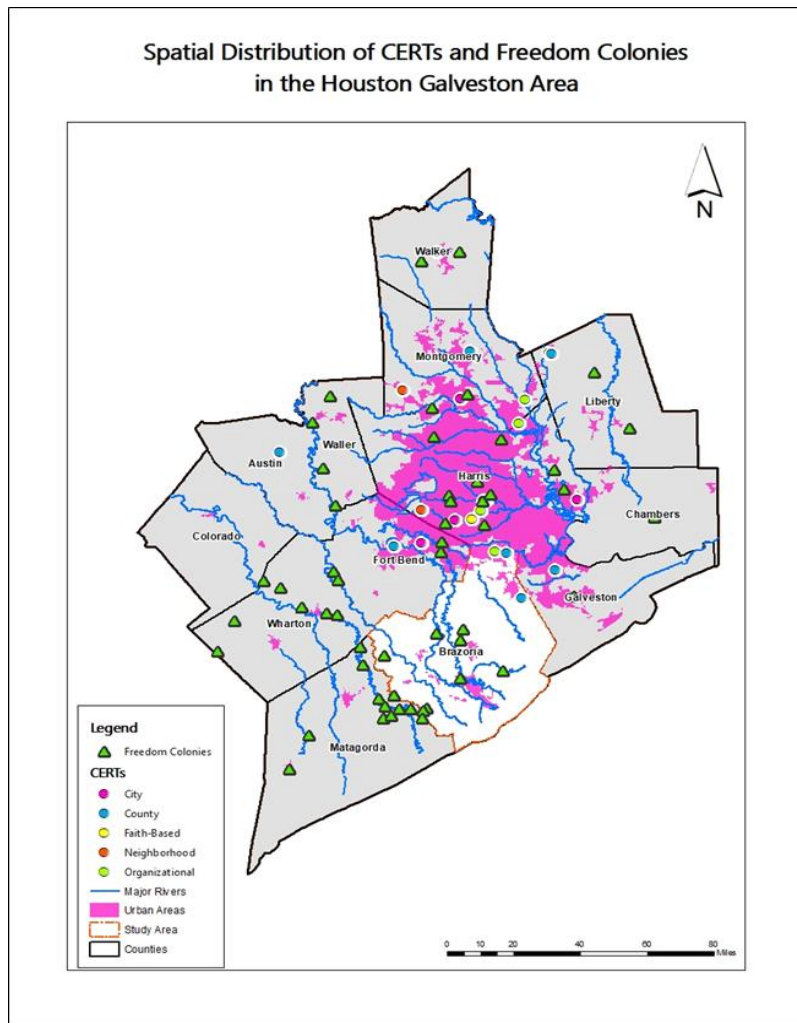


Figure 4-5- Distribution of CERTs and Freedom Colonies in the Houston Galveston Area

The location of CERTs, in most cases, do not correspond with the location of Freedom Colonies. They are concentrated in and around urban built up areas represented in purple on

Figure 4-5. The concentration of CERTs significantly declines from Harris County outwards to counties like Waller and Colorado which have no active CERTs located in the area. Table 4-3 shows the number of CERTs and Freedom Colonies in each county within the HGAC. The location and spatial distribution of Freedom colonies was obtained from the Texas Freedom Colonies Atlas 2.0 (Roberts, 2018). The study area, Brazoria County has three (3) CERTs and nine (9) Freedom Colonies.

Table 4-2- CERT program status and number of Freedom colonies in Houston Galveston Area, modified from Roberts & Biazar, 2018a.

County	No. of CERTs Active	Type of CERT Program					No. of Freedom Colonies
		C	C/M	O	N	FB	
Austin	1	√					-
Brazoria	3	√√		√			9
Chambers	-						1
Colorado	-						-
Fort Bend	2	√	√				4
Galveston	1	√					1
Harris	8	√	√√√	√√	√	√	12
Liberty	2	√		√			2
Matagorda	-						11
Montgomery	4	√	√	√	√		1
Walker	1	√					2
Waller	-						4
Wharton	-						7
Total	22						54

Legend: C- County, C/M- City Municipal, O- Organizational, N- Neighborhood and FB-Faith Based

4.4 Spatial Relationship between CERTs and Freedom Colonies in Brazoria County

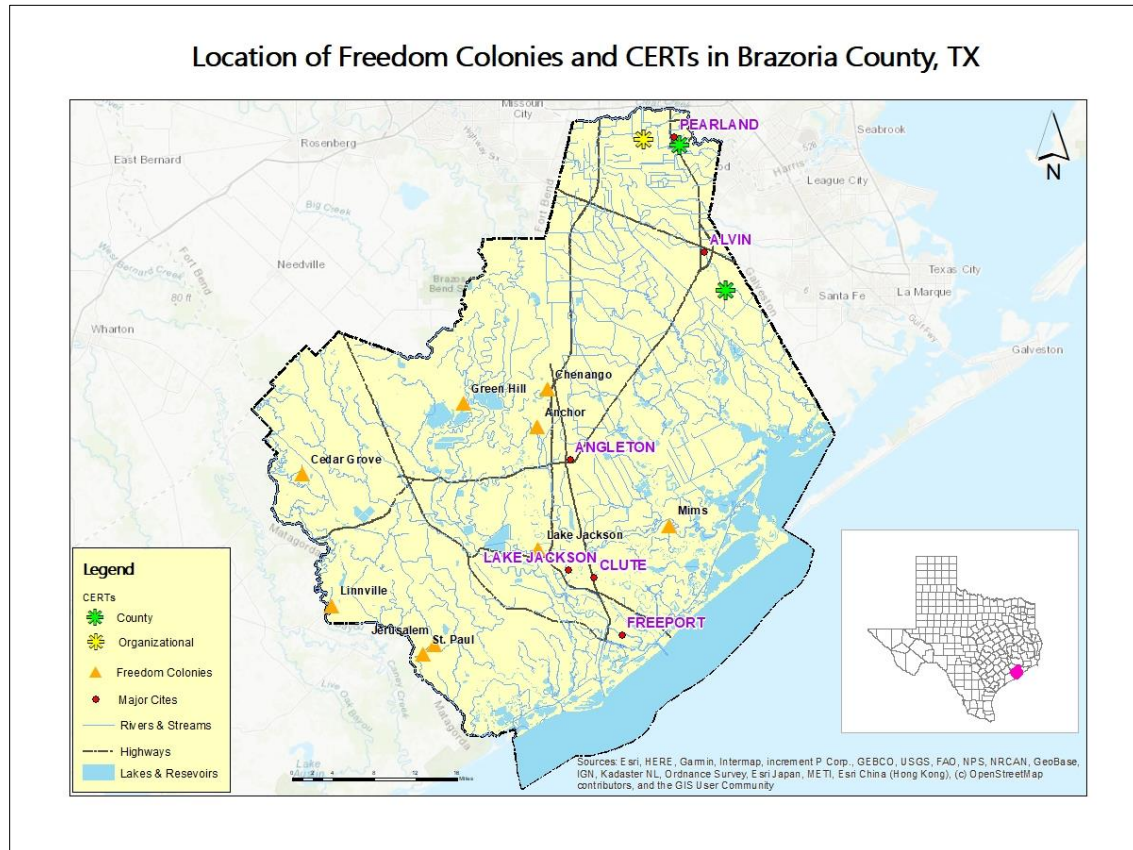


Figure 4-6- Location of Freedom Colonies in relation to CERTs

The names of the Freedom colonies located in Brazoria County are Lake Jackson, Mims, Chenango, Linnville, Jerusalem, St. Paul, Cedar Grove, Green Hill and Anchor. Freedom colonies are located west of the major highway that runs to Houston, except for Mims as shown in Figure 4-6 above. Five (5) of nine (9) freedom colonies are located around the major cities of Angleton and Lake Jackson and Clute. The other Freedom Colonies that are located further west are not near major cities as shown in Figure 4-7. The urban areas are shown by the light gray areas.

Table 4-3 shows the landmarks and cultural resources that still were present and/or are still present as the colonies that have been located. This includes historical churches, schools and other buildings that have been included in the Texas Historical Commission Handbook. Some of these sites, especially churches, are currently still community anchor institutions that promote, cultural preservation, spiritual guidance and social cohesion

Table 4-3- Historic information and landmarks for Freedom Colonies in Brazoria County adapted from Roberts & Biazar, 2018a.

Name of Colony	Status	Pop (2010)	USGS Name	THC Name
Chenango	Located	0	Chenango	Chenango
Cedar Grove	Located	0	Cedar Grove Cemetery	Cedar Grove-St. Mary's
Jerusalem	Located	0	Jerusalem School	Jerusalem Baptist Church
Lake Jackson	Located	0	Lake Jackson Farms	
Anchor	Located but needs more research	1296	Anchor	Anchor Catholic Church
Mims	Located	0	Mims	Mims Slave Cemetery
Green Hill	Located	0	Green Hill Church	
Linville	Located	0	Linnville Church	
St. Paul	Located but needs more research	492		St. Paul Baptist Church

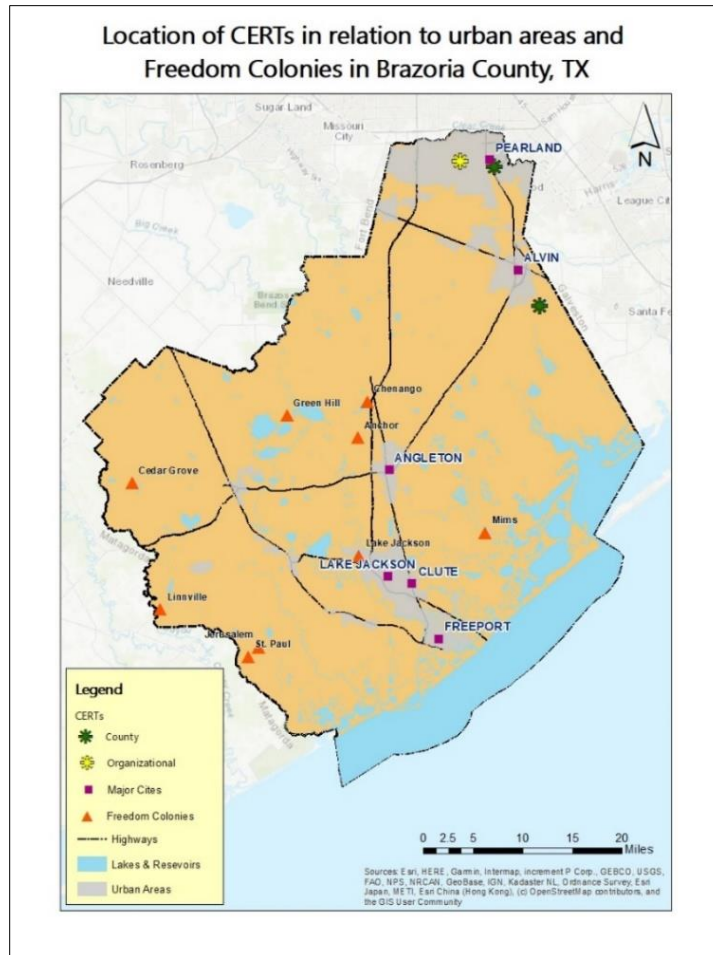


Figure 4-7- Location of Freedom Colonies and CERTS in Brazoria County

4.5 Mapping Spatial Relationships between CERTs and FCs

Different elements were analyzed to understand the socio-cultural realities that exist in the areas where CERT programs and Freedom Colonies are located using spatial analysis. In the discussion these findings will be expounded, and their possible relationships explained.

4.1.3 Spatial Distribution of African American Population

The areas in yellow on the map are census blocks where only 0%-6% of the population in that area is African American shown in Figure 4-8. The racial composition of these census

blocks exists in more than 50% of the area of the county. The areas that are shown as white on the map are uninhabited, just east of Mims. These census blocks are not populated.

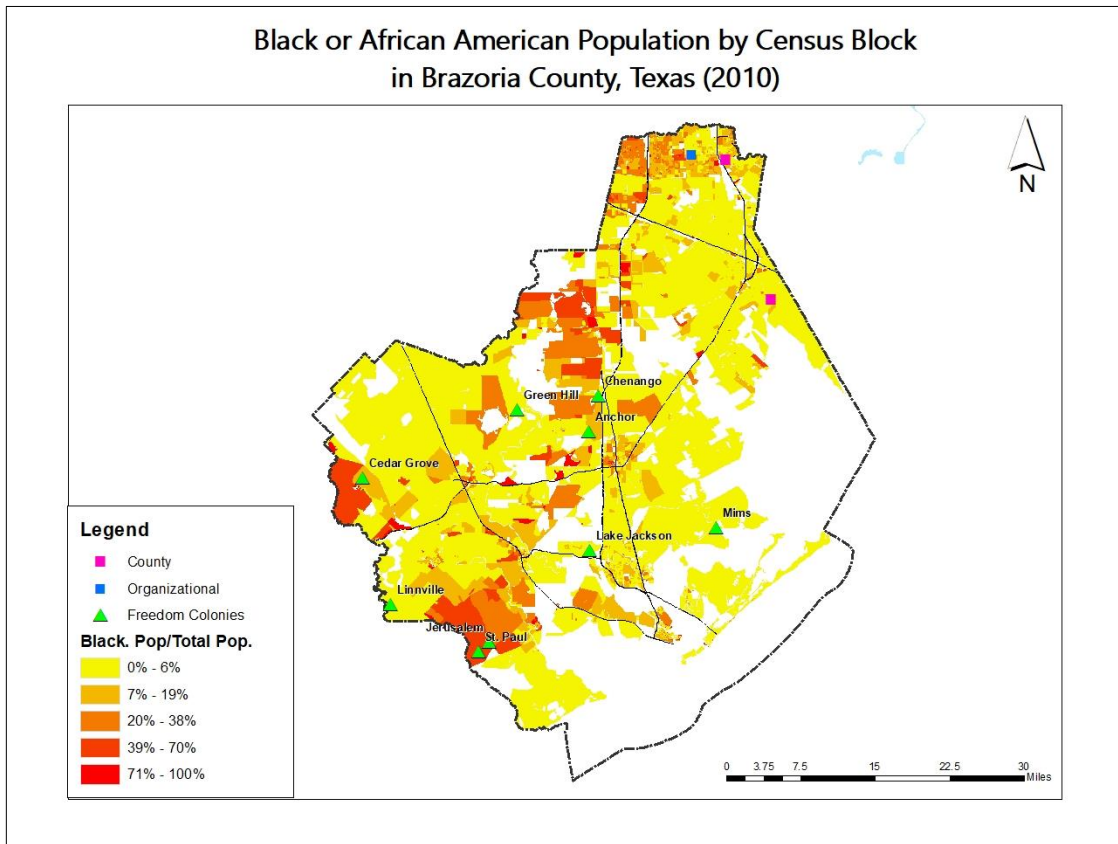


Figure 4-8- Density of African American population in Brazoria County per census block.
Source: US Census, (2010)

Census blocks with high percentage population of African Americans can also be found around the Freedom colony of Jerusalem and St. Paul as well as west of Cedar Grove. The percentage of African Americans living in those census blocks are highest, as evidenced by the darkest shade of orange. Noticeably, this increased density of African Americans extends to the north eastern end of the county closest to Houston but is interspersed with census blocks that have relatively low population of African Americans.

The African American population in Brazoria County is chiefly located in northern to central and south western section of the county with more than 20% of the population in these census blocks being African American as shown in Figure 4-8 above and in greater detail in Figure 4-9. These census blocks are concentrated in the vicinity of the Freedom Colonies of Anchor, Chenango and Green Hill near the county seat of Angleton.

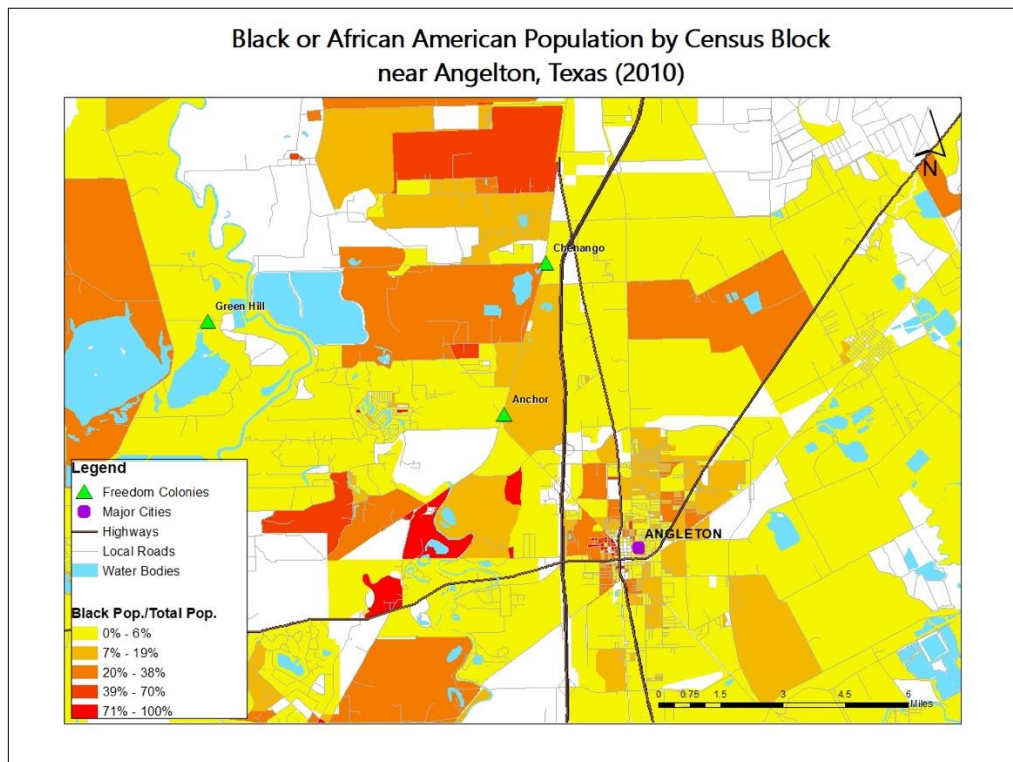


Figure 4-9- Percentage of African American population per census block near Angleton, TX

Source: US Census, (2010)

The distribution of African American population in the census blocks within major cities with nearby Freedom colonies are more nuanced. While majority of the blocks in these areas have a limited African American population present, there still exists small pockets of census blocks with high percentages of African Americans as shown in detailed maps of Lake Jackson

and Clute in Figure 4-10. The census blocks with high percentages of African American population are also in areas with rivers, lakes and or ponds or near them versus census blocks with low percentages of African American population (yellow- 0%- 6%).

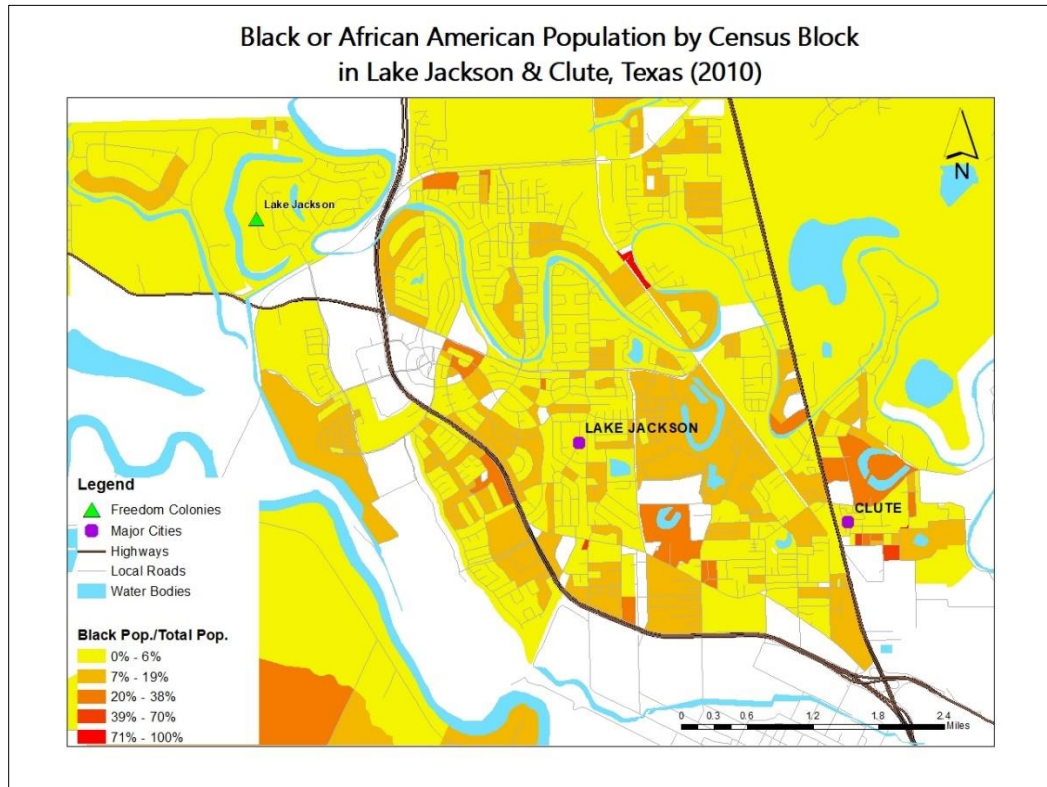


Figure 4-10- Percentage of African American population per census block in Lake Jackson and Clute, TX
Source: US Census 2010

The racial composition of census blacks surrounding the Freedom Colony of Lake Jackson is predominantly white and has the lowest percentage of African American population show in in the map above. Located further west of this area (not pictured in Figure 4-10) are census blocks with a larger percentage of African American populations.

Two CERT programs, shown by the blue and brown squares are in the northern most section of the county. These are in areas with low to medium percentages of African American population with 0-6% and 7-19% respectively shown in Figure 4-11. The organizational CERT program (blue square) and the county level CERT program (brown square), is in a predominantly white census block although census blocks within a 5 km radius of both CERTs have higher percentages of African American population. This is also true of the County Level CERT program in Alvin, TX shown in Figure 4-8.

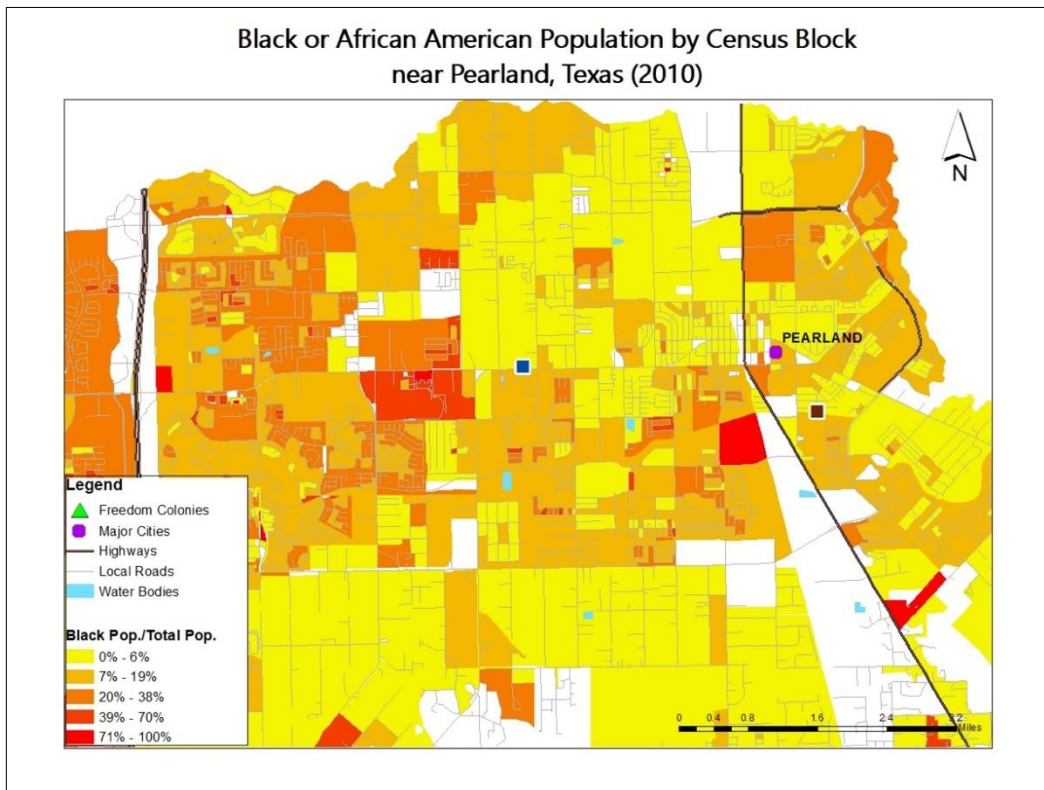


Figure 4-11- Percentage of African American population per census block and CERTs - Pearland, TX
Source: Us Census (2010)

4.1.4 Income Disparity

The comparative spatial analysis of median household income in White alone households and black households were corroborated by each. Figure 4-12 shows a comparison of median household income in black versus white alone households. In areas with middle to high median income in white households there was a commensurate absence of black households altogether or were areas of low median households' income for black families as shown in the eastern section of the county. Areas where Freedom Colonies are located have a lower median household income level than areas without Freedom colonies.

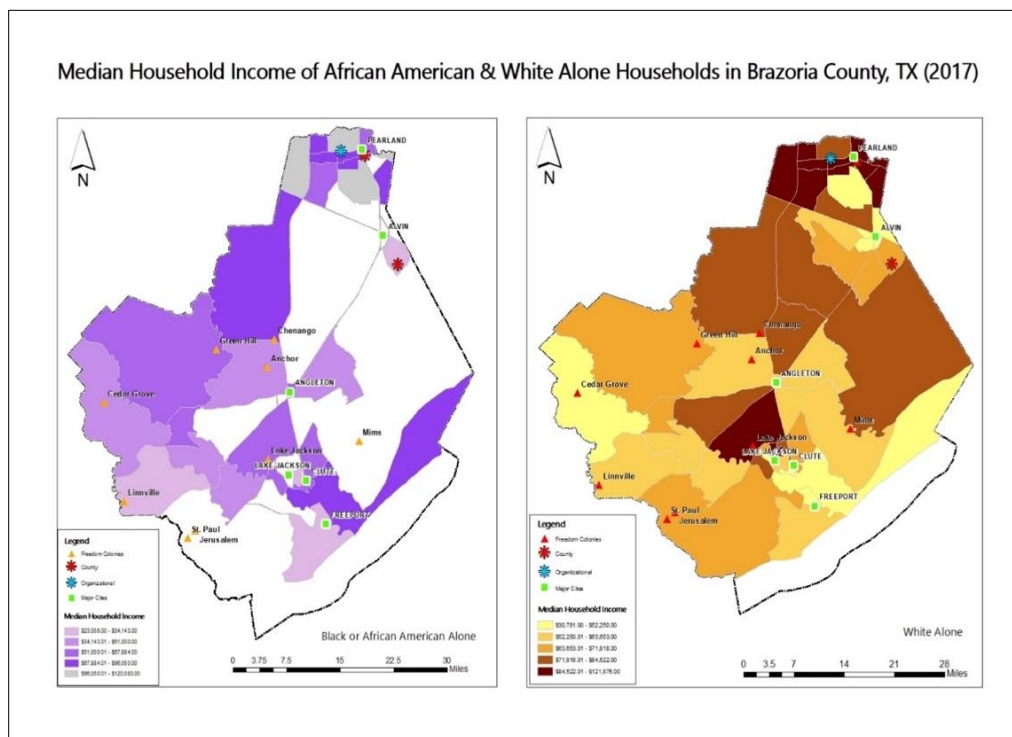


Figure 4-12- Median household income in African American alone and White alone households
Source US Census (2017a) & (2017b)

4.1.5 Concentration of Poverty

Areas in the county affected by the highest rates of poverty (19.1% - 27.8%) also indicate a concentration of African American in these areas. One dot represents 30 African Americans. The poverty level calculated at the census tract level is overlaid with more detailed population data at the census block level. The spatial extent of the dots correlates to the population distribution in Figure 4-13 below and shows that more than 60% of the African American population reside in areas of poverty rate of 9.3% - 27.8%. Areas surrounding Linnville, Cedar Grove and Lake were characterized as having higher levels of poverty but also less dense population African American population. Dense population of African Americans are in the northern section of the county around cities like Pearland located closest to Houston.

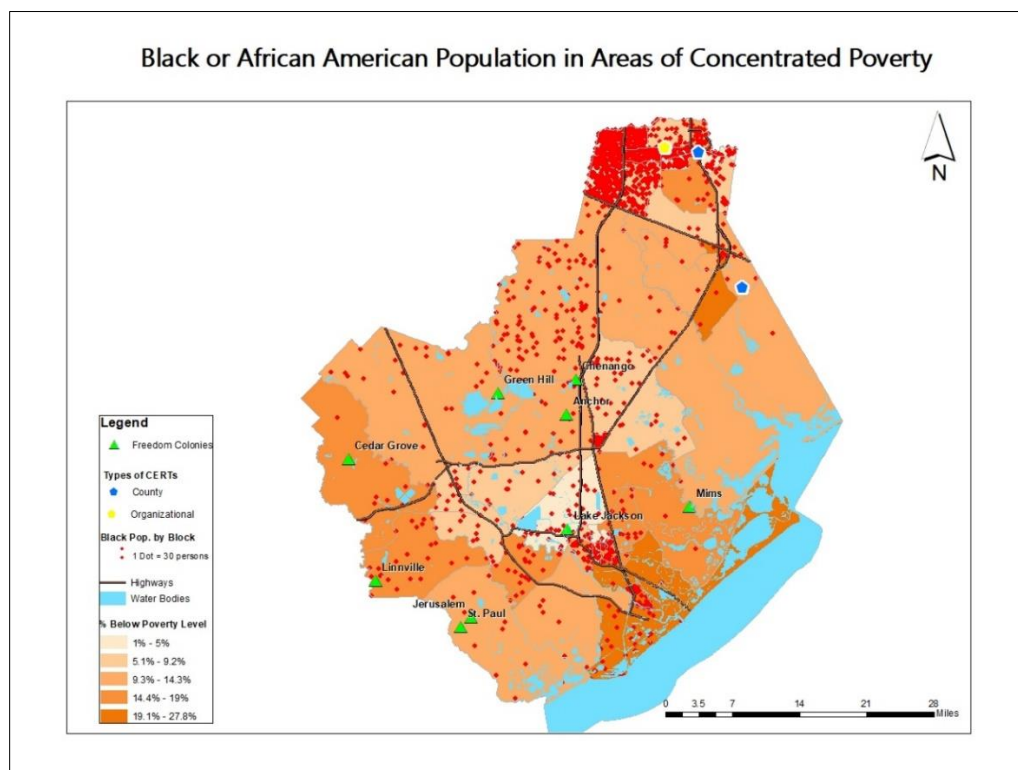


Figure 4-13-Percentage of African America population by census block living in poverty
Source: US Census (2017d)

4.1.6 Educational Attainment

Figure 4-14 shows that the highest level of education attained throughout most of the county is high school. There are however residents that have completed tertiary education. This applies for areas that are away from larger cities and are in more rural areas towards the location of the Freedom Colonies located to the west of the county. There are more persons with tertiary education located in the north of the county towards Pearland and Houston.

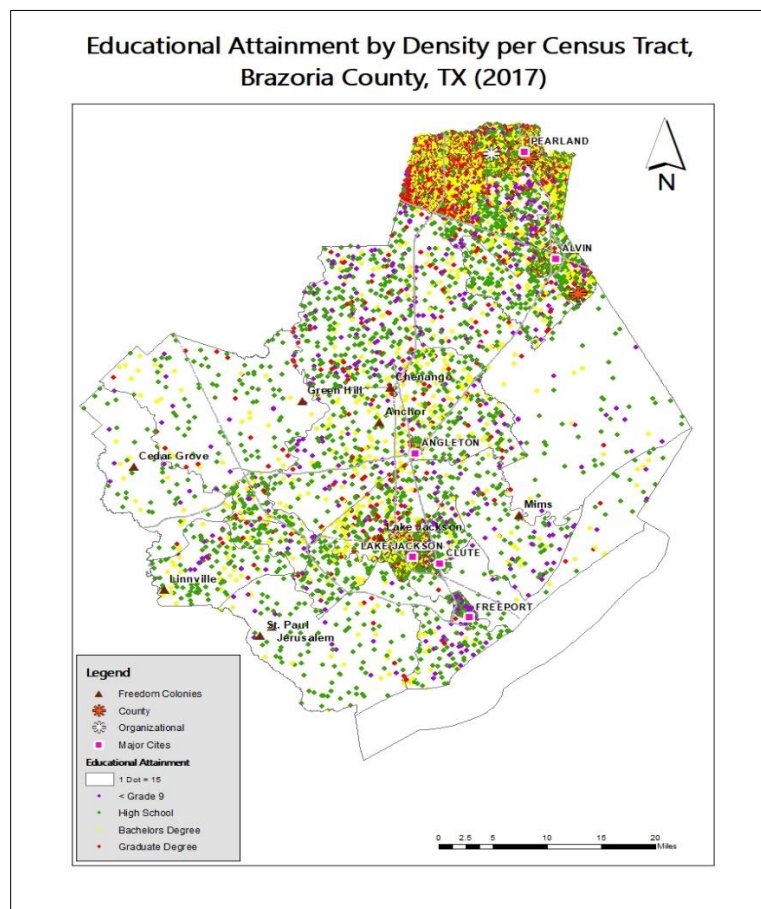


Figure 4-14- Educational attainment by census tract
Source: US Census (2017c)

4.1.7 Location of Critical Facilities

The area is served by numerous critical facilities that are located along major arterial roads shown in Figure 4-15. A proximity analysis was carried out to determine the accessibility and proximity of Freedom Colonies, CERT programs and critical facilities within a sixteen-kilometer (km) service area as shown in Figure 4-15 by a buffer created during spatial analysis. Freedom colonies of Green Hill, Cedar Grove, St. Paul and Jerusalem did not have any critical facilities within the sixteen-kilometer (16km) service area.

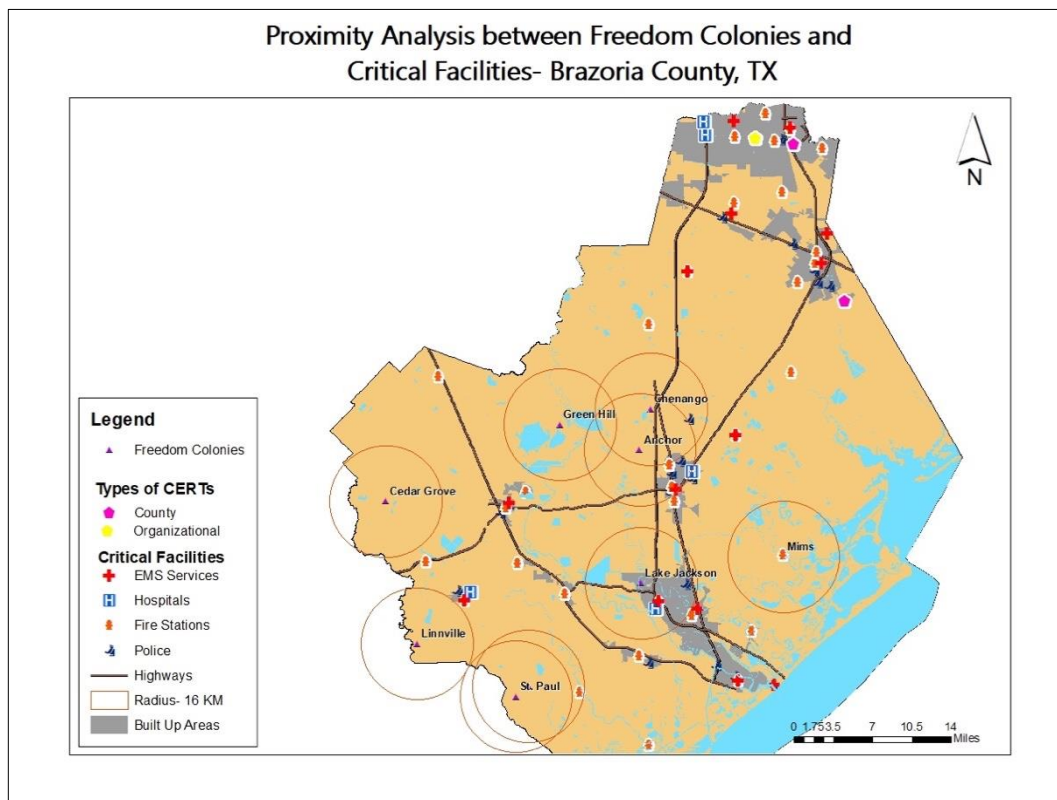


Figure 4-15- Proximity analysis: Freedom Colonies, CERTs and critical facilities

4.1.7.1 Emergency Management Services (EMS)

Of the fourteen emergency management service providers in Brazoria County only two were located within the 16 km service area of any Freedom Colony. These were the Lake Jackson Emergency Management Services which is City operated and the Angelton Area Emergency Management Services which operated by a private entity.

4.1.7.2 Fire Departments

Twenty eight of the thirty-two fire stations serving the county were volunteer fire departments. One of the four (4) permanent stations were the Brazoria Fire Department and is located closest to the cluster of freedom colonies in the city of Brazoria. The others were in Sweeney, and Freeport respectively.

4.1.7.3 Police Departments

All the police departments. but one located near the Freedom colony of Linnville, was located along arterial roads and in urban built up areas. The freedom colonies that have police departments located within their sixteen-kilometer service area are Lake Jackson, Chenango and Anchor.

4.1.7.4 Hospitals

Two hospitals are in the Pearland region and is also the general vicinity of two or three CERTs. The freedom colonies of Lake Jackson, Anchor, Chenango and Linville are in close proximity to a hospital although outside of a eight-kilometer radius. The most centrally located

hospital is near the city of Angelton in the central part of Brazoria County and is accessible through both arterial and local roads.

4.1.7.5 CERT Programs

The Two CERT programs located to the north northeast of the county near Pearland, is surrounded by various critical facilities and response agencies. The average distance of any of the two CERTs to a city run EMS is approximately five kilometers and ten kilometers to any of the two hospitals located in the same vicinity. Police Departments are also located in the same geographical area. The average distance from any of these CERT programs to a fire department is also three kilometers. The CERT program located in Alvin is also supported by several response agencies within a sixteen-kilometer service area. The average distance of these CERT programs from the nearest freedom colony of Chenango is approximately thirty-seven (37) kilometers.

4.1.8 Location in Flood Prone Areas

All the major cities as well as Freedom colonies are in FEMA special area flood zones as shown in Figure 4-16. Cities closest to the coast such as Surfside Beach, Freeport and Lake Jackson are also vulnerable to inundation from storm surges in the event of a hurricane that affect the Texas Gulf Coast. The coastline of Brazoria County has been historically affected by hurricanes and tropical storms which significantly increased the severity of flooding in the area.

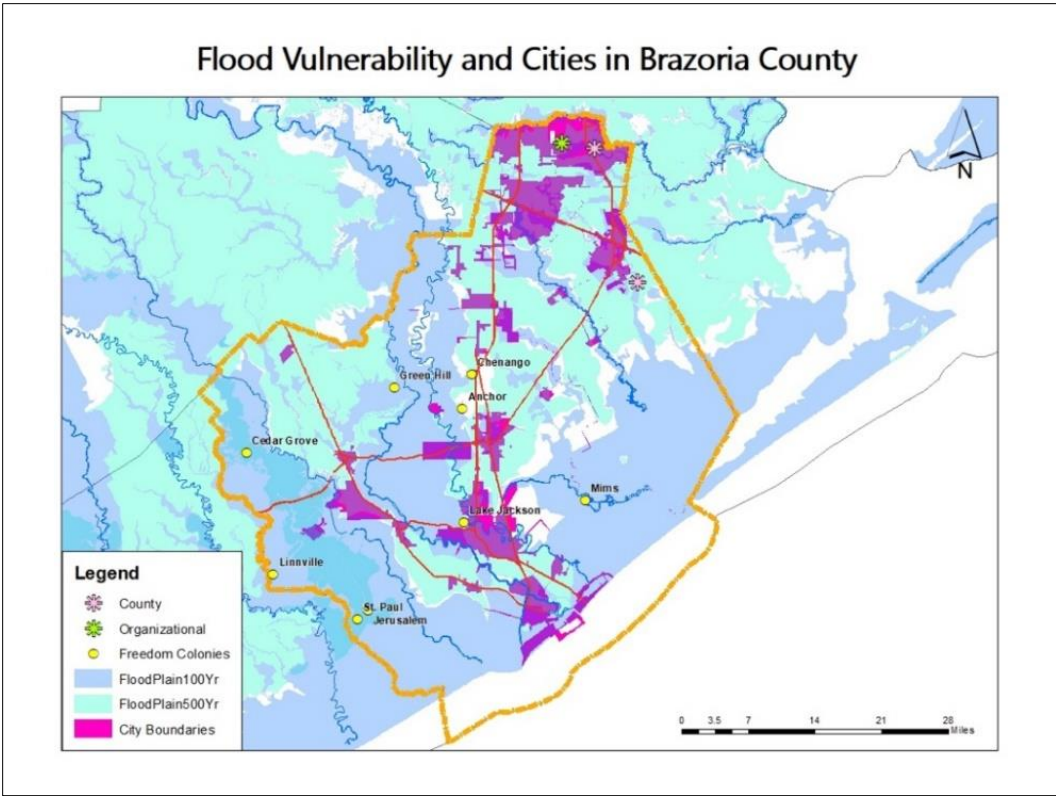


Figure 4-16- Map showing the flood vulnerability in Brazoria County, TX

5 DISCUSSION

The threats to Freedom colonies include vulnerability, visibility and access (Roberts, 2019). The study attempted to explore how pre disaster conditions in unmapped and marginalized neighborhoods affect the quality of disaster preparedness and response that can be had in the event of a disaster using spatial analysis. The study also explores, with these conditions, is the CERT model in its current form, able to meet these needs. The study also proposes future research areas and recommendation for the CERT program to be used in discrete geographies, often unmapped, like Freedom colonies.

The larger goal was to identify patterns that can contribute to future research on the use of the program in marginalized communities. Previous literature intimated that marginalized communities can suffer an unequal quality of recovery than more white homogenous neighborhoods. (Peacock, 1993; Rumbach, 2016). This reality would be even more dire if these communities failed to meet basic preparedness capabilities. The CERT Program was designed to provide members of a community with basic response training prior to the arrival of response agencies in the event of disaster or an emergency. If certain communities are unable to benefit or have not yet been able to advantage of these opportunities, then they would be more at risk from losses in the event of disaster. Understanding the spatial patterns in Brazoria County would serve as a first step in the understanding how this model can better support marginalized populations with diasporic citizenships, land tenure issues at-risk cultural resources.

The study hypothesized that the CERT model, in its current form, was unable to meet the pre and post disaster recovery needs of Freedom Colonies. These communities are extremely vulnerable to flooding, located on major rivers and in predominantly rural areas that have not

experienced comprehensive infrastructural improvement. Some freedom colonies are not currently populated making them even more vulnerable to loss as connections to the land are less tangible and mainstream to include tenure. Key landmarks are also located in these communities, that if not included in the planning process or archaeological protection, are susceptible to loss.

Freedom colonies also suffer inaccessibility of local measures of community resilience like CERTs. The spatial distribution of CERT programs in Brazoria County are confined to the larger cities of the county towards Houston. These areas are also predominantly white areas as at the 2010 Decennial Census. This applies for the county level and organizational CERT program located near Pearland as well as the county level CERT located in the city of Alvin. The fact that the closest Freedom colony of Chenango to these CERTs is approximately 37 km away speaks to the accessibility of CERTs to Freedom colonies. This is even more applicable to the county level CERT operated by the Office of Emergency Management (ORM) of Brazoria County. The average distance of the most westward Freedom Colony to any of the CERT programs in Pearland is approximately eight nine kilometers away. Comparatively the average distance from a Freedom colony to a county level CERT in Harris County is approximately 5.3 km. This shows that there is a disparity in relatively more urban and populated areas. This aligns with previous literature that rural areas are often less likely to benefit for emergency services.

Importantly all three CERTs are located within the extra territorial jurisdiction of Houston. Thus, leading to difficulties in accessing Freedom Colonies as local point of response and recovery. CERTs must register and sponsored. In analyzing the comprehensive database created more than 70% of these teams were supported by county and/city response personnel and housed within these same buildings. The limited access that these communities have within the planning

participation process because unincorporated status will limit the likelihood of them being involved in these teams. The themes espoused by Adagba (2018) may also affect the access of the Freedom colonies because these programs are not as integrated as they should be within the emergency management and disaster preparedness framework.

Spatial jurisdictions also affect the presence of CERT programs. Of the 13 counties in the Houston Galveston Area Council, 8 of these counties had county level CERT programs even if it was the only one present in the county. The initial assumption that county level CERT programs cover larger areas and are not restricted by city boundaries may be evidence of this. This matters minimally however because these programs are housed in the predominantly urban areas far from rural black spaces like Freedom Colonies.

Although the efficiency of these CERTs was not explored in this research, there are spatial dimensions that are biased against black rural and/or unincorporated spaces like Freedom Colonies. Evidenced by research proving the disparity of emergency response services in rural versus urban areas, this disparity will be emphasized in communities of color. This maybe as a result of the limited local political representation by county level government, limited resources and limited visibility in the public participation process.

6 CONCLUSIONS

The purpose of this study was to analyze the spatial dimensions that may affect how CERT programs work in Freedom colonies, which are historically marginalized and, in some cases, unmapped geographies. It was found that these communities had limited access to these programs because of their rural classification, low population density, racial characteristics as well as distance from established city and municipal jurisdictions. Freedom colonies have specific challenges based on their historic and spatial evolution and as a result are left out of robust city level hazard mitigation processes, especially for settlements that remain unincorporated and unmapped.

Critical to place preservation is predisaster recovery planning and emergency response. Specifically, the protection of these building and cultural resources such as churches and schools are important to the sustainability of these communities.

6.1 Future Research Areas

There is a need to qualify the result of this spatial analysis using qualitative and community specific data. One of the most immediate areas for research include the organization and conducting of two (single) focus group meetings with critical stakeholders from the county and city emergency response mechanism as well as and community members in these Freedom Colonies and wider Brazoria County. These focus groups will be oriented into two groups: “Users” and “Providers”. The “Providers” focus group will focus on stakeholders from the CERT programs (more specifically county or city run programs), city personnel, response

agency members and a representative from the Texas Department of Emergency Management (TXDEM). “Users” group will include community members from Freedom colonies in Brazoria County (those that currently reside in community and otherwise) and other community members from cities and communities Brazoria County.

Another research area necessary to explore the use of CERTS in these communities include looking at community organizations in Freedom colonies that may serve in unofficial disaster service worker roles and how this affect their quality of recovery. This would be important to identify how diasporic citizenship in these Freedom colonies influence the meeting of these goals.

Later areas of research to include how power dynamics, community development and local development affect predisaster capabilities in predominantly white communities versus historically marginalized communities like Freedom colonies.

6.2 Recommendations for Practice

i. CERTS for Place Preservation

CERT programs currently do not have delineated spatial boundaries of service and/or recruitment. This is beneficial to Freedom colonies that has high incidences of diasporic citizenship in which the persons connected to the space often do not reside there. The most important element in the formation of these CERTs would be a sponsoring agency. The protection of cultural resources that remain at the center of place keeping activities such as homecoming celebrations and homestead maintenance, can become sponsoring agencies.

ii. Expand Awareness Building around CERT Program

CERT programs are seemingly concentrated in more urban areas across the state of Texas in comparison to rural areas. It is recommended that Offices of Emergency Management (OEMs) specifically raise awareness of CERT programs in rural areas. Given literature on rural sociology and psychology, these communities already perform governance function considering limited amenities and opportunities for investment in these areas.

iii. Entrench CERT model in current place preservation methods in Freedom Colonies

The anchor institutions in these communities are most positioned to fill this gap and combine disaster preparedness efforts with already well established and attended homecoming and community planning initiatives. (Roberts, 2017). Faith based institutions are an intrinsic part of these communities and can act as sponsoring agencies for the registering of these CERTs so that the basic response and preparedness training can be accessed.

iv. Focus CERTS on Preparedness activities

While the variance of program integration has been documented as an issue with the use of CERTs, this may prove beneficial to marginalized and unmapped communities like Freedom Colonies. Because the only spatial element required to access this training, is the sponsoring agency, communities with large diasporic citizenship like Freedom Colonies, can take advantage of these programs.

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APPENDIX A

Appendix A- Freedom of Information Act (FOIA) Request (Case Number 2020-FEFO-00019), granted November 2019

U.S. Department of Homeland Security
500 C Street, S.W. Mail Stop 3172
Washington, DC 20472-3172



October 15, 2019

SENT VIA E-MAIL TO: i.lennox.morrison@tamu.edu

Judanne Lennox- Morrison
Graduate Research Assistant
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College Station, TX 77840

Re: **FEMA FOIA Case Number 2020-FEFO-00019**

Dear Ms. Lennox- Morrison:

This is the final response to your Freedom of Information Act (FOIA) request to the Department of Homeland Security (DHS), Federal Emergency Management Agency (FEMA), dated October 07, 2019 and received in this office on October 07, 2019. You are seeking for a registry of all the CERT teams (and Citizen Corps if necessary) in the Region VI Area.

A search of FEMA Region VI for documents responsive to your request produced one Excel spreadsheet. We are granting your request under the FOIA, Title 5 U.S.C. § 552, as amended, and DHS' implementing regulations, 6 C.F.R. Chapter I and Part 5. After carefully reviewing the responsive documents I determined that they are appropriate for public release. They are enclosed in their entirety; no deletions or exemptions have been claimed.

You have the right to appeal if you disagree with FEMA's response. The procedure for administrative appeals is outlined in the DHS regulations at 6 C.F.R. § 5.8. In the event you wish to submit an appeal, we encourage you to both state the reason(s) you believe FEMA's initial determination on your FOIA request was erroneous in your correspondence, and include a copy of this letter with your appeal. Should you wish to do so, you must send your appeal within 90 days from the date of this letter to fema-foia@fema.dhs.gov, or alternatively, via mail at the following address:

FEMA
Office of the Chief Administrative Officer
Information Management Division (FOIA Appeals)
500 C Street, SW, Seventh Floor, Mail Stop 3172
Washington, D.C. 20472-3172

As part of the 2007 amendments, the Office of Government Information Services (OGIS) was created to offer mediation services to resolve disputes between FOIA requesters and Federal agencies. You may contact OGIS in any of the following ways:
